1.1.3 Details of courses offered by the institution that focus on employability/ entrepreneurship/ skill development during the year.

1.2.1 Details of courses introduced across all programmes offered during the year

Name of the Course	Course Code	Activities/Content with a direct bearing on Employability/ Entrepreneurship/ Skill development	Link to the relevant document
Surveying	CE20APC304	Employability	https://svce.edu.in/files/naac/2023-24/crt1/1.1.3.pdf https://svce.edu.in/files/naac/2023-24/crt1/1.2.1.pdf
Fluid Mechanics and Hydraulic Machines	CE20APC303	Employability	
Structural Analysis-I	CE20APC301	Employability	
Building Materials and Concrete Technology	CE20APC302	Employability	
Soil Mechanics	CE20AES401	Employability	
Structural Analysis-II	CE20APC401	Employability	
Environmental Engineering	CE20APC402	Employability	
Design of Reinforced Concrete Structures	CE20APC501	Employability	
Highway Engineering	CE20APC502	Employability	
Foundation Engineering	CE20APC503	Employability	
Advanced Structural Analysis	CE20APE501	Employability	
Cost Effective Housing Techniques	CE20APE502	Employability	
Solid and Hazardous Waste Management	CE20APE503	Employability	
Water Harvesting and Conservation	CE20APE504	Skill Development	
Design of Steel Structures	CE20APC601	Employability	
Water Resources Engineering	CE20APC602	Employability	
Estimation Costing and Valuation	CE20APC603	Employability	
Railways, Airport and Harbor Engineering	CE20APE601	Employability	
Advanced RCC Design	CE20APE602	Employability	
Advanced Foundation Engineering	CE20APE603	Employability	
Rural Water Supply and Sanitation	CE20APE604	Employability	
Rehabilitation and Retrofitting of Structures	CE20APE701	Employability	
Advanced Water Resources Engineering	CE20APE702	Employability	
Air Pollution and Control	CE20APE703	Employability	
Transportation Safety Systems	CE20APE704	Employability	
Finite Element Methods in Civil Engineering	CE20APE705	Employability	
Disaster Management & Mitigation	CE20APE706	Employability	
Environmental Impact Assessment	CE20APE707	Employability	
Building Services & Maintenance	CE20APE708	Employability	
Construction Planning and Management	CE20APE709	Employability	
Ground Improvement Techniques	CE20APE710	Employability	
Traffic Engineering & Management	CE20APE711	Employability	
Interior Designs & Decorations	CE20APE712	Skill Development	
Elements of Building, Planning and Drawing	CE20ASC501	Skill Development	
Computer Aided Design of Structures	CE20ASC701	Employability	

Principles of Waste Management	CE20AOE502	Skill Development
Disaster Management	CE20AOE601	Skill Development
Air Pollution and Quality Control	CE20AOE701	Skill Development
Environmental Impact Analysis & Management	CE20AOE704	Skill Development
NSS/YOGA/Cultural Activities/Sports	SH20AAC401	Activities
Basic Electrical and Electronics Engineering	EE23AES101	Employability
Communicative English	EG23AHS101	Skill development
Engineering Physics	PH23ABS101	
Introduction to Programming	CS23AES101	Employability
Linear Algebra & Calculus	MA23ABS101	
Communicative English Lab	EG23AHS102	Skill development
Computer Programming Lab	CS23AES102	Employability
Electrical and Electronics Engineering Workshop	EE23AES102	Employability
Engineering Physics Lab	PH23ABS102	
Health and Wellness, Yoga and Sports	CH23ABS105	Skill development
Basic Civil & Mechanical Engineering	ME23AES101	
Differential Equations & Vector Calculus	MA23ABS201	
Electrical Circuit Analysis	EE23APC201	Employability
Engineering Chemistry	CH23ABS101	
Engineering Graphics	ME23AES102	
Electrical Circuit Analysis Lab	EE23APC202	Employability
Engineering Chemistry Lab	CH23ABS102	
Engineering Workshop	ME23AES103	Skill development
IT Workshop	CS23AES103	Skill development
NSS/NCC/Scouts & Guides / Community Service	CH23ABS106	Skill development
Complex Variables & Transforms	MA20ABS302	
Control Systems	EE20APC301	Employability
DC Machines & Transformers	EE20APC302	Employability
Semiconductor Devices and Circuits	EC20APC307	
Managerial Economics and Financial Analysis	BA20AHS301	
Business Environment	BA20AHS302	
Organizational Behavior	BA20AHS303	
DC Machines &Transformers Lab	EE20APC303	Employability
Semiconductor Devices and Circuits Lab	EC20APC308	
Control Systems & Simulation Lab	EE20APC304	Employability
Application Development using Python	IT20ASC301	
Biology For Engineers	CH20AMC301	
Logical Skills for Professionals-II	MA20AMC301	Skill development
Enhancing English Language Skills	EG20AMC301	
Data Structures using C	CS20AES401	

Numerical Methods, Probability & Statistics	MA20ABS401	
Rotating AC Machines	EE20APC401	Employability
Digital Electronics & Microprocessors	EC20AES301	
Electromagnetic Field Theory	EE20APC402	Employability
Data Structures Lab	CS20AES402	
Digital Electronics & Microprocessors Lab	EC20AES302	
AC Machines Lab	EE20APC403	Employability
Soft Skills	EG20ASC301	Skill development
Universal Human Values	BA20AHS201	
Extra Academic Activities	SH20AAC401	Skill development
Engineering Mathematics	MA20AMC401	
Linear & Digital IC Applications	EC20APC403	
Power Electronics	EE20APC501	Employability
Power System Architecture	EE20APC502	Employability
Advanced Control systems	EE20APE501	Employability
Programmable Logic Controllers	EE20APE503	Employability
Smart Grid & Electric Vehicles	EE20APE504	Employability
Principles of Waste Management	CE20AOE502	
Soft Computing Techniques	AM20AOE503	Employability
Computer Applications using programming Tools	CS20AOE501	
Basic VLSI Design	EC20AOE501	
Linear & Digital IC Applications Lab	EC20APC405	
Power Electronics & Simulation Lab	EE20APC503	Employability
Software tools for Electrical Applications development	EE20ASC501	Employability
Constitution of India	BA20AMC501	
Technical Seminar Presentation-I	EE20ATS501	Skill development
Problem Solving & Programming	IT20AMC501	Employability
Evaluation of Community Service Project	EE20ACS501	Skill development
Electrical Measurements & Sensors	EE20APC601	Employability
Power System Analysis	EE20APC602	Employability
Power System Protection	EE20APC603	Employability
Applications of Power Electronics to Renewable Energy Source	EE20APE601	Employability
Battery Technologies	EE20APE602	Employability
Energy Auditing & Energy Conservation	EE20APE603	Employability
Data Analysis Using R	CS20AOE601	
Disaster Management	CE20AOE601	
JAVA Programming	CS20AOE602	
Signal Processing	EC20AOE602	
Solar & Wind Energy Systems	ME20AOE502	Employability
Electrical Measurements & Sensors Lab	EE20APC604	Employability

Power Systems & Protection Lab	EE20APC605	Employability
Power Systems Simulation Lab	EE20APC606	Employability
Graphical System Design Using LabVIEW/ MOOCS/NPTEL	EC20ASC601	Skill development
Intellectual Property Rights & Patents	BA20AMC502	
Technical Seminar Presentation-II	EE20ATS601	Skill development
AI Tools, Techniques and Applications	AM20AMC601	Employability
Power Quality	EE20APE701	Employability
Power System Operation & Control	EE20APE702	Employability
Switched mode Power Converters	EE20APE703	Employability
Design of Photovoltaic Systems	EE20APE704	Employability
Power semiconductor Drives	EE20APE705	Employability
Utilization of Electrical Energy	EE20APE706	Employability
Electrical & Electronics Instrumentation	EE20APE707	Employability
HVDC and FACTS	EE20APE708	
Introduction to Digital Signal Processing	EC20APE603	
Air Pollution and Quality Control	CE20AOE701	
Introduction of Computer Networks	AM20A0E702	
Mobile Application Development Using Android	CS20AOE701	
Principles of Communication Engineering	EC20AOE702	
Power Generation Technologies	ME20AOE602	Employability
Cyber Security & Techniques	AM20AOE701	
Environmental Impact Analysis & Management	CE20AOE704	
Internet of Things	EC20AOE704	
Introduction to Industrial Engineering	ME20AOE703	
Mobile Computing Techniques	CS20AOE702	
Machine Learning Tools & Techniques	AM20AOE601	
E BUSINESS	BA20AHS702	Entrepreneurship
Entrepreneurship & Incubation	BA20AHS703	Entrepreneurship
Management science	BA20AHS705	Entrepreneurship
Energy Conservation and Audit MOOCS/NPTEL	EE20ASC701	Employability
Technical Seminar Presentation-III	EE20ATS701	Skill development
Project Work Stage-I	EE20APW701	Employability
Evaluation of Industrial/Research Mini Project	EE20AIP701	Skill development
Project Work Stage-II/ Full Internship in Industry	EE20APW801	Employability
Computer Organization	CA20FPC101	Employability, Skill development
Data Structures Using C	CA20FPC102	Employability, Skill development
Database Management Systems	CA20FPC103	Employability, Skill development
Accounting and Financial Management	BA20FHS101	Employability, Skill development
Mathematical Foundations for Computer Science	CA20FPC104	Employability, Skill development
Mandatory Course	CA20FMC101	Skill development

Computer Networks	CA20FPC105	Employability, Skill development
Operating Systems	CA20FPC201	Employability, Skill development
Python Programming	CA20FPC202	Employability, Skill development
OOPS through JAVA	CA20FPC203	Employability, Skill development
Probability and Statistics	MA20FBS201	Employability, Skill development
Software Engineering	CA20FPC204	Employability, Skill development
Design and Analysis of Algorithms	CA20FPC301	Employability, Skill development
Data Science & Analytics	CA20FPC302	Employability, Skill development
Web Technologies	CA20FPC303	Employability, Skill development
Cloud Computing	CA20FPC304	Employability, Skill development
Universal Human Values	CA20FMC301	Skill Development
Linear Algebra and Calculus	MA20ABS101	
Applied Physics	PH20ABS103	
Problem Solving using C	CS20AES101	
Communicative English	EG20AHS101	
Engineering Workshop	ME20AES101	
IT Workshop	CS20AES103	
Communicative English Lab	EG20AHS102	
Applied Physics Lab	PH20ABS104	
Problem Solving using C Lab	CS20AES102	
Logical Skills for Professionals-I	MA20AMC101	
Differential Equations and Vector Calculus	MA20ABS201	
Chemistry	CH20ABS103	
Basic Electrical & Electronics Engineering	EE20AES101	
Data Structures	CS20AES201	
Engineering Drawing	ME20AES102	
Engineering Graphics Lab	ME20AES103	
Chemistry Lab	CH20ABS104	
Basic Electrical & Electronics Engineering Lab	EE20AES102	
Data Structures Lab	CS20AES202	
Universal Human Values	BA20AHS201	
Speech & Oral Communication	EG20AMC101	
Discrete Mathematics & Graph Theory	MA20ABS303	
Digital Electronics & Micro processors	EC20AES301	
Computer organization	CY20APC301	
Design and Analysis of Algorithms	AM20APC301	
Python Programming	IT20APC301	
Digital Electronics &Micro processors Lab	EC20AES302	
Design and Analysis of Algorithms Lab	CY20APC302	
Python Programming Lab	IT20APC302	

Linux Administration	AM20ASC301	Skill Development
Environmental Science	CH20AMC201	
Enhancing English Language Skills	EG20AMC301	
Universal Human Values	BA20AHS201	
Number Theory	MA20ABS402	
Object Oriented Programming Through Java	CS20APC401	
Computer Networks	CY20APC401	
Operating Systems	IT20APC401	
Managerial Economics and Financial Analysis	BA20AHS301	
Business Environment	BA20AHS302	
Organizational Behavior	BA20AHS303	
Object Oriented Programming Through Java Lab	CS20APC402	
Computer Networks lab	CY20APC402	
Operating systems Lab	IT20APC402	
Exploratory Data Analysis With R	IT20ASC401	Skill Development
Design Thinking for Innovation	CS20AMC401	
NSS/YOGA/CulturalActivities /Sports	SH20AAC401	
Engineering Mathematics	MA20AMC401	
Logical Skills for Professionals-II	MA20AMC301	
Database Management Systems	CY20APC501	
Cryptography & Network Security	CY20APC503	
Formal Languages and compiler design	CY20APC505	
Basics of civil engineering	CE20AOE501	
Basic VLSI Design	EC20AOE501	
Introduction to control Systems	EE20AOE501	
Solar and wind energy systems	ME20AOE502	
Data Analytics	CY20APE501	
Artificial Intelligence	CY20APE502	
Informational Retrieval Systems	CY20APE503	
Database Management Systems Lab	CY20APC502	
Cryptography & Network Security Lab	CY20APC504	
Soft Skills	EG20ASC301	Skill Development
Connstitution Of India	BA20AMC501	
Biology of Engineers	CH20AMC301	
Technical Seminar Presentation-I	CY20ATS501	
Community Service Project	CY20ACS501	
Problem solving& Programming	IT20AMC501	
Cyber Security	CY20APC601	
Machine Learning	CY20APC603	
Ethical Hacking	CY20APC605	

Cloud Computing Big	CY20APE601	
Data Technologies	CY20APE602	
Wireless and Mobile Security	CY20APE603	
Industrial Automation	ME20AOE501	
Renewable Energy Resources	EE20AOE503	
Signal Processing	EC20AOE602	
Water Resources Planning &Management	CE20AOE603	
Cyber Security Lab	CY20APC602	
Machine Learning Lab	CY20APC604	
Ethical Hacking Lab	CY20APC606	
Fullstackdevelopment-1	AM20ASC601	Skill Development
Intellectual Property Rights &Patents	BA20AMC502	
Technical Seminar Presentation II	CY20ATS601	
AI Tools Techniques & Applications	AM20AMC601	
Privacy preserving and data publishing	CY20APE701	
Internet of Things	CY20APE702	
Deep Learning	CY20APE703	
Block Chain Technology	CY20APE704	
Natural Language Processing	CY20APE705	
Cyber Laws And Security Policies	CY20APE706	
Authentication Techniques	CY20APE707	
Cyber Physical Systems	CY20APE708	
Intrusion Detection Systems	CY20APE709	
Air Pollution and Quality Control	CE20AOE701	
Optimization Techniques Through MATLAB	EE20AOE603	
Power Generation	ME20AOE602	
Techniques Principles of Communication Engineering	EC20AOE702	
Embedded Systems	EE20AOE701	
Introduction to Image Processing	EC20AOE705	
Low Cost Housing Techniques	CE20AOE705	
Robotics in Industrial Usage	ME20AOE702	
Business Ethics and Corporate Governance	BA20AHS701	
Management Science	BA20AHS705	
Strategic Management	BA20AHS706	
Penetration Testing	CY20ASC701	
Internship	CY20AIP701	Skill Development
Project Work Stage-I	CY20APW701	
Technical Seminar Presentation-III	CY20ATS701	
Project work Stage -II or Full internship in industry	CY20APW801	
Linear Algebra & Calculus	MA23ABS101	

Introduction to Programming	CS23AES101	
Chemistry	CH23ABS101	
Basic Civil & Mechanical Engineering	ME23AES101	
Engineering Graphics	ME23AES102	
Computer Programming Lab	CS23AES102	
Chemistry Lab	CH23ABS102	
IT Workshop	CS23AES103	
Engineering Workshop	ME23AES103	
NSS/NCC/Scouts & Guides/Community Service	CH23ABS106	
Differential Equations & Vector Calculus	MA23ABS201	
Data Structures	CS23APC201	
Engineering Physics	PH23ABS101	
Communicative English	EG23AHS101	
Basic Electrical& Electronics Engineering	EE23AES101	
Electrical and Electronics Engineering Workshop	EE23AES102	
Data Structures Lab	CS23APC202	
Engineering Physics lab	PH23ABS102	
Communicative English Lab	EG23AHS102	
Health and wellness, Yoga and Sports	CH23ABS105	
Discrete Mathematics & Graph Theory	MA20ABS303	Employability
Digital Electronics & Microprocessors	EC20AES301	Employability
Computer Organization	CS20APC301	Employability
Database Management Systems	CS20APC303	Employability
Python Programming	IT20APC301	Employability
Digital Electronics & Microprocessors Lab	EC20AES302	Employability
Database Management Systems Lab	CS20APC304	Employability
Python Programming Lab	IT20APC302	Employability
Skill oriented course-I	AM20ASC301	Skill Development
Universal Human Values	BA20AHS201	Entrepreneurship
Mandatory non-credit course-II	CH20AMC201	Entrepreneurship
Enhancing English Language Skills	EG20AMC301	Entrepreneurship
Numerical Methods, Probability & Statistics	MA20ABS401	Employability
Object Oriented Programming Through Java	CS20APC401	Employability
Operating Systems	IT20APC401	Employability
Design Analysis and Algorithms	AM20APC401	Employability
Managerial Economics and Financial Analysis	BA20AHS401	Employability
Business Environment	BA20AHS402	Employability
Organizational Behaviour	BA20AHS403	Employability
Object Oriented Programming Through Java Lab	CS20APC402	Employability
Operating Systems Lab	IT20APC402	Employability

Design Analysis and Algorithms Lab	AM20APC402	Employability
Exploratory Data Analysis with R	IT20ASC401	Skill Development
Design Thinking for Innovation	CS20AMC401	Skill Development
NSS/YOGA/Cultural Activities/Sports	SH20AAC401	Activities
Engineering Mathematics	MA20AMC401	Employability
Computer Networks	IT20APC501	Employability
Data Warehousing and Data mining	IT20APC503	Employability
Formal Languages and Automata Theory	IT20APC505	Employability
Basics of Civil Engineering	CE20AOE501	Employability
Introduction to Control Systems	EE20AOE501	Employability
Industrial Automation	ME20AOE501	Employability
Basic VLSI design	EC20AOE501	Employability
Computer Applications using programming Tools	CS20AOE501	Employability
Software Engineering	IT20APE501	Employability
Cloud Computing	IT20APE502	Employability
No SQL Databases	IT20APE503	Employability
Computer Networks Lab	IT20APC502	Employability
Data Warehousing & Data Mining Lab	IT20APC504	Employability
Soft Skills	EG20ASC301	skill development
Intellectual Property Rights & Patents	BA20AMC502	Entrepreneurship
Biology for Engineers	CH20AMC301	Employability
Problem Solving and Programming (Lateral Entry Students only)	IT20AMC501	Employability
Technical SeminarPresentation-I	IT20ATS501	Employability
Evaluation of Summer Internship/Community service project	IT20ACS501	Employability
Mobile Application Development	IT20APC601	Employability
Web Programming	IT20APC603	Employability
Object Oriented Analysis Design & Testing	IT20APC605	Employability
Compiler Design	IT20APE601	Employability
Machine Learning	IT20APE602	Employability
Natural language processing	IT20APE603	Employability
Disaster Management	CE20AOE601	Employability
Electrical Power Distribution Systems	EE20AOE601	Employability
Power Generation Technologies	ME20AOE602	Employability
Signal Processing	EC20AOE602	Employability
Technical Communication and Presentation Skills	EG20AOE601	Employability
Mobile Application Development Lab	IT20APC602	Employability
Web Programming Lab	IT20APC604	Employability
Object Oriented Analysis Design & Testing Lab	IT20APC606	Employability
Amazon Web Services/MOOC-1	IT20ASC601	Skill Development
Constitution of India	BA20AMC501	Employability

AI Tools Techniques & Applications	AM20AMC601	Employability
Logical Skills for Professionals-II	MA20AMC301	Employability
Technical Seminar Presentation-II	IT20ATS601	Employability
Block Chain Technology and Applications	IT20APE701	Employability
Ad hoc Sensor networks	IT20APE702	Employability
Internet of Things	IT20APE703	Employability
Software Project Management	IT20APE704	Employability
Deep Learning	IT20APE705	Employability
Cryptography & Network Security	IT20APE706	Employability
Big data Analytics	IT20APE707	Employability
Human Computer Interaction	IT20APE708	Employability
Agile Methodologies	IT20APE709	Employability
Air Pollution and Quality Control	CE20AOE701	Employability
Embedded Systems	EE20AOE701	Employability
Robotics in Industrial Usage	ME20AOE702	Employability
Sensors & Systems	EC20AOE703	Employability
Mobile Computing Techniques	CS20AOE702	Employability
Low-Cost Housing Techniques	CE20AOE7O5	Employability
Energy Storage Systems	EE20AOE702	Employability
Introduction to Product Marketing	ME20AOE704	Employability
Internet of Things	EC20AOE704	Employability
Cyber Security Techniques	AM20A0E701	Employability
Business Ethics and Corporate Governance	BA20AHS701	Employability
Management Science	BA20AHS705	Employability
Strategic Management	BA20AHS706	Employability
MOOC-2 (NPTEL)/Advanced Web Programming	IT20ASC701	Skill Development
Evaluation of Internship	IT20AIP701	Employability
Project Work Stage -I	IT20APW701	Employability
Technical Seminar Presentation-III	IT20ATS701	Employability
Basic Civil & Mechanical Engineering	ME23AES101	Employability
Engineering Graphics	ME23AES102	Employability
Engineering Physics	PH23ABS101	Employability
Introduction to Programming	CS23AES101	Employability
Linear Algebra & Calculus	MA23ABS101	Employability
Computer Programming Lab	CS23AES102	Employability
Engineering Physics Lab	PH23ABS102	Employability
Engineering Workshop	ME23AES103	Employability
IT Workshop	CS23AES103	Employability
Health and Wellness, Yoga and Sports	CH23ABS105	Activities
Basic Electrical & Electronics Engineering	EE23AES101	Employability

Communicative English	EG23AHS101	Employability
Data Structures	CS23APC201	Employability
Differential Equations & Vector Calculus	MA23ABS201	Employability
Chemistry	CH23ABS101	Employability
Communicative English Lab	EG23AHS102	Employability
Data Structures Lab	CS23APC202	Employability
Chemistry Lab	CH23ABS102	Employability
Electrical & Electronics Engineering Workshop	EE23AES102	Employability
NSS/NCC/Scouts & Guides/Community Service	CH23ABS106	Activities
MANAGEMENT & ORGANIZATIONAL BEHAVIOUR	BA20EPC101	Employability
BUSINESS ENVIRONNENT & LAW	BA20EPC102	Employability
MANAGERIAL ECONOMICS	BA20EPC103	Employability
ACCOUNTING FOR MANAGEMENT	BA20EPC104	Employability
BUSINESS STATISTICS	BA20EPC105	Employability
BUSINESS COMMUNICATION	BA20EPC106	Employability
INFORMATION TECHNOLOGY FOR MANAGERS	BA20EPC107	Employability
BUSINESS COMMUNICATION LAB	BA20EPC108	Skill development
PERSONALITY DEVELOPMENT (AUDIT COURSE)	BA20EAC109	Entrepreneurship
HUMAN RESOURCE MANAGEMENT	BA20EPC201	Employability
MARKETING MANAGEMENT	BA20EPC202	Employability
BUSINESS RESEARCH METHODS	BA20EPC203	Employability
FINANCIAL MANAGEMENT	BA20EPC204	Employability
OPERATIONS RESEARCH	BA20EPC205	Employability
OPERATIONS MANAGEMENT	BA20EPC206	Employability
MANAGEMENT INFORMATION SYSTEM	BA20EPC207	Employability
BUSINESS ANALYTICS LAB	BA20EPC208	Skill development
WORLD TRADE ORGANIZATION AND INTELLECTUAL PR(	BA20EAC209	Entrepreneurship
Cost and Management Accounting	BA20EPE303	Employability
Product and Brand Management	BA20EPE304	Employability
Human Resource Development	BA20EPE305	Employability
Mobile Commerce	BA20EPE306	Employability
Financial Institutions and Services	BA20EPE307	Employability
Consumer Behavior	BA20EPE308	Employability
Labor laws and Legislation	BA20EPE309	Employability
Supply Chain Management	BA20EPE310	Employability
Investment and Portfolio Management	BA20EPE311	Employability
Retail Management	BA20EPE312	Employability
Performance Management	BA20EPE313	Employability
Enterprise Resource Planning	BA20EPE314	Employability
Mergers and Acquisitions	BA20EPE315	Employability

Advertising and Sales Promotion Management	BA20EPE316	Employability
Knowledge Management	BA20EPE317	Employability
Data warehousing and Mining	BA20EPE318	Employability
Financial Derivatives	BA20EPE403	Employability
Services Marketing	BA20EPE404	Employability
Organization Development	BA20EPE405	Employability
Data Communication and Network Analysis	BA20EPE406	Employability
International Financial Management	BA20EPE407	Employability
International Marketing	BA20EPE408	Employability
Global Human Resource Management	BA20EPE409	Employability
Corporate Information Management	BA20EPE410	Employability
Introduction to Data Science	DS23APC301	Employability
Data Science Lab	DS23APC302	Employability
Data Engineering	DS23APC401	Employability
Data Engineering Lab	DS23APC402	Employability
Exploratory Data Analysis with Python	DS23ASC401	Employability
Computer System Architecture	DS20APC401	Employability
Computer Organization and Electronics Lab	DS20APC402	Employability
NSS/NCC/Scouts & Guides/Community Service	CH23ABS106	Activities
Internet of Things	DS20ASC401	Employability
Artificial Intelligence& Machine Learning	DS20APC501	Employability
Automata theory and Compiler	DS20APC503	Employability
Design		Employability
Data Analytics	DS20APC505	Employability
Data Visualization Techniques	DS20APE501	Employability
Information Storage Management	DS20APE502	Employability
Data Warehousing Data Mining	DS20APE503	Employability
Artificial Intelligence& Machine Learning Lab	DS20APC502	Employability
Data Analytics Lab	DS20APC504	Employability
Big Data Analytics	DS20APC601	Employability
Cloud Computing	DS20APC603	Employability
Natural Language Processing	DS20APC605	Employability
Data science for Business	DS20APE601	Employability
Informational Retrieval	DS20APE602	Employability
Computer networks	DS20APE603	Employability
Big Data Analytics Lab	DS20APC602	Employability
Cloud Computing Lab	DS20APC604	Employability
Natural Language Processing Lab	DS20APC606	Employability
Block Chain Technology	DS20APE701	Employability
Predictive Analytics	DS20APE702	Employability

Software Engineering and software project management	DS20APE703	Employability
Deep Learning	DS20APE704	Employability
Process Mining	DS20APE705	Employability
Advanced Databases	DS20APE706	Employability
Video Analytics	DS20APE707	Employability
Business Intelligence	DS20APE708	Employability
Cryptography & Network Security	DS20APE709	Employability
Digital &Social Media Marketing	DS20ASC701	Skill development
Surveying	CE20APC304	Employability
Elements of Building, Planning and Drawing	CE20ASC501	Employability
Computer Aided Design of Structures	CE20ASC701	Employability
Principles of Waste Management	CE20AOE502	Skill Development
Disaster Management	CE20AOE601	Skill Development
Air Pollution and Quality Control	CE20AOE701	Skill Development
Environmental Impact Analysis & Management	CE20AOE704	Skill Development
Linear Algebra & Calculus	MA23ABS101	Employability
Introduction to Programming	CS23AES101	Employability
Chemistry	CH23ABS101	Employability
Basic Electrical & Electronics Engineering	EE23AES101	Employability
Engineering Graphics	ME23AES102	Employability
Computer Programming Lab	CS23AES102	Employability
Chemistry Lab	CH23ABS102	Employability
IT Workshop	CS23AES103	Employability
Electrical and Electronics Engineering Workshop	EE23AES102	Employability
NSS/NCC/Scouts & Guides/Community Service	CH23ABS106	Employability
Differential Equations & Vector Calculus	MA23ABS201	Employability
Data Structures	CS23APC201	Employability
Engineering Physics	PH23ABS101	Employability
Communicative English	EG23AHS101	Skill Development
Basic Civil & Mechanical Engineering	ME23AES101	Employability
Engineering Workshop	ME23AES103	Employability
Data Structures Lab	CS23APC202	Employability
Engineering Physics lab	PH23ABS102	Employability
Communicative English Lab	EG23AHS102	Employability
Health and wellness, Yoga and Sports	CH23ABS105	Employability
Discrete Mathematics & Graph Theory	MA20ABS303	Employability
Design and Analysis of Algorithms	AM20APC301	Employability
Computer Organization and Architecture	AM20APC303	Employability
Database Management Systems	CS20APC303	Employability
Python Programming	IT20APC301	Employability

Algorithms Lab	AM20APC302	Employability
Database Management Systems Lab	CS20APC304	Employability
Python Programming Lab	IT20APC302	Employability
Linux Administration	AM20ASC301	Employability
Enhancing English Language Skills	CH20AMC201	Skill Development
Environmental Science	EG20AMC301	Employability
Universal Human Values	BA20AHS201	Employability
Numerical Methods, Probability and Statistics	MA20ABS401	Employability
Numerical Methods, Probability and Statistics	CS20APC401	Employability
Object Oriented Programming Through Java	IT20APC401	Employability
Operating Systems	EC20AES301	Employability
Digital Electronics & Microprocessors	BA20AHS301	Employability
Humanities Elective-I	BA20AHS302	Employability
Managerial Economics and Financial Analysis	BA20AHS303	Employability
Business Environment	CS20APC402	Employability
Organizational Behavior	IT20APC402	Employability
Object Oriented Programming Through Java Lab	EC20AES302	Employability
Operating Systems Lab	IT20ASC401	Employability
Digital Electronics & Microprocessors Lab	CS20AMC401	Employability
Skill Oriented Course-II	AM20APC501	Skill Development
Exploratory Data Analysis With R	AM20APC503	Employability
Mandatory non-credit course-III	AM20APC504	Employability
Design Thinking for Innovation	CE20AOE501	Employability
NSS/YOGA/Cultural Activities/Sports	EC20AOE501	Employability
Engineering Mathematics	EE20AOE501	Employability
Artificial Intelligence	AM20APE501	Employability
Data Warehousing and Data mining	ME20AOE502	Employability
Formal Languages and Compiler Design	AM20APE503	Employability
Basic VLSI Design	AM20APC502	Employability
Artificial Intelligence& Data Mining Tools Lab	AM20APC505	Employability
Compiler Design Lab	AM20APC506	Employability
Soft Skills	EG20ASC301	Skill Development
Constitution of India	BA20AMC501	Employability
Biology for Engineers	CH20AMC301	Employability
Community Service Project	AM20ATS501	Employability
Problem solving & Programming	AM20ACS501	Employability
Big Data Analytics	AM20APC603	Employability
Machine Learning	AM20APC605	Employability
Natural Language Processing	AM20APE601	Employability
Cloud computing	AM20APE602	Employability

Computer Applications using programming Tools and Techniques	AM20APE603	Employability
Software Project Management	ME20AOE501	Employability
Industrial Automation	EE20AOE503	Employability
Renewable Energy Resources	EC20AOE602	Employability
Signal Processing	CE20AOE603	Employability
Big Data Analytics Lab	AM20APC604	Employability
Machine Learning Lab	AM20APC606	Employability
Full stack development-1	AM20ASC601	Employability
Intellectual Property Rights & Patents	BA20AMC502	Employability
Technical Seminar Presentation II	AM20ATS601	Employability
Logical Skills for Professionals - II	AM20AMC601	Employability
Intelligent Information Retrieval Systems	AM20APE701	Employability
Internet of Things	AM20APE702	Employability
Recommender Systems	AM20APE703	Employability
Block Chain Technology	AM20APE704	Employability
Data Visualization	AM20APE705	Employability
Ethical Hacking	AM20APE706	Employability
Agile Methodologies	AM20APE707	Employability
Deep Learning	AM20APE708	Employability
Design Patterns	AM20APE709	Employability
Air Pollution and Quality Control	CE20AOE701	Employability
Optimization Techniques Through MATLAB	EE20AOE603	Employability
Power Generation Techniques	ME20AOE602	Employability
Principles of Communication Engineering	EC20AOE702	Employability
Emebedded Systems	EE20AOE701	Employability
Introduction to Image Processing	EC20AOE705	Employability
Low Cost Housing Techniques	CE20AOE705	Employability
Robotics in Industrial Usage	ME20AOE702	Employability
Business Ethics and Corporate Governance	BA20AHS701	Employability
Management Science	BA20AHS705	Employability
Strategic Management	BA20AHS706	Employability
Full stack development-2	AM20ATS701	Employability
Internship	AM20ATS702	Employability
Basic Electrical & Electronics Engineering	EE23AES101	
Chemistry	CH23ABS101	
Communicative English	EG23AHS101	
Introduction to Programming	CS23AES101	
Linear Algebra & Calculus	MA23ABS101	
Chemistry lab	CH23ABS102	
Communicative English Lab	EG23AHS102	

Computer Programming Lab	CS23AES102	
Electrical & Electronics Engineering Workshop	EE23AES102	
NSS/NCC/Scouts & Guides/Community Service	CH23ABS106	
Basic Civil and Mechanical Engineering	ME23AES101	
Differential Equations & Vector Calculus	MA23ABS201	
Engineering Graphics	ME23AES102	
Engineering Physics	PH23ABS101	
Network Analysis	EC23APC201	
Engineering Physics Lab	PH23ABS102	
Engineering Workshop	ME23AES103	
IT Workshop	CS23AES103	
Network Analysis and Simulation Laboratory	EC23APC202	
Health and wellness, Yoga and Sports	CH23ABS105	
Complex Variables & Transforms	MA20ABS302	
Digital Logic Design	EC20APC301	
Electronic Circuit -Analysis and Design	EC20APC302	
Signals & Systems	EC20APC303	
Managerial Economics and Financial Analysis	BA20AHS301	
Basic Simulation Lab	EC20APC304	
Electronic Circuit -Analysis and Design Lab	EC20APC306	
Application Development using Python	IT20ASC301	Skill oriented
Logical Skills for Professionals -II	MA20AMC301	Employability
Data Structures using C	CS20AES401	
Probability Theory and Stochastic Processes	MA20ABS402	
Analog Communications	EC20APC401	
Electro Magnetic Waves and Transmission Lines	EC20APC402	
Linear & Digital IC Applications	EC20APC403	
Analog Communications Lab	EC20APC404	
Data Structures using C Lab	CS20AES402	
Linear & Digital IC Applications Lab	EC20APC405	
Soft Skills	EG20ASC301	Skill oriented
Antennas and Wave Propagation	EC20APC501	
Digital Communications	EC20APC502	
Microprocessors & Microcontrollers	EC20APC503	
Principles of Waste Management	CE20AOE502	
Industrial Automation	ME20AOE501	Employability
Programmable Logic Controllers	EE20AOE502	Employability
Introduction to Operating Systems	AM20AOE501	Employability
Computer Architecture & Organization	CS20AOE502	Employability
Chemistry of Polymers & Applications	CH20AOE501	Employability

Control System Engineering	EE20APE502	
Mechatronics	EC20APE501	
Nanoelectronics	EC20APE502	
PCB Design and Prototype Development	EC20ASC501	Skill oriented
Constitution of India	BA20AMC501	
Digital Signal Processing	EC20APC601	
Microwave Engineering and Optical Communications	EC20APC602	
VLSI Design	EC20APC603	
Electronic Measurements and Instrumentation	EC20APE601	
Information Theory and Coding	EC20APE602	
Introduction to Digital Signal Processing	EC20APE603	
RADAR Systems	EC20APE604	
Disaster Management	CE20AOE601	Employability
Fundamentals of Additive Manufacturing	ME20AOE601	Employability
Optimization Techniques through MATLAB	EE20AOE603	Employability
JAVA Programming	CS20AOE602	Employability
Web Technologies	AM20AOE502	Employability
Technical Communication & Presentation Skills	EG20AOE601	Employability
Graphical System Design Using Lab-view	EC20ASC601	Skill oriented
CISCO	EC20ASC601	Skill oriented
Intellectual Property Rights & Patents	BA20AMC502	
Analog and Digital IC Design	EC20APE701	
FPGA Design	EC20APE702	
Low Power VLSI Circuits and Systems	EC20APE703	
Digital Image Processing	EC20APE704	
Electronic Defense Systems	EC20APE705	
Smart Sensor Networks	EC20APE706	
Data Communication and Networking	EC20APE707	
Satellite Communications	EC20APE708	
Wireless Sensor Networks	EC20APE709	
Air Pollution and Quality Control	CE20AOE701	Employability
Introduction to Industrial Engineering	ME20AOE703	Employability
Embedded Systems	EE20AOE701	Employability
Machine Learning Tools and Techniques.	AM20AOE601	Employability
Structured Query Language	CS20AOE503	Employability
Introduction to Smart Grid & Electric vehicles	EE20AOE704	Employability
Numerical Methods for Engineers	MA20AOE701	Employability
Environmental Impact Analysis and Management	CE20AOE704	Employability
Introduction to Product Marketing	ME20AOE704	Employability
IoT applications in Electrical Engineering	EE20AOE703	Employability

Cyber Security Techniques	AM20AOE701	Employability	
Data Analysis using ‘R’	CS20AOE601	Employability	
Nano Materials	PH20AOE701	Employability	
Entrepreneurship and Incubation	BA20AHS703	Entrepreneurship	
Enterprise Resource Planning	BA20AHS704	Entrepreneurship	
Management Science	BA20AHS705	Entrepreneurship	
IoT and Industrial Automation	EC20ASC701	Skill oriented	
Basic VLSI design	EC20AOE501	Employability	
Digital Electronics	EC20AOE502	Employability	
Electronic Instrumentation & Measurements	EC20AOE601	Employability	
Signal Processing	EC20AOE602	Employability	
IC Applications	EC20AOE701	Employability	
Principles of Communication Engineering	EC20AOE702	Employability	
Sensors & Systems	EC20AOE703	Employability	
Internet of Things	EC20AOE704	Employability	
Introduction to Image Processing	EC20AOE705	Employability	
Microcontroller & Applications	EC20AOE706	Employability	

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

(Affiliated to J.N.T. University Anantapur, Ananthapuramu)

Karakambadi Road Tirupati-517 507

BoS Minutes of Meeting

on

12-09-2023

DEPARTMENT OF
ELECTRONICS & COMMUNICATION ENGINEERING

BOARD OF STUDIES MEETING

Minutes of the Meeting

Mode	Online
Platform	Google Meet
Meeting Link	**https://meet.google.com/hmu-kxvp-pfb**
Venue	Sri Venkateswara College of Engineering, Tirupati.
Date	12-09-2023
Time	11:30 AM

DEPARTMENT OF ECE – BoS MEMBERS

S.No.	Name of the Member	Designation & Address	Role
1.	Dr. D. Srinivasulu Reddy	Professor &HOD, Department of ECE, SV College of Engineering, Tirupati. Mobile No.: 8074436276 Email: hod_ece@svce.edu.in	Chairman
2.	Dr. R. Ramana Reddy	Professor, Department of ECE, JNTUA College of Engineering, Pullivendula. Mobile No.: 7670902305 Email: rrreddy.ece@jntua.ac.in	Subject Expert nominated by JNTUA.
3.	Dr. N. BheemaRao	Professor, Department of ECE, NIT Warangal. Mobile No.: 9492909194 Email: nbr.rao@gmail.com	Subject Expert nominated by Academic Council.
4.	Dr. S. Varadarajan	Professor, Department of ECE, S.V. U.C.E.,S. V. University, Tirupati. Mobile No: 9949300990 Email: varadasouri@gmail.com	Subject Expert nominated by Academic Council.
5.	Mr. M. Narasimham	Lead Consultant, Wipro Technologies, Bengaluru. Mobile No. :8618381438 Email: n_simham@yahoo.com	Industry Expert nominated by Academic Council.
6.	Mr.M. JagannadhaRao	IT Operations Professional, Siemens Healthineers Pvt. Ltd., Bengaluru. Mobile No. : 8861227894 Email: jagannadhsap.m@gmail.com	PG Alumni nominated by Academic Council.

7.	Dr. K. Lokesh Krishna	Professor, Department of ECE, SV College of Engineering, Tirupati. Mobile No.: 8309974328 Email: lokeshkrishna.k@svcolleges.edu.in	Member
8.	Dr. C. Chandrasekar	Professor, Department of ECE, SV College of Engineering, Tirupati. Mobile No.: 9177217190 Email: dr.chandrasekhar.c@svcolleges.edu.in	Member
9.	Dr.T.ChandrasekarRao	Professor, Department of ECE, SV College of Engineering, Tirupati. Mobile No: 94413363390 Email: chandrasekhar.t@svcolleges.edu.in	Member
10.	Dr. B. Shobanbabu	Associate Professor, Department of ECE, SV College of Engineering, Tirupati. Mobile No: 94413363390 Email: shobanbabu.b@svcolleges.edu.in	Member
11.	Dr. K. Raveendra	Associate Professor, Department of ECE, SV College of Engineering, Tirupati. Mobile No: 94413363390 Email: raveendra.k@svcolleges.edu.in	Member
12.	Dr. T. Kaliraja	Associate Professor, Department of ECE, SV College of Engineering, Tirupati. Mobile No: 94413363390 Email: kaliraja.t@svcolleges.edu.in	Member
13.	Dr.V. Madhurima	Associate Professor, Department of ECE, SV College of Engineering, Tirupati. Mobile No.: 8897665775 Email: madhurima.v@svcolleges.edu.in	Member
14.	Dr. G. Sujatha	Associate Professor, Department of ECE, SV College of Engineering, Tirupati. Mobile No.: 9959505760 Email: sujatha.g@svcolleges.edu.in	Member
15.	Dr. K. MaheshBabu	Associate Professor, Department of ECE, SV College of Engineering, Tirupati. Mobile No.: 8179762414 Email: maheshbabu.kt@svcolleges.edu.in	Member
16.	Dr. G. PadmaPriya	Associate Professor, Department of ECE, SV College of Engineering, Tirupati. Mobile No.: 9502020187 Email:padmapriya.gudiyatham@svcolleges.edu.in	Member

17.	Dr. G. Chandraiah	Associate Professor Department of ECE SV College of Engineering, Tirupati Mobile No.: 8500393752 Email: chandraiah.g@svcolleges.edu.in	Member
18.	Dr. C. Padma	Associate Professor Department of ECE SV College of Engineering, Tirupati Mobile No.: 9573804456 Email: padma.c@svcolleges.edu.in	Member
19.	Dr. S. Salma	Assistant Professor Department of ECE SV College of Engineering, Tirupati Mobile No.: 8885624395 Email: salma.sy@svcolleges.edu.in	Member
20.	A. Krishna Mohan	Associate Professor Department of ECE SV College of Engineering, Tirupati Mobile No.: 9949983365 Email: krishnamohan.a@svcolleges.edu.in	Member
21.	K. UpendraRaju	Associate Professor Department of ECE SV College of Engineering, Tirupati Mobile No.: 9182146045 Email: upendraraju.k@svcolleges.edu.in	Member
22.	Sk. Allabaksh	Associate Professor Department of ECE SV College of Engineering, Tirupati Mobile No.: 9700644100 Email: allabaksh.sk@svcolleges.edu.in	Member

DEPARTMENT OF ECE – BoS MEMBERS (ATTENDANCE)

S.No.	Name of the Member	Attendance
1	Dr. D. Srinivasulu Reddy	Attended
2	Dr. R. Ramana Reddy	Attended
3	Dr. N. BheemaRao	Attended
4	Dr. S. Varadarajan	Attended
5	Mr. M. Narasimham	Attended
6	Mr. M. JagannadhaRao	Attended

7	Dr. K. Lokesh Krishna	Attended
8	Dr. C. Chandrasekar	Attended
9	Dr. T. ChandrasekarRao	Attended
10	Dr. B. Shobanbabu	Attended
11	Dr. K. Raveendra	Attended
12	Dr. T. Kaliraja	Attended
13	Dr. V. Madhurima	Attended
14	Dr. G. Sujatha	Attended
15	Dr. K. MaheshBabu	Attended
16	Dr. G. PadmaPriya	Attended
17	Dr. G, Chandraiah	Attended
18	Dr. C. Padma	Attended
19	Dr. S. Salma	Attended
20	A. Krishna Mohan	Attended
21	K. UpendraRaju	Attended
22	Sk. Allabaksh	Attended

Agenda:

1. Introduction of Members of the Board of Studies.
2. Approval for I B.Tech R23 Course Structure pertaining to ECE.
3. Approval of I Year R23 Course Structure and syllabi.
4. Suggestions from BoS Members.

Order of events:

1. The meeting was held online via Google Meet platform.
2. Welcome address by Dr. D. Srinivasulu Reddy, Professor & HOD of ECE, SVCE.
3. Presentation by Dr. D. Srinivasulu Reddy, Professor & HOD of ECE, SVCE.
4. Discussion on 1st B. Tech ECE R23 Course Structure & Syllabus.
5. Discussion on Honor/Minor degree course structure and guidelines.
6. Review &Suggestions from BoS Academic Experts.
7. Vote of thanks by chairman.

Minutes of Meeting:

1. Proceedings of the 4th BoS meeting held on 12-09-2023.

2. BoS Chairman presided over the meeting and cordially welcomed all the members of BoS to the meeting.

3. The meeting held in virtual platform (Google Meet) and commenced at about 11.35 AM on 12-09-2023.

4. Dr. D. Srinivasulu Reddy, Chairman BoS ECE introduced newly included internal BoS Committee members Dr B. Shoban Babu, Associate Professor, Dr. K. Raveendra, Associate Professor, Dr. G. Chandraiah, Associate Professor, Dr C. Padma, Associate Professor, Dr. S. Salma, Associate Professor, Assistant Professor to BoS Committee.

5. Dr. B. Sudharani and Dr. M. Sureshkumar have left the department, resulting in the reformation of the BoS committee with newly appointed members.

    - Dr. N. BheemaRao, Professor, NIT Warangal (nominated by Academic Council).
    - Dr. S. Varadarajan, Professor, SVUCE, Tirupati (nominated by Academic Council).
    - Dr. M. Narasimham, Lead Consultant, Wipro Technologies, Bengaluru (nominated by Academic Council).
    - Dr.R.Ramana Reddy, Professor, Department of ECE,JNTUA College of Engineering, Pullivendula, JNTUA College of Engineering (nominated by JNTUA).
    - Mr.M.JagannadhaRao, IT Operations Professional, Siemens Healthineers Pvt. Ltd., Bengaluru.

    The presentation includes genesis of the department, B.Tech 1st year Course Structure along with the detailed syllabi.

The following are the few suggestions and feedback given by the academic experts

1. **Dr. N. BheemaRao** from NIT Warangal has put forward the following recommendations. The relevance and worth of suggestions are valuable in revising and restructuring the syllabus.
    - He recommended removing the topic "Vacuum Tubes to Nano Electronics" from Unit I, Part-B of the Basic Electronics Engineering syllabus as it will be covered in the evolution of electronics section.
    - He suggested to include introduction to Laplace transforms, fundamental theorems, and problem-solving through Laplace transforms in Unit II of the Network Analysis syllabus. Additionally, he put forth the idea of removing specific content from Unit V, such as topics related to image and iterative impedances and associated concepts.

- He queried the reasoning behind incorporating the course "Basic Civil & Mechanical Engineering" into the ECE stream. In response, the Chairman convinced by an explanation of the exit policy designed to equip candidates with job-ready skills necessary for entering the workforce.

2. **Dr. S. Varadarajan** from S.V.U.C.E., S.V. University, expressed satisfaction with the course structure and syllabus.

3. **Dr. R. Ramana Reddy,** Professor, Department of ECE, JNTUA College of Engineering, Pullivendula has provided the following inputs. The relevance and worth of suggestions are valuable in revising and restructuring the syllabus.
    - He recommended considering and adhering to the curriculum provided by JNTUA as well as APSCHE.
    - He recommended excluding the topic of "Vacuum Tubes to Nano Electronics" from Unit I, Part B of Basic Electronics Engineering, citing its coverage within the "Evolution of Electronics" section.
    - He recommended considering the adjustments to the Network Analysis syllabus, as proposed by JNTUA if necessary.
4. **Mr. M. Narasimham** from Wipro Technologies, Bangalore, expressed satisfaction with the course structure and syllabus.

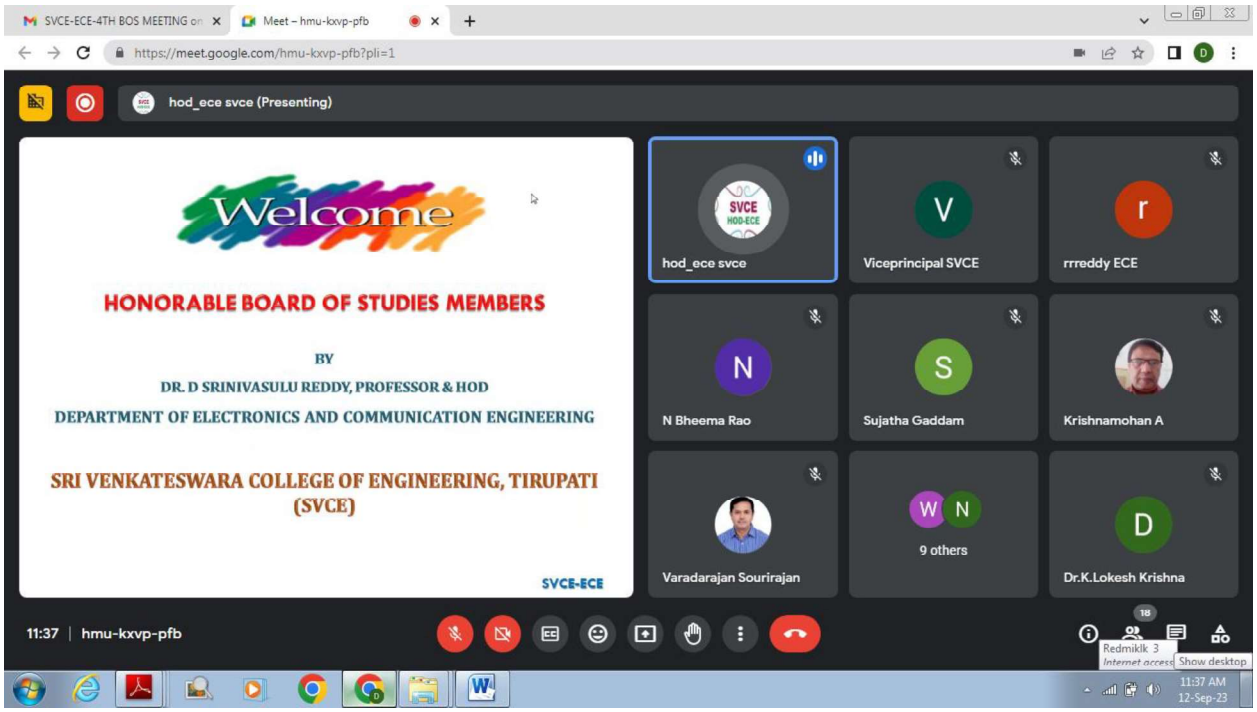
5. **Mr. M. JagannadhaRao,** IT Operations Professional, Siemens Healthineers Pvt. Ltd., Bengaluru expressed satisfaction with the course structure and syllabus of ECE related subjects and ECE course structure is almost meeting the requirements of industry needs.

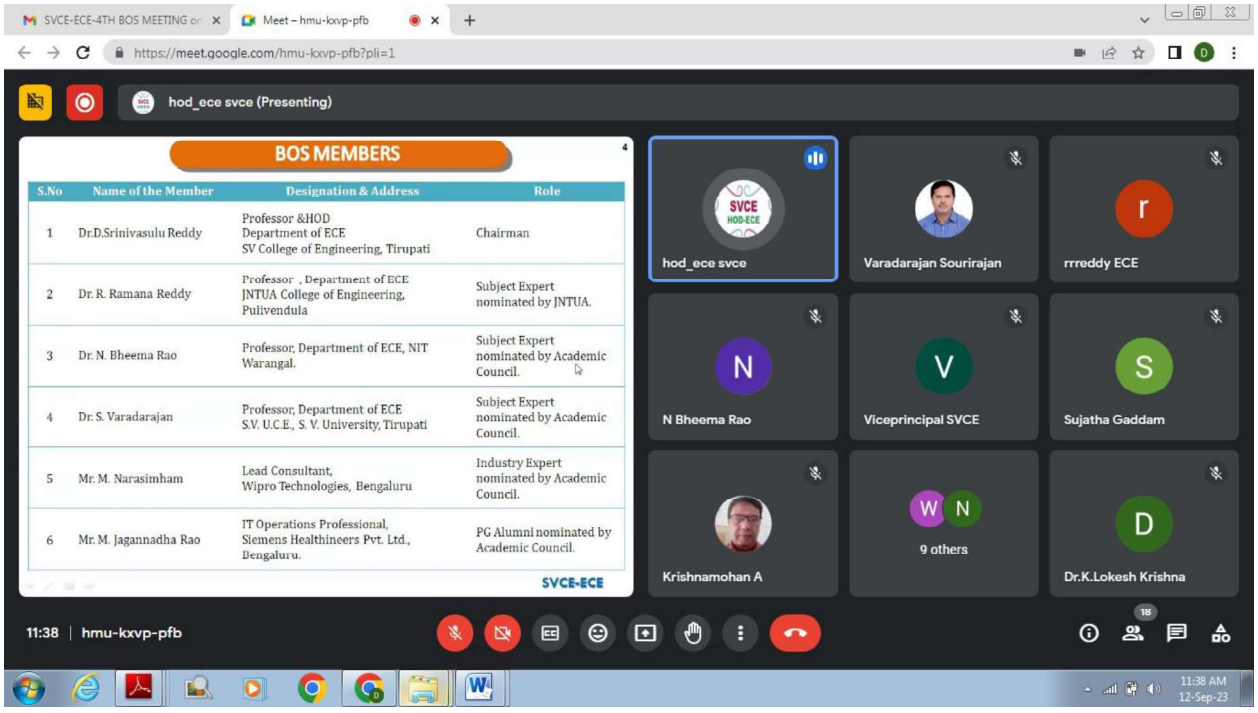
6. The chairman graciously extended an invitation to visit the college and engage with the students, with the purpose of sharing insights about the present state of the industry and Emerging Technologies.

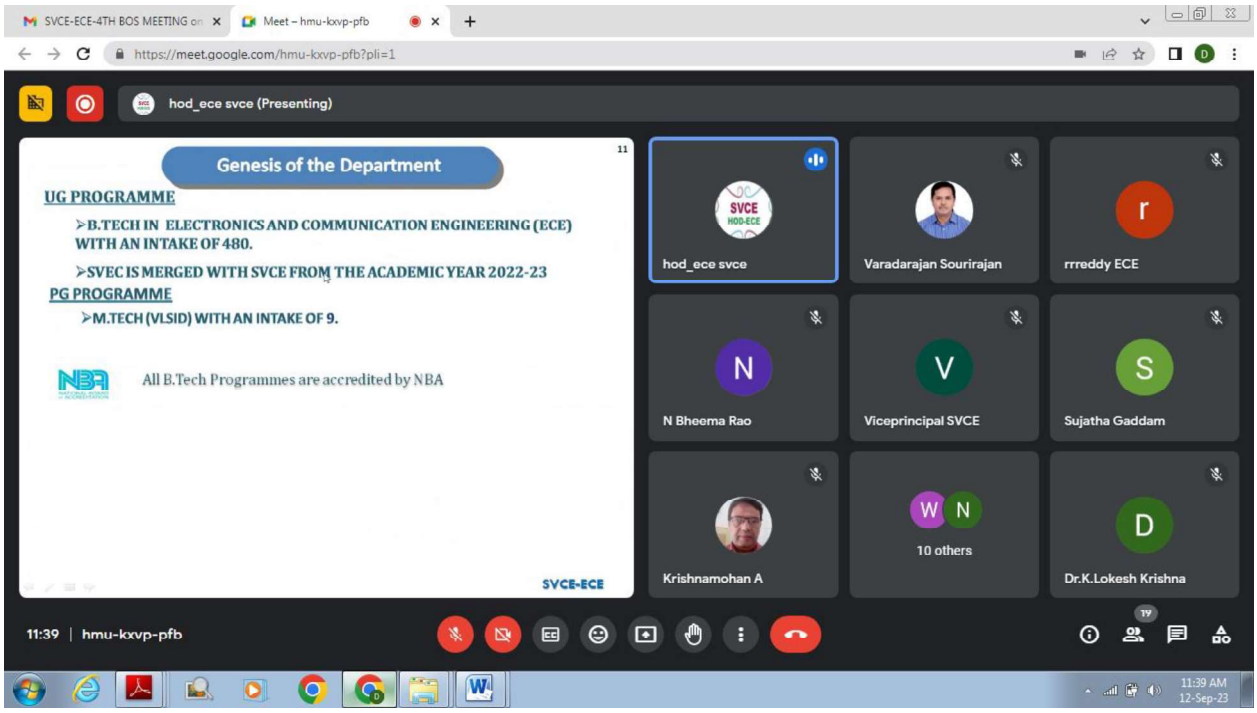
7. **Dr. D. SrinivasuluReddy** concluded the meeting by giving vote of thanks to all the BoS members. He thanked all the members for their kind presence and support.

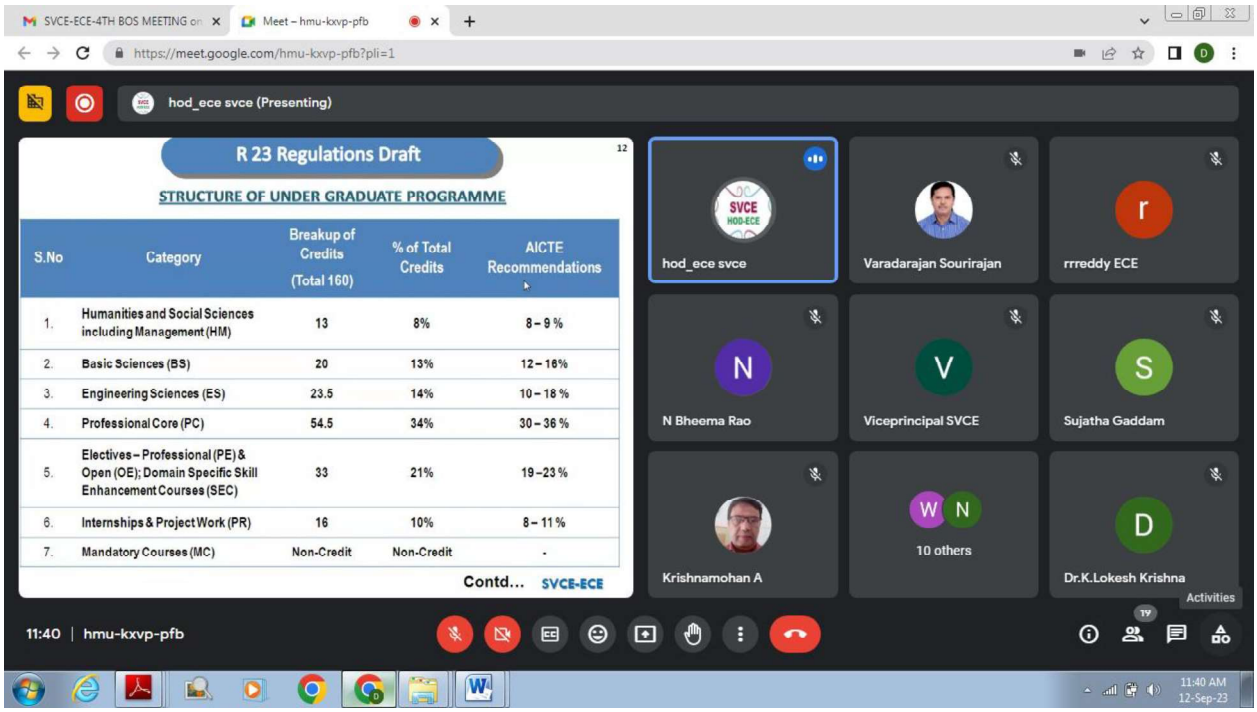
8. At the end it is decided to incorporate modifications as suggested by academic experts and share it all members for further approval process.

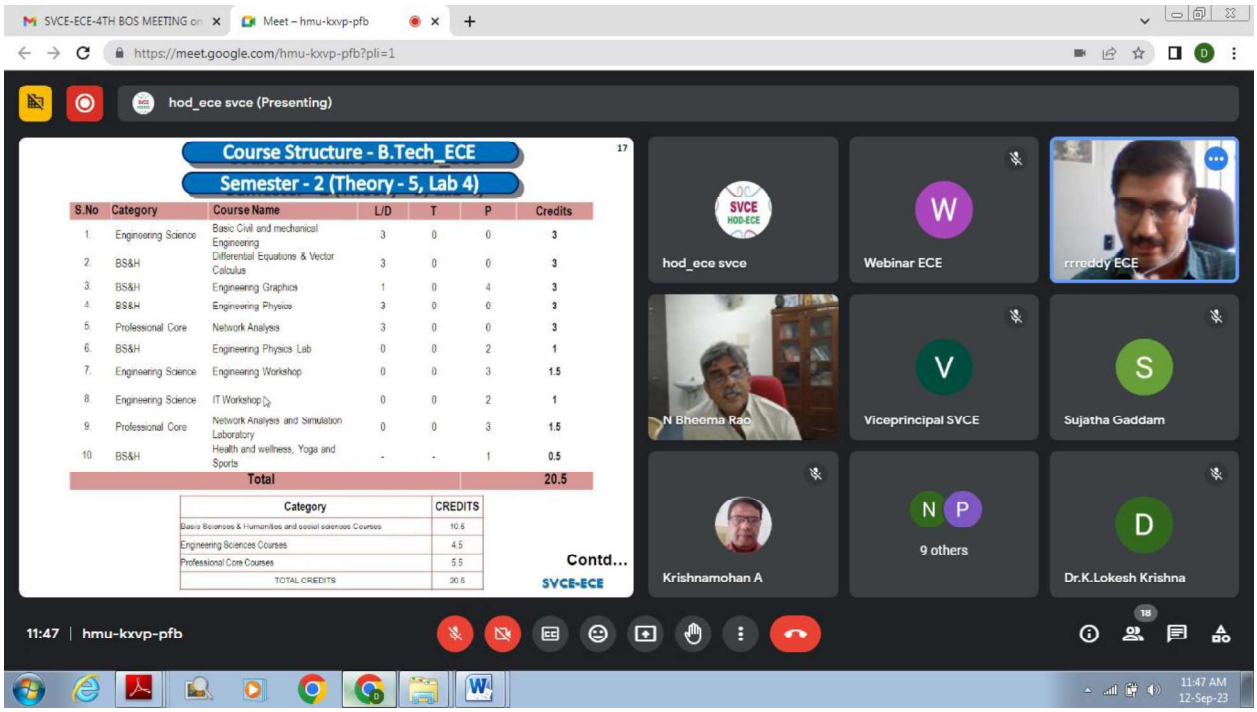
9. The meeting ended with the wishes by BoS members at 1:20 PM.

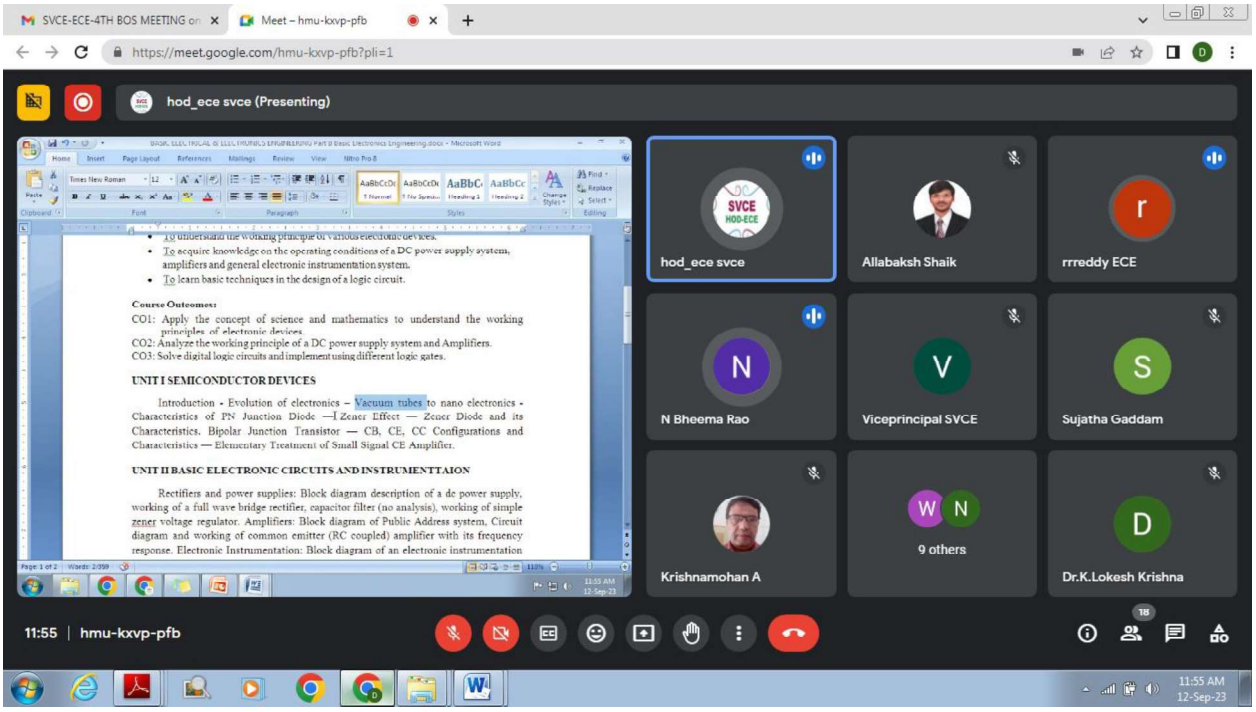

SVCE-ECE-4TH BOS MEETING on
Meet – hmu-kxvp-pfb
https://meet.google.com/hmu-kxvp-pfb?pli=1
hod_ece svce (Presenting)
Welcome
HONORABLE BOARD OF STUDIES MEMBERS
BY
DR. D SRINIVASULU REDDY, PROFESSOR & HOD
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SRI VENKATESWARA COLLEGE OF ENGINEERING, TIRUPATI (SVCE)
SVCE-ECE
hod_ece svce
Viceprincipal SVCE
rrreddy ECE
N Bheema Rao
Sujatha Gaddam
Krishnamohan A
Varadarajan Sourirajan
9 others
Dr.K.Lokesh Krishna
11:37 | hmu-kxvp-pfb
Redmiklk 3
Show desktop
11:37 AM
12-Sep-23

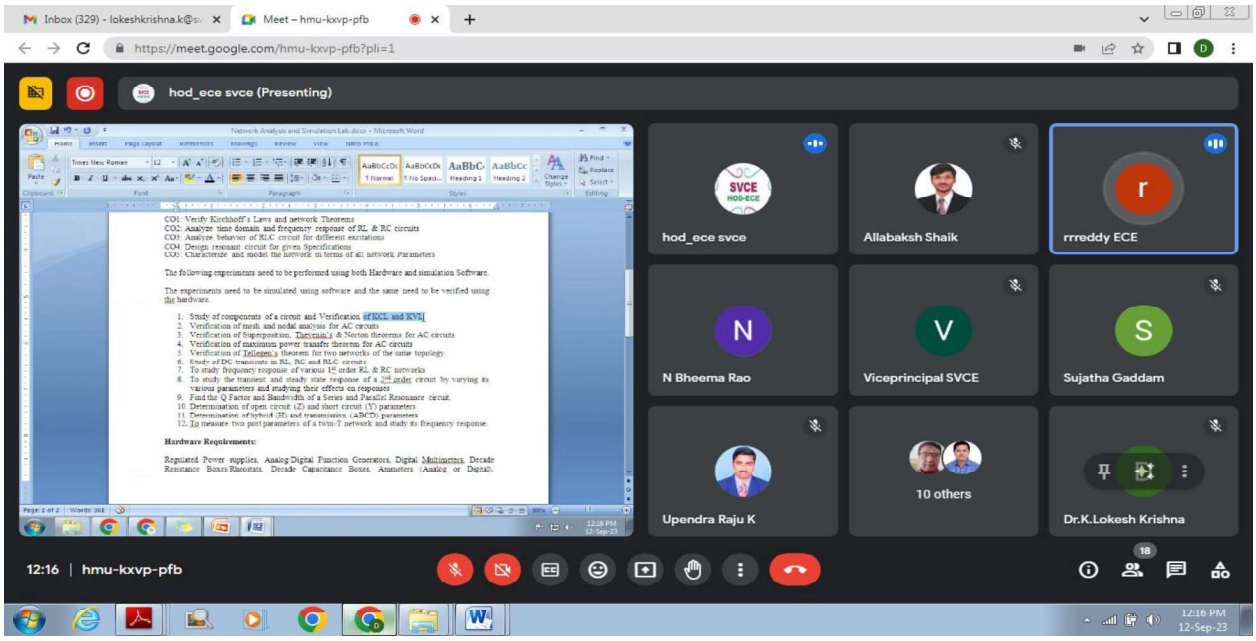

SVCE-ECE-4TH BOS MEETING on
Meet – hmu-kxvp-pfb
https://meet.google.com/hmu-kxvp-pfb?pli=1
hod_ece svce (Presenting)
BOS MEMBERS
S.No | Name of the Member | Designation & Address | Role
1 | Dr.D.Srinivasulu Reddy | Professor &HOD Department of ECE SV College of Engineering, Tirupati | Chairman
2 | Dr. R. Ramana Reddy | Professor , Department of ECE JNTUA College of Engineering, Pulivendula | Subject Expert nominated by JNTUA.
3 | Dr. N. Bheema Rao | Professor, Department of ECE, NIT Warangal. | Subject Expert nominated by Academic Council.
4 | Dr. S. Varadarajan | Professor, Department of ECE S.V. U.C.E., S. V. University, Tirupati | Subject Expert nominated by Academic Council.
5 | Mr. M. Narasimham | Lead Consultant, Wipro Technologies, Bengaluru | Industry Expert nominated by Academic Council.
6 | Mr. M. Jagannadha Rao | IT Operations Professional, Siemens Healthineers Pvt. Ltd., Bengaluru. | PG Alumni nominated by Academic Council.
SVCE-ECE
hod_ece svce
Varadarajan Sourirajan
rrreddy ECE
N Bheema Rao
Viceprincipal SVCE
Sujatha Gaddam
Krishnamohan A
9 others
Dr.K.Lokesh Krishna
11:38 | hmu-kxvp-pfb
11:38 AM
12-Sep-23

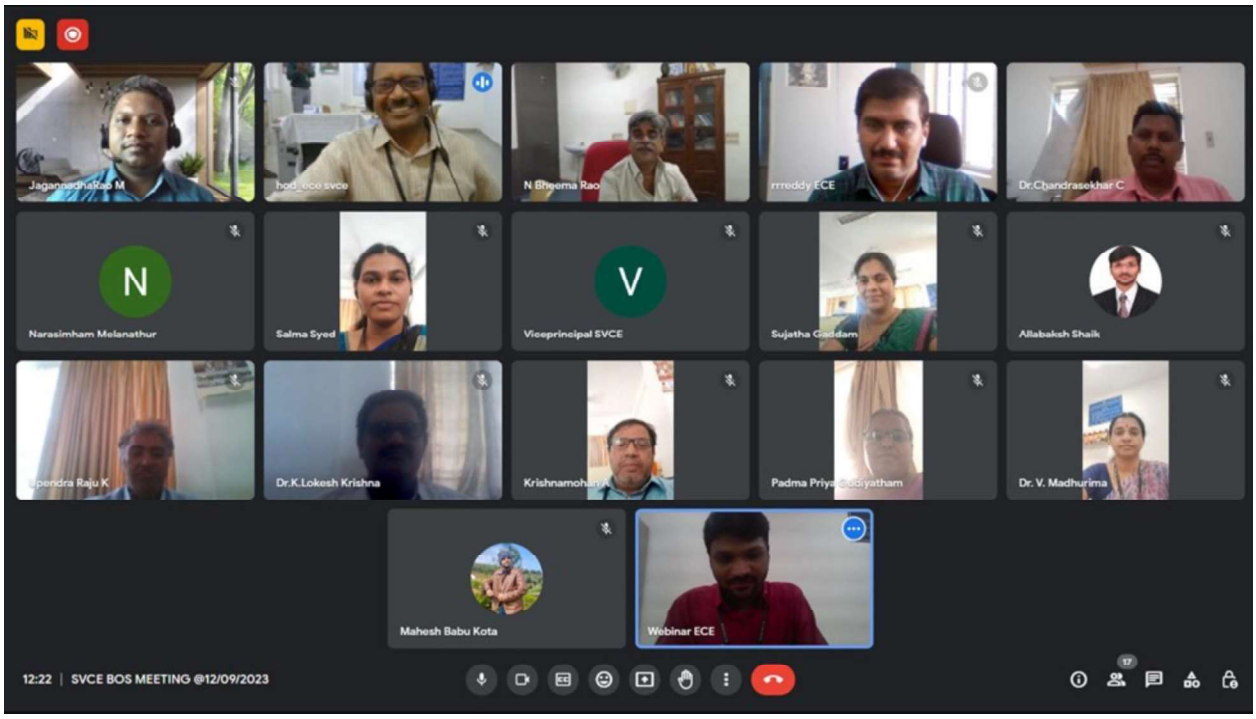

SVCE-ECE-4TH BOS MEETING on
Meet – hmu-kxvp-pfb
https://meet.google.com/hmu-kxvp-pfb?pli=1
hod_ece svce (Presenting)
11
Genesis of the Department
UG PROGRAMME
➢B.TECH IN ELECTRONICS AND COMMUNICATION ENGINEERING (ECE) WITH AN INTAKE OF 480.
➢SVEC IS MERGED WITH SVCE FROM THE ACADEMIC YEAR 2022-23
PG PROGRAMME
➢M.TECH (VLSID) WITH AN INTAKE OF 9.
All B.Tech Programmes are accredited by NBA
SVCE-ECE
hod_ece svce
Varadarajan Sourirajan
rrreddy ECE
N Bheema Rao
Viceprincipal SVCE
Sujatha Gaddam
Krishnamohan A
10 others
Dr.K.Lokesh Krishna
11:39 | hmu-kxvp-pfb
11:39 AM
12-Sep-23


SVCE-ECE-4TH BOS MEETING on
Meet – hmu-kxvp-pfb
https://meet.google.com/hmu-kxvp-pfb?pli=1
hod_ece svce (Presenting)
12
R 23 Regulations Draft
STRUCTURE OF UNDER GRADUATE PROGRAMME
S.No | Category | Breakup of Credits (Total 160) | % of Total Credits | AICTE Recommendations
1. Humanities and Social Sciences including Management (HM) | 13 | 8% | 8 – 9 %
2. Basic Sciences (BS) | 20 | 13% | 12 – 16%
3. Engineering Sciences (ES) | 23.5 | 14% | 10 – 18 %
4. Professional Core (PC) | 54.5 | 34% | 30 – 36 %
5. Electives – Professional (PE) & Open (OE); Domain Specific Skill Enhancement Courses (SEC) | 33 | 21% | 19 – 23 %
6. Internships & Project Work (PR) | 16 | 10% | 8 – 11 %
7. Mandatory Courses (MC) | Non-Credit | Non-Credit | -
Contd... SVCE-ECE
hod_ece svce
Varadarajan Sourirajan
rrreddy ECE
N Bheema Rao
Viceprincipal SVCE
Sujatha Gaddam
Krishnamohan A
10 others
Dr.K.Lokesh Krishna
Activities
11:40 | hmu-kxvp-pfb
11:40 AM
12-Sep-23


SVCE-ECE-4TH BOS MEETING on
Meet – hmu-kxvp-pfb
https://meet.google.com/hmu-kxvp-pfb?pli=1
hod_ece svce (Presenting)
Course Structure - B.Tech_ECE
Semester - 2 (Theory - 5, Lab 4)
17
S.No | Category | Course Name | L/D | T | P | Credits
1. Engineering Science | Basic Civil and mechanical Engineering | 3 | 0 | 0 | 3
2. BS&H | Differential Equations & Vector Calculus | 3 | 0 | 0 | 3
3. BS&H | Engineering Graphics | 1 | 0 | 4 | 3
4. BS&H | Engineering Physics | 3 | 0 | 0 | 3
5. Professional Core | Network Analysis | 3 | 0 | 0 | 3
6. BS&H | Engineering Physics Lab | 0 | 0 | 2 | 1
7. Engineering Science | Engineering Workshop | 0 | 0 | 3 | 1.5
8. Engineering Science | IT Workshop | 0 | 0 | 2 | 1
9. Professional Core | Network Analysis and Simulation Laboratory | 0 | 0 | 3 | 1.5
10. BS&H | Health and wellness, Yoga and Sports | - | - | 1 | 0.5
Total | 20.5
Category | CREDITS
Basic Sciences & Humanities and social sciences Courses | 10.5
Engineering Sciences Courses | 4.5
Professional Core Courses | 5.5
TOTAL CREDITS | 20.5
Contd...
SVCE-ECE
hod_ece svce
Webinar ECE
rrreddy ECE
N Bheema Rao
Viceprincipal SVCE
Sujatha Gaddam
Krishnamohan A
9 others
Dr.K.Lokesh Krishna
11:47 | hmu-kxvp-pfb
11:47 AM
12-Sep-23


SVCE-ECE-4TH BOS MEETING on
Meet – hmu-kxvp-pfb
https://meet.google.com/hmu-kxvp-pfb?pli=1
hod_ece svce (Presenting)
To learn basic techniques in the design of a logic circuit.
Course Outcomes:
CO1: Apply the concept of science and mathematics to understand the working principles of electronic devices.
CO2: Analyze the working principle of a DC power supply system and Amplifiers.
CO3: Solve digital logic circuits and implement using different logic gates.
UNIT I SEMICONDUCTOR DEVICES
Introduction - Evolution of electronics – Vacuum tubes to nano electronics - Characteristics of PN Junction Diode —I Zener Effect — Zener Diode and its Characteristics. Bipolar Junction Transistor — CB, CE, CC Configurations and Characteristics — Elementary Treatment of Small Signal CE Amplifier.
UNIT II BASIC ELECTRONIC CIRCUITS AND INSTRUMENTTAION
Rectifiers and power supplies: Block diagram description of a dc power supply, working of a full wave bridge rectifier, capacitor filter (no analysis), working of simple zener voltage regulator. Amplifiers: Block diagram of Public Address system, Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response. Electronic Instrumentation: Block diagram of an electronic instrumentation
hod_ece svce
Allabaksh Shaik
rrreddy ECE
N Bheema Rao
Viceprincipal SVCE
Sujatha Gaddam
Krishnamohan A
9 others
Dr.K.Lokesh Krishna
11:55 | hmu-kxvp-pfb
11:55 AM
12-Sep-23





Dr. D. Srinivasulu Reddy
(HOD of ECE)
&
Chairman, BoS (ECE)

Copy to

Principal,
Chairman,
BoS Members,
To file

+91 944 11 88 123
www.brightgeeks.in
info@brightgeeks.in
Marathahalli ORR, Bengaluru, Karnataka - 560 103.

CLAUSE 2 **SCOPE OF THE MoU**

2.1 Industrial Training & Visits: Industry and Institution interaction will provide an insight into the latest developments / requirements of the industries; the Second Party to permit the Faculty and Students of the First Party to visit its group companies and also be involved in Industrial Training Programs for the First Party. This will provide confidence & smooth transition for students' work. Also the Second party may register on the AICTE Internship Portal for the benefit of students.

2.2 Guest Lectures: Second Party to extend the necessary support to deliver guest lecturers to the students of the First Party on the technology trends and in house requirements.

2.3 Placement of trained students: second party will actively engage to help the delivery of the training and placement of the students of the first party on the technology trends and in house requirements.

2.4 There is no financial commitment on the part of the **SV College of Engineering,** the first party to take up any program mentioned in MoU. If there is any financial consideration, it will be dealt separately.

2.5 Both Parties to obtain all internal approvals, consents, permissions, and licenses of whatsoever nature required.

2.6First Party may utilize the services of the second Party for providing certificate courses to their students.If there is any financial consideration, it will be dealt with separately.

2.7 The Second Party may utilize the premises/infrastructure/staff of the First Party for providing Placement/Recruitment/Admission/Certification/Internship Examinations through the Second Party's assessment platform.If there is any financial consideration, it will be dealt separately.

CLAUSE 3 **VALIDITY**

3.1 This Agreement will be valid until it is expressly terminated by either Party on mutually agreed terms.

CLAUSE 4 **RELATIONSHIP BETWEEN THE PARTIES**

4.1 It is expressly agreed that First Party and Second Party are acting under this MOU as independent contractors, and the relationship established under this MOU shall not be construed as a partnership.

First Party

Dr. N Sudhakar Reddy

Principal Zonal Head

SV College of Engineering

Second Party

Varigonda Yaswanth (09389940)

Managing Director

BrightGeeks Technologies Pvt Ltd

MEMORANDUM OF UNDERSTANDING

(MoU)

BETWEEN

ExcelR Edtech Pvt Ltd.

&

SRI VENKATESWARA COLLEGE OF ENGINEERING
(AUTONOMOUS)
Tirupati, Andhra Pradesh

FOR

Student Development Programs, Faculty Development Programs and Student Internships on Different Emerging Software Technologies

ExcelR Edtech Pvt. Ltd
49, 1st Cross, 27th Main, behind Tata Motors, 1st Stage, BTM Layout, Bengaluru, Karnataka 560068.
Email: enquiry@excelr.com | 1800-212-2120 (Toll Free)
www.excelr.com

Scanned with OKEN Scanner

EXCELR
Raising Excellence

MEMORANDUM OF UNDERSTANDING

This **Memorandum of Understanding** (herein after called as the 'MOU') is entered into on this 12 th day of Oct 2023 (Date 12-10-2023)

ExcelR Edtech Pvt. Ltd

(Here in after referred as '**First Party**')

And

SRI VENKATESWARA COLLEGE OF ENGINEERING
(Autonomous)
Tirupati, Andhra Pradesh

(Here in after referred to as '**Second Party**')

(First Party and Second Party are hereinafter jointly referred to as 'Parties' and individually as 'Party')

WHEREAS:

1. First Party is a EdTech company: **ExcelR Edtech Pvt Ltd.**
2. Second Party is Higher Educational Institution named:
3. First Party & Second Party believe that collaboration and co-operation between themselves will promote more effective use of each of their resources and provide each of them with enhanced opportunities.
4. The Parties intent to cooperate and focus their efforts on cooperation within area of Skill Based Training, Education and Research.
5. Both Parties, being legal entities in themselves desire to sign this MOU for advancing their mutual interests.

PRINCIPAL
S.V. COLLEGE OF ENGINEERING
KARAKAMBADI ROAD
TIRUPATI- 517 507, A.P

Scanned with OKEN Scanner

EXCELR
Raising Excellence

NOW THEREFORE, IN CONSIDERATION OF THE MUTUAL PROMISES SET FORTH IN THIS MOU, THE PARTIES HERE TO AGREE AS FOLLOWS:

CLAUSE 1: CO-OPERATION

6. Both Parties are united by common interests and objectives, and they shall establish channels of communication and co-operation that will promote and advance their respective operations within the Institution and its related wings.

7. First Party and Second Party co-operation will facilitate effective utilization of the intellectual capabilities of the faculty of First Party providing significant inputs to the second party in developing suitable teaching / training systems, keeping in mind the needs of the industry, the Second Party.

8. The general terms of co-operation shall be governed by this MOU. The Parties shall cooperate with each other and shall, as promptly as is reasonably practical, enter into all relevant agreements, deeds, and documents (the 'Definitive Documents') as may be required to give effect to the actions contemplated in terms of this MOU. The term of Definitive Documents shall be mutually decided between the Parties. Along with the Definitive Documents, this MOU shall represent the entire understanding as to the subject matter hereof and shall supersede any prior understanding between the Parties on the subject matter hereof.

9. ExcelR would be the training delivery partner for the second party on various trending technologies.

10. ExcelR would be the training delivery partner for the student internships of second party on various trending technologies of minimum four weeks duration.

11. ExcelR will reach out to students to communicate about course details, webinars, blogs, industry events etc., which will be informative or promotional in nature.

12. Training & Development and dissemination of knowledge for students of second party & affiliated colleges and employees of both the organizations.

PRINCIPAL
V. COLLEGE OF ENGINEERING
KARAKAMBADI ROAD
TIRUPATI- 517 507, A.P

Scanned with OKEN Scanner

EXCELR
Raising Excellence

13. ExcelR would work with incubation centers/ innovation cells of second party (Case to case basis), to formulate the business cases and data collection process from various industry and academic bodies that are associated with the second party

14. Cooperation between both parties would be extended to any other area which may be mutually beneficial to both the organizations.

CLAUSE 2: SCOPE OF THE MoU

15. The budding graduates from the institutions could play a key role in technological up-gradation, innovation, and competitiveness of an industry. Both parties believe that close co-operation between the two would be of major benefit to the student community to enhance their skills and knowledge.

16. **Software Technologies Training**: The first party will provide the trainings to the students and Faculties of the second party on different technologies like Data Science, Data Analyst, Artificial Intelligence, Tableau, Python, etc., Research and Development

17. **Skill Development Programs**: First Party to train the students of second Party on the emerging technologies to bridge the skill gap and make them industry ready.

18. **Guest Lectures**: First Party to extend the necessary support to deliver guest lectures to the students of the second Party on the technology trends and in house requirements.

19. **Faculty Development Programs**: First Party to train the faculties of second Party for imparting training as per the industrial requirement considering the National Occupational Standards in concerned sector, if available.

20. Both Parties to obtain all internal approvals, consents, permissions, and licenses of whatsoever nature required for offering the Programs on the terms specified herein

21. There is no financial commitment on the part of the second party to enroll the students and faculties for the different free trainings run by the first party under Everyday Learning Initiation.

PRINCIPAL
S.V. COLLEGE OF ENGINEERING
KARAKAMBADI ROAD
TIRUPATI- 517 507. A.P

Scanned with OKEN Scanner

22. First party would extend the help in providing artifacts such as training records, certificates to the second party upon a written request from the second party. This information is limited to only the students of second party and at the discretion of first party.

23. In case, second party wants to conduct customized commercial trainings then this agreement can be amend/adding annexure with mutually agreed terms.

CLAUSE 3: INTELLECTUAL PROPERTY

24. The first party will have the sole rights on the curriculum and related content provided in the trainings and it cannot be replicated or copied without the consent of the first party.

25. Confidentiality: Except as may otherwise be required by law, each party will hold confidential, during and after the term of this Agreement, any confidential information disclosed to it or its representatives, and will not disclose any such confidential information to any third party.

CLAUSE 4: VALIDITY

26. The period of the agreement is valid for a period of **2** years from the date of signing of this agreement

27. This agreement will be valid only at the intentions of the parties involved therein, this MOU could be dissolved or cancelled by either party any time by giving 30 days' notice and shall not have any legal bindings in nature. should either or all the parties to it opt to not act upon, the MOU loses its validity.

CLAUSE 5: RELATIONSHIP BETWEEN THE PARTIES

28. It is expressly agreed that First Party and Second Party are acting under this MOU as independent contractors, and the relationship established under this MOU shall not be construed as a partnership. Neither Party is authorized to use the other Party's name to make any representations or create any obligation or liability, expressed or implied, on behalf of the

other Party, without the prior written consent of the other Party. Neither Party shall have, nor represent itself as having, any authority under the terms of this MOU to make agreements of any kind in the name of or binding upon the other Party, to pledge the other Party's credit, or to extend credit on behalf of the other Party.

PRINCIPAL
S.V. COLLEGE OF ENGINEERING
KARAKAMBADI ROAD
TIRUPATI- 517 507, A.P

Scanned with OKEN Scanner

EXCELR
Raising Excellence

AGREED:

For: ExcelR Edtech Pvt Ltd.

Authorized Signatory
Mr. Shyam Narayan
Director, HR, ExcelR.

Mr. Vineeth Perumalla
Title: Manager-Business Development
Mobile No: 92810 96182
Vineeth.perumalla@excelr.com
www.excelr.com

For:
Sri Venkateswara College of Engineering
(Autonomous)
Tirupati, Andhra Pradesh

Authorized Signatory
Dr. N Sudhakar Reddy,
Principal,
Sri Venkateswara College of Engineering (Autonomous),
Karkambadi Road, Tirupati.
Mobile: 8886644955

SRI VENKATESWARA COLLEGE OF ENGINEERING
SV COLLEGES Since 1981
TIRUPATI

Dr. R Swathi
Designation: Professor & HOD-CSA
Sri Venkateswara College of
Engineering, Tirupati, Andhra Pradesh.
Mobile: 9381069694

HEAD OF THE DEPARTMENT
COMPUTER SCIENCE & ENGINEERING (AI & ML)
S.V. COLLEGE OF ENGINEERING
KARAKAMBADI ROAD, TIRUPATI-517 507

Scanned with OKEN Scanner



ఆంధ్రప్రదేశ్ आंध्र प्रदेश ANDHRA PRADESH 85AA 747214

S.No. 13685 Date.18-11-2022, Rs.20/-

Purchased by:Dr.N.SUDHAKAR REDDY (PRINCIPAL), TIRUPATI.

For Whom:SRI VENKATESWARA COLLEGE OF ENGINEERING (AUTONOMOUS).

C. KALPANAMMA
LICENCED STAMP VENDOR
L.No. 10-22-034/2012,R.L.No. 10-22-611/2021
D.No. 20-5-234B Sanjay Gandhi Colony, Kotlagunta
TIRUPATI-517501 Cell: 9515791213

MEMORANDUM OF UNDERSTANDING

BETWEEN

This MoU is entered between the **Department of Electrical and Electronics Engineering, Sri Venkateswara College of Engineering (Autonomous)**, Tirupati-517507 hereinafter called the **"SVCE"** and represented by its **Principal, Dr. N Sudhakar Reddy.**

AND

BhairavIndustriees, Pump & Motor Manufacture in Coimbatore, having its residential office at 345/2, Velankurichi Road (Near VisakhapatnamSteel Yard), Thaneerpandal Road, Peelamedu, Coimbatore, Tamil Nadu 641004herein called **"BIPMM"** and represented by its **CEO, Mr. S.C. Tiwari**.

SRI VENKATESWARA COLLEGE OF ENGINEERING
SV COLLEGES Since 1981
TIRUPATI

BHAIRAV INDUSTRIES
CBE

Scanned with CamScanner

Objective and purpose of this MOU:

(i) To improve the skills of engineering students in Pump & Motor manufacturing-related technologies.

(ii) To bridge the gap between Academic Knowledge and Industrial requirement

(iii) To provide opportunities for the Electrical and Electronics Engineering students of SVCE to undergo Industrial Training through Value added courses and to take up projects.

(iv) To provide Internship, in-plant training, and project help for the students

(v) To train Electrical Engineers right from scratch to reach the global market with expertise in technical solutions faced in Industries.

Roles and Responsibilities of the MoU signing company

(i) To allow students and faculty members of SVCEto research and development works related to their fields. Problems identified in thrust areas during the course of interaction between SVCE and BIPMM will be addressed through collaborative work between the SVCE and Industry for further research and Problem-solving.

(ii) To allow students of SVCE for the live project works aimed at building confidence to get prepared for a smooth transition from an academic to a professional working environment.

(iii) To guide and assist the students of the SVCE in getting better Industrial Placements

(iv) To identify and help the faculty members in taking up R&D Projects.

(v) To provide internships for the best-performing individuals.

Roles and Responsibilities of SVCE

(i) To create awareness among students about Industrial Automation and Motor & Pump system technologies.

(ii) To undertake consultancy work from BIPMM.

(iii) To provide classroom/LCD and audio facilities and laboratory facilities as required for the training of Electrical Engineering students and faculty by BIPMM.

(iv) To train the faculty of SVCE on the latest technologies and techniques like Automation and the Internet of Things.

SRI VENKATESWARA COLLEGE OF ENGINEERING * TIRUPATI * SV COLLEGES Since 1981

BHAIRAV INDUSTRIES * CBE *

Scanned with CamScanner

Time frame

1. This MoU shall become effective on the date of its signing by both parties and continue to be in force for Five (5) years.
2. Both parties may terminate this MoU upon 30 calendar days' notice in writing. In the event of termination, both parties have to discharge their obligations.

General

In the event of any issue to be resolved which is beyond the control of the nominated persons of both parties,the proprietor and the head who are the signatories to this MoU can discuss directly and resolve them.

There is **no financial commitment** on both parties to take up any program mentioned in the MoU.

Relationship between the Parties

It is expressly agreed that the First party and Second party are acting under this MoU as independent contractors, and the relationship established under this MoU shall not be constructed as a partnership. Neither party is authorized to use the other party's name in any way, to make any representations, or create any obligations or liability, expressed or implied, on behalf of the other party, without the prior written consent of the other party.

It is desired that both parties take steps to have the minimum following activities on signing the MoU.

1. Identification of areas of interest between the parties which may eventually lead to the development of a product/published paper. There shall be a minimum of one outcome in this category during a year.
2. Identification of expertise to share resources in the form of workshops/Seminars/ Webinars. There shall be a minimum of one outcome of this category during one semester.

FIRST PARTY
Sri Venkateswara College of Engineering (Autonomous)
Tirupati

SRI VENKATESWARA COLLEGE OF ENGINEERING
SV COLLEGES
Since 1981
TIRUPATI

SECOND PARTY
BhairavIndustriees
Coimbatore

BHAIRAV INDUSTRIEES
No.345/2,Vilankurichi Road,
Thanneerpandhal,
Peelamedu,
Coimbatore - 641 004.

Scanned with CamScanner



ఆంధ్రప్రదేశ్ आंध्र प्रदेश ANDHRA PRADESH

Sl. No. 799 Date 19/3/16 Rs. 10/-

Sold to Sri. A. Gangi Reddy S/o A. Chinna Chenna Reddy

For Whom Sri. The Chairman S.V. College of Engineering

50AA 498344

K. Vasundhara

K. VASUNDHARA

Licensed Stamp Vendor

L.No: 10-22-017/15

7-1-21/A, R.N.Mada Street

TIRUPATI-517507, Cell No: 9490182747

MEMORANDUM OF UNDERSTANDING (MOU)

This MOU is made and entered into on 5th December 2022 **Sri Venkateswara College of Engineering** (Here in after referred to as SVCE and **M/s. Sri Shasha Prayathi Technologies Pvt. Ltd.,** (Here in after referred to as SSPT) for the purpose of enriching the technical education process and for continuous interaction between industry and institution.

Sri Venkateswara College of Engineering (SVCE) is a private engineering college established in the year 2007, at Tirupati, Andhra Pradesh. The college is affiliated to Jawaharlal Nehru Technological University and is approved by AICTE. It is an Autonomous Institution. It offers UG & PG courses in the field of Engineering, Management & Computer Applications. The college has state-of-the-art infrastructure and qualified faculties to deliver high-quality technical education

PRINCIPAL
S.V. COLLEGE OF ENGINEERING
TARAKAMBADI ROAD
TIRUPATI-517 507, A.P.

Scanned with OKEN Scanner

MEMORANDUM OF UNDERSTANDING BETWEEN SVCE AND SSPT

The SVCE and SSPT, agree to share the information of mutual concern and interest in the following areas.

- Industrial training and academic projects for students of SVCE by the Engineers of SSPT.
- Provision of experts and their ideas in Innovation oriented projects and partnerships in areas like Radar Signal Processing, VLSI based Signal Processing, Machine Learning and Deep Learning for Radar System, Millimeter wave radar sensors, Software defined Radios, Arduino based IoT Applications.
- Short – Term Activities of mutual interest including technical consultancy.
- Long – Term Development program on topics of mutual interest.

THE RESPONSIBILITIES OF THE SVCE AND SSPT UNDER THIS MOU ARE DETAILED BELOW

- The SVCE and SSPT shall extend each other's facilities such as Computers Software, workshops, sophisticated equipments, instruments etc, and library facilities according to rules and regulations of each party as per the conditions laid down by the parties.
- Engineers of SSPT to serve as faculty to guide in the development programs of mutual interest and conduct of intensive courses.
- Design and Development of curriculum in new areas of Engineering & Technology, particularly with short- and long-term courses in Embedded Systems, VLSI, Radar Signal Processing (MATLAB), Machine Learning and Deep Learning for Radar System, Millimeter wave radar sensors, Software defined Radios, Arduino based IoT Applications which will be beneficial to the students of SVCE. The SSPT has coordination with the faculty of SVCE and R&D Engineers of SSPT in order to bring out good instruction manuals, which will benefit both parties.
- The Engineers from SSPT will deliver special lectures on the current development, which will be very useful for students to update their knowledge.
- The procedural aspects and responsibilities of the collaboration will be based on mutually agreed terms. A committee shall be constituted with the members of SVCE faculty and Engineers of SSPT to identify the areas for collaborative programs.

PRINCIPAL
S.V. COLLEGE OF ENGINEERING
KARAKAMBADI ROAD
TIRUPATI-517 507, A.P.

Scanned with OKEN Scanner

PERIOD AGREEMENT

This agreement becomes effective on the date of signature and continues for 5 years. It may be modified by mutual consent of both the parties. The agreement may be terminated by any party upon 60 days advance written notice to the other party.

ACCEPTANCE AND APPROVAL OF AUTHORIZING OFFICIALS

Authorized Signatory

Name: Dr. N Sudhakar Reddy

Designation: PRINCIPAL
Sri Venkateswara College of
Engineering (SVCE)
Karkambadi Road,
TIRUPATHI – 517 507

Authorized Signatory

For

Name: Mr. Yeswanth Pattipati

Designation: Director
Sri Shasha Prayathi Technologies Pvt. Ltd
Nursery Unit 12(b), NITK- STEP
Srinivasnagar P.O., Mangalore
Karnataka-575025

SRI VENKATESWARA COLLEGE OF ENGINEERING
SV COLLEGES
Since 1981
TIRUPATI

Scanned with OKEN Scanner

Memorandum of Understanding (MoU) for Industry Academia Collaboration

This Memorandum of Understanding ("MOU") for general cooperation is entered into an effective as of **03-08-2021** by and between:

Entuple Technologies Pvt. Ltd., having its registered office at #2730, Trikannika, 80 Feet Road, Opp. C M H Hospital, HAL III Stage, Indiranagar, Bangalore - 560038. hereinafter referred to as "COMPANY", which expression shall, unless it is repugnant to the context thereof be deemed to include all its successors and assignees represented by its board of Directors of the FIRST PARTY.

AND

Sri Venkateswara College Of Engineering, an Educational Institution registered under the Council for Social Development Society and having its office at, Karkambadi road, opposite to LIC Training Centre Tirupati, Andhra Pradesh-517 507, and represented by its authorized signatory Director/Principal, Dr. N. Sudhakar Reddy herein after referred to as "SVCE" hereinafter referred to as "INSTITUTION" which expression shall, unless it is repugnant to the context thereof be deemed to include its successors and assignees represented by its Registrar of the SECOND PARTY.

COMPANY AND INSTITUTION shall hereinafter be individually referred to as "Party" and collectively referred to as the "Parties"

Now, therefore this MoU witnesses:

I - PURPOSE

Entuple & S.V.College of Engineering hereby establish this memorandum of understanding (MOU) to express their desire to work together in areas of skill development and capacity building activities for students, faculty.

ENTUPLE TECHNOLOGIES PVT. LTD. BANGALORE INDIA

Entuple & S.V.College of Engineering wish to explore a mutual beneficial relationship to:

- Facilitating Industry and Academia interactions for the benefit of upskilling faculty on a regular basis and ensure they impart the relevant technology foundation and application skill to students using the appropriate teaching methodology, tools and infrastructure time to time.
- Drive skill development focused value-added courses, job-oriented courses to students to assist them to acquire the skill desired by industry
- Providing industry relevant project ideas for student projects
- Providing industry relevant R & D project ideas for faculty projects

II - ROLES AND RESPONSIBILITIES

This MOU sets forth the general roles and responsibilities that the parties propose to follow as they cooperate in the exchange of information in order to collaborate further in the areas which are mutually beneficial to the charter and mission of both Entuple & S.V.College of Engineering.

The broad areas of engagement that have been identified as part of this general cooperation agreement are:

A. Entuple & S.V.College of Engineering will endeavor to set a joint agenda on an annual basis in aid of implementing the purpose
B. Entuple will work with S.V.College of Engineering as Industry Partner for competency/skill development activities

COMPANY Responsibilities:

A. ENTUPLE to support S.V.College of Engineering has Industry Partner in VLSI Design, RF and Antenna Design, Electronic Circuit Design and Simulation, Electromagnetics & Electro-Magnetics System Analysis and IoT System design and allied areas of mutual interest.
B. Entuple to support S.V.College of Engineering in framing/upgrading curriculum in the defined technology as industry partner.

ENTUPLE TECHNOLOGIES PVT. LTD. BANGALORE INDIA

C. Entuple to support short term courses/ training cum internship programs and/or Career Builder Programs for students to increase awareness on VLSI Design, RF and Antenna Design, Electronic Circuit Design and Simulation, Electromagnetics & Electro-Magnetics System Analysis and IoT System design and allied technologies.

D. The duration, schedule, commercials, and revenue sharing of all training programs are jointly devised by COMPANY AND S.V.College of Engineering.

INSTITUTION Responsibilities:

1. S.V.College of Engineering to upgrade curriculum as per the inputs from INDUSTRY partner and implement the same in delivery of courses in the curriculum
2. S.V.College of Engineering to be responsible for providing Hardware - PCs & networking, basic Operating systems software & pertinent equipment & software required for FDP/Short Term Courses & Training cum Internship Programs at campus
3. S.V.College of Engineering to encourage faculty and students to actively participate in FDP and training programs driven jointly.
4. S.V.College of Engineering shall drive minimum batch size and number of programs per annum as per mutually agreed terms and conditions
5. S.V.College of Engineering shall designate a faculty coordinator for all training programs to coordinate with COMPANY in scheduling, execution of all training programs
6. S.V.College of Engineering shall make payment to the COMPANY the training charges as per mutually agreed terms & conditions

ENTUPLE TECHNOLOGIES PVT. LTD. BANGALORE INDIA

IV Training Programs focused on Skill Enhancement

Training Programs focused on Skill Enhancement & mode delivery supported

a. **Short Term Courses (Online/Classroom)** – Upto 5 days–
   Classroom training is supported at campus
b. **Training cum Internship Programs for students (Online and Classroom):** Upto 4 weeks
   Classroom training is supported at campus
c. **Career Builder Programs (Online/Classroom):** Upto 4 months
   Classroom delivery only at Entuple Technologies, Bangalore

V Activities Benefitting Host institution under MoU

1) S.V.College of Engineering can conduct free Webinar/workshop in association with Entuple technologies as per mutually agreed schedules and mode of operandi
2) S.V.College of Engineering can conduct paid Faculty Development Program (FDP), Short Term Training Programs (STTP), Training cum Internship Program, Career Builder Programs in association with Entuple. These programs are aimed at providing industry skills in campus and boost competency and employability of students.
3) The cost of all training programs is decided mutually by INSTITUTION & COMPANY.
4) Under this MoU S.V.College of Engineering & Entuple agree for a revenue share of 30:70 respectively for all training programs jointly driven under mutually agreed terms & conditions
5) The minimum batch size for all training programs and number of batches per annum as per mutually agreed terms and conditions.
6) All training programs cost is subject to level of complexity and expertise level as per the discretion of Entuple
7) All the training information will be sent to the mail id given by the institution.
8) Entuple shall support one day Career guidance program every year either onsite or online
9) Special discounted price for Virtual Lab options supported by Entuple technologies.
10) Two faculty can avail free entry for selected programs under this MoU
11) Entuple technical team will provide support for institution in forming the curriculum and upgrade

ENTUPLE TECHNOLOGIES PVT. LTD. BANGALORE INDIA

12) COMPANY shall accommodate students from S.V.College of Engineering for industrial visits and technical discussions at a mutually agreed terms and conditions. The field visits to serve the industrial exposure to faculty and students of S.V.College of Engineering

VI - INTELLETUAL PROPERTY

a. The term "intellectual property" as used herein means all intellectual property, whether or not capable of being registered, including but not limited to patents, copyright, computer software, code, design, chip technology rights, mask works, trade secrets, know how technique, methodologies, trademark, service mark, logo ,trade name and corporate names.

b. It is hereby expressly clarified that any intellectual property independently created by S.V.College of Engineering /its faculty/Student at the Entuple center for excellence which is not derived from and does not embody Entuple intellectual property or Entuple confidential information shall vest solely with S.V.College of Engineering, and Entuple shall not be entitled to the same unless and until specifically agreed upon prior to or during the engagement.

VII – RELATIONSHIP

S.V.College of Engineering understands and acknowledges that its relationship with COMPANY or its affiliate will be that of an independent principal and nothing in this agreement is intended to or should be construed to create a partnership, joint venture, agency or employer-employee relationship and neither party shall have any authority of the other otherwise than as strictly provided herein

VIII – TERMS AND TERMINATION

1) This MoU shall become effective from the date hereof and shall remain in force unless terminated in accordance with provisions for a duration of 3 years.
2) Entuple and S.V.College of Engineering may extend the areas of collaboration on mutual discussion, agreeable terms, and conditions time to time.
3) Institution shall be provided by a unique id and students needs to enter the ID number while making the payment for any of the programs conducted/supported by Entuple

ENTUPLE TECHNOLOGIES PVT. LTD. BANGALORE INDIA

4) All programs should be published in S.V.College of Engineering website and social media channels/notice board or through email or other channels of communication to all students all times.
5) The MOU shall be renewed for the consecutive year only if - Minimum number of training programs with agreed batch size is facilitated by S.V.College of Engineering and executed by INDUSTRY at mutually agreed terms and conditions
6) The MOU shall be renewed after every two years.

7) This MoU may be terminated by either party hereto if another party commits material breach or default in performance of its obligations hereunder and the same (if capable of being remedied), has not been cured within 30 (thirty) days of receipt of written notice of such breach or default.
8) In case of termination of agreement by S.V.College of Engineering, the institution is obliged to give an undertaking stating that any part of training content IP including source content, illustrations, design case studies will not be used/reproduced in any format without prior written permission for any training related activities the institution might choose to offer and execute either independently or in collaboration with any other 3rd party. Violation of this may warrant legal implications subject to the discretion of Entuple Technologies Private Limited, Bangalore.
9) The termination hereof shall not serve to release a Party from the performance of such of its obligations as may have arisen prior to termination.

In WITNESS WHEREOF, the Parties have caused this MOU to be signed by their duly authorized representatives as of the MOU effective date above.

WITNESSES:

For S.V.College of Engineering

Name: Dr.N. SUDHAKAR REDDY
Designation: PRINCIPAL

Signature:
Date:

For Entuple Technologies Pvt. Ltd.

Name: Mehta S D – Director Sales

Designation:

Signature: _____
Date:

MEMORANDUM OF UNDERSTANDING

HYDERABAD INSTITUTE OF ELECTRICAL ENGINEERS (HIEE)

AND

SRI VENKATESWARA COLLEGE OF ENGINEERING (SVCE)

This Memorandum of Understanding (MoU) establishes a type of partnership between **HIEE** and **SVCE**.

I. MISSION:

Hyderabad Institute of Electrical Engineers (HIEE) an ISO certified Pioneer Finishing School in India for Electrical designing courses, located in Hyderabad. Designed with the intent of bridging the gap between the academics & industry from the year 2010 onwards and trained more than 6000 students as on date.

Sri Venkateswara College of Engineering (SVCE) ensures setting high standards in imparting professional education by employing proven new education methodologies along with the measurable techniques which would help both the faculty & students to make learning a great experience to help them embrace the opportunity suiting them.

The Memorandum of Understanding to promote PLACEMENTS, INTERNSHIPS, WORKSHOP's AND PROJECTS. Accordingly, HIEE and SVCE operating under this MoU agree as follows:

II. PURPOSE AND SCOPE

HIEE and SVCE describe the intended results or effects that the organizations hope to achieve, and the area(s) that the specific activities will cover.

BENEFITS TO SVCE:

- Job oriented training
- Practical Oriented sessions
- Real time projects
- Industry visits
- Certificates
- Placements
- Workshops and guest lectures
- Internships

Dr. N. SUDHAKAR REDDY
M.Tech.,Ph.D.
PRINCIPAL
S.V. COLLEGE OF ENGINEERING
KARAKAMBADI ROAD
TIRUPATI - 517 507, A.P.

Scanned with CamScanner

BENEFITS TO HIEE- EMPOWERING ENGINEERS:

- This would strengthen our Effort of being the one of the preferred Premier Finishing School in India.
- We are in this Space of Establishing the Connect Between the academics & Industry for over a decade and this role of ours would help us build the careers of the upcoming generation of qualified engineers.
- Develop HIEE as the most desired platform for the Core Engineers serving both the student and industry.

BENEFITS TO THE STUDENTS OF:

- 2nd year students for workshops Industry visits
- 3rd year students for Internship programs and mini projects
- 4th year Final Semester students for Job oriented training with Placements.

Note: All the courses are provided with Certificates.

III. TERMS OF UNDERSTANDING:

The term of this MoU is for a period of 3 years with effect from 09/09/2021. This MoU can be extended upon written mutual agreement. It shall be reviewed annually to ensure that it is fulfilling its purpose and to make any necessary revisions.
Either organization may terminate this MoU upon thirty (30) days written notice without penalties or liabilities.

AUTHORIZATION:

The signing of this MoU is not a formal undertaking. It implies that the signatories will strive to reach, to the best of their ability, the objectives stated in the MoU.

On behalf of the organization I represent, I wish to sign this MoU and contribute to its further development.

Note:

1. There will be no financial commitments between HIEE and SVCE.

2. All the courses are provided with Certificates& few Programs would be on chargeable basis which would be informed to the students directly. Placements are the additional support on a non-chargeable basis.

Dr. N. SUDHAKAR REDDY
M.Tech.,Ph.D.
PRINCIPAL
S.V. COLLEGE OF ENGINEERING
KARAKAMBADI ROAD
TIRUPATI

Hyderabad

Scanned with CamScanner

Partnering organization:

HYDERABAD INSTITUTE OF ELECTRICAL ENGINEERS (HIEE)
GST No: **36AAIFH5036P1ZX**
AICTE Organization Reference ID: CORPORATE612f1d8dadeeb1630477709

Name: (Hdars)

Date: 09/09/2021.

Designation: (Manager Marketing)

Your organization:

SRI VENKATESWARA COLLEGE OF ENGINEERING (SVCE)

Name: Dr. N. SUDHAKAR REDDY
M.Tech.,Ph.D.
PRINCIPAL
S.V. COLLEGE OF ENGINEERING
KARAKAMBADI ROAD
TIRUPATI - 517 507

Date: 09/09/2021.

Scanned with CamScanner

R23 ACADEMIC REGULATIONS

COURSE STRUCTURE AND SYLLABI

of

I & II B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING

FOR

B.TECH. REGULAR FOUR YEAR DEGREE PROGRAM

(For the batches admitted from 2023-24)

&

B.TECH. LATERAL ENTRY PROGRAM

(For the batches admitted from 2024-25)

CHOICE BASED CREDIT SYSTEM

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

(Affiliated to J.N.T. University Anantapur, Ananthapuramu, Accredited by NBA & NAAC "A")

Karakambadi Road, Tirupati - 517 507

Vision

To be a centre of excellence focusing on high quality technical education, research and technical services with global leadership competence to succeed in employment and higher education with ethical, social, entrepreneurial aspects updating to the real time requirements.

Mission

M 1: To impart high quality technical education by providing the state-of-the art infrastructure, core instruction.

M 2: Advanced research and technical consultancy services with qualified and senior faculty.

M 3: To prepare the students professionally deft and intellectually adept possessing excellent skill, knowledge and behavior with global competence.

Department of Electronics and Communication Engineering

Vision

To be a focal centre for Academic excellence in competing global standards and dynamics in the field of Electronics and Communication Engineering with research and services focusing on effective communication skills, entrepreneurial, ethical and social concern.

Mission

M 1: To impart quality technical education in Electronics and Communication Engineering with well established infrastructure, state-of-art laboratories core instructions and cognizant faculty.

M 2: To prepare the young and dynamic Electronics and Communication Engineers professionally deft and intellectually adept with knowledge, behavior and information competency.

M 3: To enable the learners for changing trends in the field of Electronics and Communication Engineering with a focus on career guidance, placements and higher education by industry institute relationship.

PROGRAM EDUCATIONAL OBJECTIVES

PEO1: Graduates should be cognizant in basic science, fundamental engineering stream along with core related domains in ECE and Allied fields.

PEO2: Graduates should understand issues related to design, problem solving, and intellectually adept with knowledge, behavior and information competency.

PEO3: Graduates should demonstrate their technical, communication, research, aptitudes along with leadership skills in professional environment to empower employability, higher education and entrepreneurs successfully through industry-institute interaction.

PEO4: Graduates should be motivated with high ethical, human values and team work towards development of the society.

PROGRAM OUTCOMES

PO1: **Engineering Knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: **Problem Analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: **Design/Development of Solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations

PO4: **Conduct Investigations of Complex Problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: **Modern Tool Usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: **The Engineer and Society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: **Environment and Sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: **Individual and Team Work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES

PSO 1: An ability to get an employment in Electronics and Communication Engineering field and related industries and to participate & succeed in competitive examinations like GRE, GATE, TOEFL, PSUs, etc.

PSO 2: Should be able to design and test various electronic systems that perform analog and digital processing functions.

PRELIMINARY DEFINITIONS AND NOMENCLATURE

AICTE: Means All India Council for Technical Education, New Delhi.

Autonomous Institute: Means an institute designated as Autonomous by University Grants Commission (UGC), New Delhi in concurrence with affiliating University (**Jawaharlal Nehru Technological University Anantapur**).

Academic Autonomy: Means freedom to an institute in all aspects of conducting its academic programmes granted by UGC for promoting excellence.

Academic Council: The Academic Council is the highest academic body of the institute and is responsible for the maintenance of standards of instruction, education and examination within the institute. Academic Council is an authority as per UGC regulations and it has the right to take decisions on all academic matters including academic research.

Branch: Means specialization in a programme like B.Tech. degree programme in Civil Engineering, B.Tech. degree programme in Computer Science and Engineering etc.

Board of Studies (BOS): BOS is an authority as defined in UGC regulations, constituted by Head of the Organization for each of the departments separately. They are responsible for curriculum design and updation in respect of all the programmes offered by a department.

Backlog Course: A course is considered to be a backlog course, if the student has obtained a failure grade in that course.

Commission: Means University Grants Commission (UGC), New Delhi.

Certificate Course: It is a course that makes a student to have hands-on expertise and skills required for holistic development in a specific area/field.

Internal Examination: It is an examination conducted towards sessional assessment.
Core: The courses that are the essential constituents of each engineering discipline are categorized as professional core courses for that discipline.

Course: A course is a subject offered by a department for learning in a particular semester.

Course Outcomes: The essential skills that need to be acquired by every student through a course.

Credit: A credit is a unit that gives weight to the value, level or time requirements of an academic course. The number of 'Contact Hours' in a week of a particular course determines its credit value.

Credit Point: It is the product of grade point and number of credits for a course.

Cumulative Grade Point Average (CGPA): It is a measure of cumulative performance of a student overall the completed semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of the total credits of all courses in all the semesters. It is expressed up to two decimal places.

Curriculum: Curriculum incorporates the planned interaction of students with instructional content, materials & resources.

Department: An academic entity that conducts relevant curricular and co-curricular activities, involving both teaching and non-teaching staff, and other resources in the process of study for a degree.

Detention in a Semester: Student who does not obtain minimum prescribed attendance in a Semester shall be detained in that particular Semester. A Student can also be detained for lack of required number of credits at the end of IV semester or VI semester respectively.

Elective Course: A course that can be chosen from a set of courses. An elective can be Professional Elective and/or Open Elective.

Evaluation: Evaluation is the process of judging the academic performance of the student in her/his courses. It is done through a combination of continuous internal examinations and semester end examinations.

Grade: It is an index of the performance of the students in a said course. Grades are indicated by alphabets.

Grade Point: It is a numerical weight allotted to each letter grade on a 10 - point scale.

Institute: Represents Sri Venkateswara College of Engineering, Tirupati unless indicated otherwise by the context.

Massive Open Online Courses (MOOC): MOOCs inculcate the habit of self-learning. MOOCs would be additional choices in all the elective group courses.

Minor: Minor are coherent sequences of courses which may be taken in addition to the courses required for the B.Tech. degree.

Pre-requisite: A specific course or subject, the knowledge of which is required to complete before student register another course at the next grade level.

Professional Elective: It indicates a course that is discipline centric. An appropriate choice of minimum number of such electives as specified in the programme will lead to a degree with specialization.

Programme: Denotes UG degree programme: Bachelor of Technology (B.Tech.).

Project work: It is a design or research-based work to be taken up by a student during his / her VIII semester to achieve a particular aim. It is a credit-based course and is to be planned carefully by the student.

Registration: Process of enrolling into a set of courses in a semester of a programme.

Regulations: The regulations, common to all B.Tech. programmes offered by Institute, are designated as "SVCE – R23" and are binding on all the stakeholders.

Semester: It is a period of study consisting of 90 working days. Odd semester commences usually in July and even semester in December of every year.

Semester End Examinations: It is an examination conducted for all courses offered in a semester at the end of the semester.

University: Represents Jawaharlal Nehru Technological University Anantapur (JNTUA), Ananthapuramu.

Table of Contents

PRELIMINARY DEFINITIONS AND NOMENCLATURE 8
1. About the College 11
1.1 Applicability 11
1.2 Extent 11
2. Vision and Mission 11
3. Programmes Offered 11
4. Award of the Degree 12
5. Admissions 12
6. Program related terms 12
7. Semester / Credits 13
8. Structure of the Undergraduate Programme 13
9. Course Classification 13
10. Programme Pattern 14
11. Evaluation Process 15
11.1 Theory Courses 15
(a) Continuous Internal/Evaluation 15
(b) End Examinaion Evaluation 16
11.2 Practical Courses 16
12. Skill Oriented Courses 18
13. Massive Open online courses (MOOCs) 19
14. Credit Transfer Policy 19
15. Academic Bank of Credits (ABC) 20
16. Mandatory Internships 20
16.1 Summer Internships. 20
16.2 Full Semester Internship and Project Work. 20
17. Guidelines for Offering Minor 21
18. Guidelines for Offering Honors 21
19. Enrolment into Honors 22
20. Registration for Honors 22
21. Attendance Requirements 22
22. Promotion Rules 23
23. Grading 23
24. Award of Class 24
25. Recounting / Revaluation 24
26. Supplementary Examinations 25
27. Withhoding of Results 25
28. Re-Registration for Improvement of Internal Marks 25
29. Multiple Entry / Exit Option 25
30. Gap Year Concept 26
31. Transitory Regulations 26
32. Minimum Intruction days for a Semester 26
33. Medium of Instructions 26
34. Student Transfers 26
35. General Instructions 26
36. Amendment to Regulations 27
37. Rules for Disciplinary Action for Malpractices 27
38. Academic Regulations (R23), for B.Tech (Lateral Entry Scheme) 31

1. About the College

Sri Venkateswara College of Engineering (SVCE) is a part of **SV Colleges** group established in the year 2007 with a vision to become a leader in providing quality educational services.

College is affiliated to JNTUA & approved by AICTE, recognized under **section 2 (f)** & **12 (B)** of UGC act 1956. Accredited by NAAC with A grade. Six B.Tech. Programmes CSE, ECE, EEE, IT, ME & CE are accredited by NBA New Delhi. The Campus is equipped with state of art laboratories of centre of excellence through advanced tools and technologies.

Learning at **Sri Venkateswara College of Engineering** has a pragmatic approach with a clear focus, valuing individual vision, intellectual discipline, and a sense of teamwork. We aim at developing our students to their full potential, preparing them to take the next step towards career success.

Sri Venkateswara College of Engineering is committed to its role in creating leaders through its innovative programmes, outstanding faculty and effective leadership. **Sri Venkateswara College of Engineering** nurtures global leaders who can speak their minds and work well with others in a wide range of cultural contexts. It will develop their ability to manage a career successfully in the global economy.

Our teaching modes and methods of assessment vary between courses to ensure that you gain the most benefit from the interactive course content, faculty members, fellow students, and invited guests. Lectures comprise only a portion of course delivery, with the remaining taken up by discussions, seminars, case analysis, simulation, individual and group projects, and presentations.

1.1 Applicability

All the rules specified herein, approved by the Academic Council, shall be in force and applicable to students admitted from the academic year 2023 – 24 onwards. Any reference to "College" in these rules and regulations stands for Sri Venkateswara College of Engineering.

1.2 Extent

All the rules and regulations, specified hereinafter shall be read as a whole for the purpose of interpretation and as and when a doubt arises, the interpretation of the Chairman, Academic Council is final. It shall be ratified by the Academic Council in the forthcoming meeting. As per the requirements of statutory bodies, Principal, **Sri Venkateswara College of Engineering** shall be the Chairman, Academic Council.

2. Vision& Mission

VISION
To be a centre of excellence focusing on high quality technical education, research and technical services with global leadership competence to succeed in employment and higher education with ethical, social, entrepreneurial aspects updating to the real time requirements.

MISSION
To impart high quality technical education by providing the state-of-the art infrastructure, core instruction. Advanced research and technical consultancy services are carried with qualified and senior faculty to prepare the students professionally deft and intellectually adept possessing excellent skill, knowledge and behaviour with global competence.

3. Programmes Offered

Following programmes are offered in various branches at **Sri Venkateswara College of Engineering** leading to the award of B.Tech. Degree

S. No.	Branch
1	Civil Engineering
2	Computer Science and Engineering
3	Computer Science and Engineering (Artificial Intelligence and Machine Learning)
4	Computer Science and Engineering (Cyber Security)
5	Computer Science and Engineering (Data Science)
6	Electronics and Communication Engineering
7	Electrical and Electronics Engineering
8	Information Technology
9	Mechanical Engineering

4. Award of the Degree

a) Award of the B.Tech. Degree / B.Tech. Degree with a Minor if he/she fulfils the following:
   (i) Pursues a course of study for not less than four academic years and not more than eight academic years. However, for the students availing Gap year facility this period shall be extended by two years at the most and these two years would in addition to the maximum period permitted for graduation (Eight years).
   (ii) Registers for 160 credits and secures all 160 credits.

b) Award of B.Tech. degree with Honors if he/she fulfils the following:
   (i) Student secures additional 15 credits fulfilling all the requisites of a B.Tech. program i.e., 160 credits.
   (ii) Registering for Honors is optional.
   (iii) Honors is to be completed simultaneously with B.Tech. programme.

c) Students, who fail to fulfill all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech. course and their admission stands cancelled. This clause shall be read along with **clause 4 a) i)**.

5. Admissions

Admission to the B. Tech Program shall be made subject to the eligibility, qualifications and specialization prescribed by the A.P. State Government/University from time to time. Admissions shall be made either based on the merit rank obtained by the student in the common entrance examination conducted by the A.P. Government/University or any other order of merit approved by the A.P. Government/University, subject to reservations as prescribed by the Government/University from time to time.

6. Program related terms

Credit: A unit by which the course work is measured. It determines the number of hours of instruction required per week. One credit is equivalent to one hour of teaching (Lecture/Tutorial) or two hours of practical work/field work per week.

Credit Definition:

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
1 Hr. Practical (P) per week	0.5 credit
2 Hrs. Practical (Lab) per week	1 credit

a) Academic Year: Two consecutive (one odd + one even) semesters constitute one academic year.
b) Choice Based Credit System (CBCS): The CBCS provides a choice for students to select from the prescribed courses.

7. Semester/Credits

i. A semester comprises 90 working days and an academic year is divided into two semesters.
ii. The summer term is for eight weeks during summer vacation. Internship/ apprenticeship / work-based vocational education and training can be carried out during the summer term, especially by students who wish to exit after two semesters or four semesters of study.
iii. Regular courses may also be completed well in advance through MOOCs satisfying prerequisites.

8. Structure of the Undergraduate Programme

All courses offered for the undergraduate program (B. Tech.) are broadly classified as follows:

S.No	Category	Breakup of Credits (Total 160)	Percentage of Total Credits	AICTE Recommendations
1	Humanities and Social Science including Management (HS)	13	8%	8-9%
2	Basic Sciences (BS)	20	13%	12-16%
3	Engineering Sciences (ES)	23.5	14%	10-18%
4	Professional Core (PC)	54.5	34%	30-36%
5	Electives – Professional (PE) & Open (OE); Domain Specific Skill Enhancement Courses (SEC)	33	21%	19-23%
6	Internships & Project work (PR)	16	10%	8-11%
7	Mandatory Courses (MC)	Non-Credit	Non-Credit	-

9. Course Classification

All subjects/ courses offered for the undergraduate programme in Engineering & Technology (B.Tech. degree programmes) are broadly Classified as follows:

S. No.	Broad Course Classification	Course Category	Description
1	Foundation Course	Foundation courses	Includes Mathematics, Physics and Chemistry; fundamental engineering courses; humanities, social sciences and management courses
2	Core Courses	Professional Core Courses (PC)	Includes subjects related to the parent discipline/ department/ branch of Engineering
3	Elective Courses	Professional Elective Courses (PE)	Includes elective subjects related to the parent discipline/department/ branch of Engineering
		Open Elective Courses (OE)	Elective subjects which include interdisciplinary subjects or subjects in an area outside the parent discipline/ department/ branch of Engineering
		Domain specific skill enhancement courses (SEC)	interdisciplinary/job-oriented/domain courses which are relevant to the industry
4	Project & Internships	Internships	Summer Internships – Community based and Industry Internships; Industry
5	Audit Courses	Mandatory non-credit courses	Covering subjects of developing desired attitude among the learners

10. Programme Pattern

i. Total duration of the of B. Tech (Regular) Programme is four academic years.
ii. Each academic year of study is divided into two semesters.
iii. Minimum number of instruction days in each semester is 90 days.
iv. There shall be mandatory student induction program for fresher's, with a three-week duration before the commencement of first semester. Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, visits to local Areas, Familiarization to Dept./Branch & Innovations etc., are included as per the guidelines issued by AICTE.
v. Health/wellness/yoga/sports and NSS /NSS /Scouts & Guides / Community service activities are made mandatory as credit courses for all the under graduate students.
vi. Courses like Environmental Sciences, Indian Constitution, Technical Paper Writing & IPR are offered as non-credit mandatory courses for all the undergraduate students.
vii. Design Thinking for Innovation & Tinkering Labs are made mandatory as credit courses for all the undergraduate students.
viii. Increased flexibility for students through an increase in the elective component of the curriculum, with 05 Professional Elective courses and 04 Open Elective courses.
ix. Professional Elective Courses, include the elective courses relevant to the chosen specialization/branch. Proper choice of professional elective courses can lead to students specializing in emerging areas within the chosen field of study.

x. A total of 04 Open Electives are offered in the curriculum. A student can complete the requirement for B.Tech. Degree with a Minor within the 160 credits by opting for the courses offered through various verticals/tracks under Open Electives.
xi. While choosing the electives, students shall ensure that they do not opt for the courses with syllabus contents similar to courses already pursued.
xii. A pool of interdisciplinary/job-oriented/domain skill courses which are relevant to the industry are integrated into the curriculum of all disciplines. There shall be 05 skill-oriented courses offered during III to VII semesters. Among the five skill courses, four courses shall focus on the basic and advanced skills related to the domain/interdisciplinary courses and the other shall be a soft skills course.
xiii. Students shall undergo mandatory summer internships, for a minimum of eight weeks' duration at the end of second and third year of the programme. The internship at the end of second year shall be community oriented and industry internship at the end of third year.
xiv. There shall also be mandatory full internship in the final semester of the programme along with the project work.
xv. Undergraduate degree with Honors is introduced by the college for the students having good academic record.
xvi. Each college shall take measures to implement Virtual Labs (https://www.vlab.co.in) which provide remote access to labs in various disciplines of Engineering and will help student in learning basic and advanced concept through remote experimentation. Student shall be made to work on virtual lab experiments during the regular labs.
xvii. Each college shall assign a faculty advisor/mentor after admission to a group of students from same department to provide guidance in courses registration/career growth/placements/opportunities for higher studies/GATE/other competitive exams etc.
xviii. Preferably 25% of course work for the theory courses in every semester shall be conducted in the blended mode of learning.

11. Evaluation Process

i. The performance of a student in each semester shall be evaluated subject wise with a maximum of 100 marks for theory and 100 marks for practical subject. Summer Internships shall be evaluated for 50 marks, Full Internship & Project work in final semester shall be evaluated for 200 marks, mandatory courses with no credits shall be evaluated for 30 mid semester marks.
ii. A student has to secure not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the mid semester and end examination marks taken together for the theory, practical, design, drawing subject or project etc. In case of a mandatory course, he/she should secure 40% of the total marks.

11.1 Theory Courses

Assessment Method	**Marks**
Continuous Internal Assessment	30
Semester End Examination	70
Total	**100**

i. For theory subject, the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.

ii. For practical subject, the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End- Examination.
iii. If any course contains two different branch subjects, the syllabus shall be written in two parts with 3 units each (Part-A and Part-B) and external examination question paper shall be set with two parts each for 35 marks.

a) Continuous Internal Evaluation

i. For theory subjects, during the semester, there shall be two midterm examinations. Each midterm examination shall be evaluated for 30 marks of which 10 marks for objective paper (20 minutes duration), 15 marks for subjective paper (90 minutes duration) and 5 marks for assignment.
ii. Objective paper shall contain for 05 short answer questions with 2 marks each or maximum of 20 bits for 10 marks. Subjective paper shall contain 3 either or type questions (totally six questions from 1 to 6) of which student has to answer one from each either-or type of questions. Each question carries 10 marks. The marks obtained in the subjective paper are condensed to 15 marks.
iii. The internal evaluation for the course on **"Design Thinking and Innovation"** shall be activity based, in the form of presentations / reports as per the curriculum and shall be evaluated for 15 marks by the concerned teacher and 15 marks for internal tests. There shall be two internal tests. The internal test shall be of 20 marks for subjective paper and 10 marks for objective paper, total shall be condensed to 15 marks.

Note:

i. The objective paper shall be prepared in line with the quality of competitive examinations questions.
ii. The subjective paper shall contain 3 either or type questions of equal weight age of 10 marks. Any fraction shall be rounded off to the next higher mark.
iii. The objective paper shall be conducted by the respective institution on the day of subjective paper test.
iv. Assignments shall be in the form of problems, mini projects, design problems, slip tests, quizzes etc., depending on the course content. It should be continuous assessment throughout the semester and the average marks shall be considered.
v. If the student is absent for the mid semester examination, no re-exam shall be conducted and mid semester marks for that examination shall be considered as zero.
vi. First midterm examination shall be conducted for I, II units of syllabus with one either or type question from each unit and third either or type question from both the units. The second midterm examination shall be conducted for III, IV and V units with one either or type question from each unit.
vii. Final mid semester marks shall be arrived at by considering the marks secured by the student in both the mid examinations with 80% weight age given to the better mid exam and 20% to the other.

For Example:

Marks obtained in first mid: 25
Marks obtained in second mid: 20
Final mid semester Marks: (25x0.8) + (20x0.2) = 24

If the student is absent for any one midterm examination, the final mid semester marks shall be arrived at by considering 80% weight age to the marks secured by the student in the appeared examination and zero to the other. For Example:

Marks obtained in first mid: Absent
Marks obtained in second mid: 25
Final mid semester Marks: (25x0.8) + (0x0.2) =20

b) End Examination Evaluation

End examination of theory subjects shall have the following pattern:

i. There shall be 6 questions and all questions are compulsory.
ii. Question I shall contain 10 compulsory short answer questions for a total of 20marks such that each question carries 2 marks.
iii. There shall be 2 short answer questions from each unit. In each of the questions from 2 to 6, there shall be either/or type questions of 10 marks each. Student shall answer any one of them.
iv. The questions from 2 to 6 shall be set by covering one unit of the syllabus for each question.
v. End examination of theory subjects consisting of two parts of different subjects, for Example: Basic Electrical & Electronics Engineering shall have the following pattern:
    a. Question paper shall be in two parts viz., Part A and Part B with equal weight age of 35 marks each.
    b. In each part, question 1 shall contain 5 compulsory short answer questions for a total of 5 marks such that each question carries 1mark.
    c. In each part, questions from 2 to 4, there shall be either/or type questions of 10 marks each. Student shall answer any one of them.
    d. The questions from 2 to 4 shall be set by covering one unit of the syllabus for each question.

11.2 Practical Courses

Assessment Method	Marks
Continuous Internal Assessment	30
Semester End Examination	70
Total	100

i. For practical courses, there shall be a continuous evaluation during the semester for 30 sessional marks and end examination shall be for 70 marks.
ii. Day-to-day work in the laboratory shall be evaluated for 15 marks by the concerned laboratory teacher based on the record/viva and 15 marks for the internal test.
iii. The end examination shall be evaluated for 70 marks, conducted by the concerned laboratory teacher and a senior expert in the subject from the same department.
    - Procedure: 20 marks
    - Experimental work & Results: 30 marks
    - Viva voce: 20 marks.

    In a practical subject consisting of two parts (Eg: Basic Electrical & Electronics Engineering Lab), the end examination shall be conducted for 70 marks as a single laboratory in 3 hours. Mid semester examination shall be evaluated as above for 30 marks in each part and final mid semester marks shall be arrived by considering the average of marks obtained in two parts.
iv. For the subject having design and/or drawing, such as Engineering Drawing, the distribution of marks shall be 30 for mid semester evaluation and 70 for end examination.

    Day-to-day work shall be evaluated for 15 marks by the concerned subject teacher based on the reports/submissions prepared in the class. And there shall be two midterm examinations in a semester for duration of 2 hours each for 15 marks with weight age of 80% to better mid marks and 20% for the other. The subjective paper shall contain 3 either or type questions of equal weight age of 5 marks. There shall be no objective paper in mid semester examination. The sum of day- to-day evaluation and the mid semester marks will be the final sessional marks for the subject.

The end examination pattern for Engineering Graphics, shall consists of 5 questions, either/or type, of 14 marks each. There shall be no objective type questions in the end examination. However, the end examination pattern for other subjects related to design/drawing, multiple branches, etc is mentioned along with the syllabus.

v. There shall be no external examination for mandatory courses with zero credits. However, attendance shall be considered while calculating aggregate attendance and student shall be declared to have passed the mandatory course only when he/she secures 40% or more in the internal examinations. In case, the student fails, a re-examination shall be conducted for failed candidates for 30 marks satisfying the conditions mentioned in item 1 & 2 of the regulations.

vi. The laboratory records and mid semester test papers shall be preserved for a minimum of 3 years in the respective institutions as per the University norms and shall be produced to the Committees of the University as and when the same are asked for.

vii. Evaluation Guidelines for the courses like HEALTH AND WELLNESS, YOGA & SPORTS AND NSS/NCC/SCOUT & GUIDES/ COMMUNITY SERVICE is
   - Evaluated for a total of 100 marks.
   - A Student can select 6 activities of his/her choice with a minimum of 1 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totally to 90 marks.
   - The student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject.

12. Skill Oriented Courses

i. There shall be five skill-oriented courses offered during III to VII semesters.

ii. Out of the five skill courses two shall be skill-oriented courses from the same domain. Of the remaining three skill courses, one shall be a soft skill course and the remaining two shall be skill-advanced courses from the same domain/Interdisciplinary/Job oriented.

iii. The course shall carry 100 marks and shall be evaluated through continuous assessments during the semester for 30 sessional marks and end examination shall be for 70 marks. Day-to-day work in the class / laboratory shall be evaluated for 30 marks by the concerned teacher based on the regularity/assignments/viva/mid semester test. The end examination similar to practical examination pattern shall be conducted by the concerned teacher and an expert in the subject nominated by the principal.

iv. The Head of the Department shall identify a faculty member as coordinator for the course. A committee consisting of the Head of the Department, coordinator and a senior Faculty member nominated by the Head of the Department shall monitor the evaluation process. The marks/grades shall be assigned to the students by the above committee based on their performance.

v. The student shall be given an option to choose either the skill courses being offered by the college or to choose a certificate course being offered by industries/Professional bodies or any other accredited bodies. If a student chooses to take a Certificate Course offered by external agencies, the credits shall be awarded to the student upon producing the Course Completion Certificate from the agency. A committee shall be formed at the level of the college to evaluate the grades/marks given for a course by external agencies and convert to the equivalent marks/grades.

vi. The recommended courses offered by external agencies, conversions and appropriate grades/marks are to be approved by the College at the beginning of the semester.

vii. If a student prefers to take a certificate course offered by external agency, the department shall mark attendance of the student for the remaining courses in that semester excluding the skill course in all the calculations of mandatory attendance requirements upon producing a valid certificate as approved by the College.

13. Massive Open Online Courses (MOOCs)

A Student has to pursue and complete one course compulsorily through MOOCs approved by the College. A student can pursue courses other than core through MOOCs and it is mandatory to complete one course successfully through MOOCs for awarding the degree. A student is not permitted to register and pursue core courses through MOOCs.

A student shall register for the course (Minimum of either 8 weeks or 12 weeks) offered through MOOCs with the approval of Head of the Department. The Head of the Department shall appoint one mentor to monitor the student's progression. The student needs to earn a certificate by passing the exam. The student shall be awarded the credits assigned in the curriculum only by submission of the certificate. Examination fee, if any, will be borne by the student.

Students who have qualified in the proctored examinations conducted through MOOCs platform can apply for credit transfer as specified and are exempted from appearing internal as well as external examination (for the specified equivalent credit course only) conducted by the College.

Necessary amendments in rules and regulations regarding adoption of MOOC courses would be proposed from time to time.

14. Credit Transfer Policy

Adoption of MOOCs is mandatory, to enable Blended model of teaching-learning as also envisaged in the NEP 2020. As per University Grants Commission (Credit Framework for Online Learning Courses through SWAYAM) Regulation, 2016, the College shall allow up to a maximum of 20% of the total courses being offered in a particular programme i.e., maximum of **32** credits through MOOCs platform.

i. The College shall offer credit mobility for MOOCs and give the equivalent credit weight age to the students for the credits earned through online learning courses.
ii. Student registration for the MOOCs shall be only through the respective department of the institution, it is mandatory for the student to share necessary information with the department.
iii. Credit transfer policy will be applicable to the Professional & Open Elective courses only.
iv. The concerned department shall identify the courses permitted for credit transfer.
v. The College/institution shall notify at the beginning of semester the list of the online learning courses eligible for credit transfer.
vi. The institution shall designate a faculty member as a Mentor for each course to guide the students from registration till completion of the credit course.
vii. The College shall ensure no overlap of MOOC exams with that of the College examination schedule. In case of delay in results, the College will re-issue the marks sheet for such students.
viii. Student pursuing courses under MOOCs shall acquire the required credits only after successful completion of the course and submitting a certificate issued by the competent authority along with the percentage of marks and grades.
ix. The departments shall submit the following to the examination section of the College:
    a) List of students who have passed MOOC courses in the current semester along with the certificate of completion.
    b) Undertaking form filled by the students for credit transfer.
x. The College shall resolve any issues that may arise in the implementation of this policy from time to time and shall review its credit transfer policy in the light of periodic changes brought by UGC, SWAYAM, NPTEL and state government.

Note: Students shall be permitted to register for MOOCs offered through online platforms approved by the College from time to time.

15. Academic Bank of Credits (ABC)

The College has implemented Academic Bank of Credits (ABC) to promote flexibility in curriculum as per NEP 2020 to

i. Provide option of mobility for learners across the universities of their choice.
ii. Provide option to gain the credits through MOOCs from approved digital platforms.
iii. Facilitate award of certificate/diploma/degree in line with the accumulated credits in ABC.
iv. Execute Multiple Entry and Exit system with credit count, credit transfer and credit acceptance from students' account.

16. Mandatory Internships

16.1 Summer Internships

Two summer internships either onsite or virtual each with a minimum of 08 weeks' duration, done at the end of second and third years, respectively are mandatory. It shall be completed in collaboration with local industries, Govt. Organizations, construction agencies, Power projects, software MNCs or any industries in the areas of concerned specialization of the Undergraduate program. One of the two summer internships at the end of second year (Community Service Project) shall be society oriented and shall be completed in collaboration with government organizations/NGOs & others. The other internship at the end of third year is Industry Internship and shall be completed in collaboration with Industries. The student shall register for the internship as per course structure after commencement of academic year. The guidelines issued by the APSCHE / College shall be followed for carrying out and evaluation of Community Service Project and Industry Internship. Evaluation of the summer internships shall be through the departmental committee. A student will be required to submit a summer internship report to the concerned department and appear for an oral presentation before the departmental committee comprising of Head of the Department, supervisor of the internship and a senior faculty member of the department. A Certificate of successful completion from industry shall be included in the report. The report and the oral presentation shall carry 50% weight age each. It shall be evaluated for 50 external marks. There shall be no internal marks for Summer Internship. A student shall secure minimum 40% of marks for successful completion. In case, if a student fails, he/she shall reappear as and when semester supplementary examinations are conducted by the College.

16.2 Full Semester Internship and Project work

In the final semester, the student should mandatorily register and undergo internship (onsite/virtual) and in parallel he/she should work on a project with well-defined objectives. At the end of the semester the candidate shall submit an internship completion certificate and a project report. A student shall also be permitted to submit project report on the work carried out during the internship.

The project report shall be evaluated with an external examiner. The total marks for project work 200 marks and distribution shall be 60 marks for internal and 140 marks for external evaluation. The supervisor assesses the student for 30 marks (Report: 15 marks, Seminar: 15 marks). At the end of the semester, all projects shall be showcased at the department for the benefit of all students and staff and the same is to be evaluated by the departmental Project Review Committee consisting of supervisor, a senior faculty and HOD for 30 marks. The external evaluation of Project Work is a Viva-Voce Examination conducted in the presence of internal examiner and external examiner appointed by the College and is evaluated for 140 marks.

The college shall facilitate and monitor the student internship programs. Completion of internships is mandatory, if any student fails to complete internship, he/she will not be eligible for the award of degree. In such cases, the student shall repeat and complete the internship.

17. Guidelines for offering a Minor

To promote interdisciplinary knowledge among the students, the students admitted into B.Tech. in a major stream/branch are eligible to obtain degree in Minor in another stream.

The Minor program requires the completion of 18 credits in Minor stream chosen. 05 theory courses of 3 credits each, 2 practical courses of 1.5 credits each or a Project for 3 credits, for Minor Program.

Specialization tracks are available for Minor Program.

18. Guidelines for offering Honors

The objective of introducing B.Tech. (Hons.) is to facilitate the students to choose additionally the specialized courses of their choice and build their competence in a specialized area in the UG level. The programme is a best choice for academically excellent students having good academic record and interest towards higher studies and research.

i. Honors is introduced in the curriculum of all B. Tech. programs offering a major degree and is applicable to all B. Tech (Regular and Lateral Entry) students admitted in Engineering & Technology.
ii. A student shall earn additional 18 credits for award of B.Tech. (Honors) degree from same branch/department/discipline registered for major degree. This is in addition to the credits essential for obtaining the Undergraduate degree in Major Discipline (i.e., 160 credits).
    05 theory courses of 3 credits each, 2 practical courses of 1.5 credits each or a Project for 3 credits, for Honors Program.
    Specialization tracks are available for Honors Program.
iii. A student is permitted to register for Honors in IV semester after the results of III Semester are declared and students may be allowed to take maximum two subjects per semester pertaining to the Honors from V Semester onwards.
iv. The concerned Principal of the college shall arrange separate class work and timetable of the courses offered under Honors program.
v. Courses that are used to fulfil the student's primary major may not be double counted towards the Honors. Courses with content substantially equivalent to courses in the student's primary Major may not be counted towards the Honors.
vi. Students can complete the courses offered under Honors either in the college or in online platforms like SWAYAM with a minimum duration of 12 weeks for a 3-credit course and 8 weeks' duration for a 2-credit course satisfying the criteria for credit mobility. If the courses under Honors are offered in conventional mode, then the teaching and evaluation procedure shall be similar to regular B. Tech courses.
vii. The attendance for the registered courses under Honors and regular courses offered for Major degree in a semester are to be considered separately.
viii. A student shall maintain an attendance of 75% in all registered courses under Honors to be eligible for attending semester end examinations.
ix. A student registered for Honors shall pass in all subjects that constitute the requirement for the Honors degree program. No class/division (i.e., second class, first class and distinction, etc.) shall be awarded for Honors degree programme.
x. If a student drops or is terminated from the Honors program, the additional credits so far earned cannot be converted into open or core electives; they will remain extra. However, such students will receive a separate grade sheet mentioning the additional courses completed by them.

xi. The Honors will be mentioned in the degree certificate as Bachelor of Technology (Honors) in XYZ. For example, B.Tech. (Honors) in Mechanical Engineering.

19. Enrolment into Honors

i. Students of a Department/Discipline are eligible to opt for Honors program offered by the same Department/Discipline.
ii. The enrolment of student into Honors is based on the CGPA obtained in the major degree program. CGPA shall be taken up to III semester in case of regular entry students and only III semester in case of lateral entry students. Students having 7 CGPA without any backlog subjects will be permitted to register for Honors.
iii. If a student is detained due to lack of attendance either in Major or in Honors, registration shall be cancelled.
iv. Transfer of credits from Honors to regular B. Tech degree and vice-versa shall not be permitted.
v. Honors are to be completed simultaneously with a Major degree program.

20. Registration for Honors

i. The eligible and interested students shall apply through the HOD of his/her parent department. The whole process should be completed within one week before the start of every semester. Selected students shall be permitted to register the courses under Honors.
ii. The selected students shall submit their willingness to the principal through his/her parent department offering Honors. The parent department shall maintain the record of student pursuing the Honors.
iii. The students enrolled in the Honors courses will be monitored continuously. An advisor/mentor from parent department shall be assigned to a group of students to monitor the progress.
iv. There is no fee for registration of subjects for Honors program offered in offline at the respective institutions.

21. Attendance Requirements

i. A student shall be eligible to appear for the College external examinations if he/she acquires a minimum of 40% attendance in each subject and 75% of attendance in aggregate of all the subjects. b) Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee.
ii. Shortage of Attendance below 65% in aggregate shall in NO CASE be condoned.
iii. A stipulated fee shall be payable towards Condonation of shortage of attendance to the College.
iv. Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that class and their registration shall stand cancelled.
v. A student will not be promoted to the next semester unless he satisfies the attendance requirements of the present semester. They may seek readmission for that semester from the date of commencement of class work.
vi. If any candidate fulfils the attendance requirement in the present semester, he shall not be eligible for readmission into the same class.
vii. If the learning is carried out in blended mode (both offline & online), then the total attendance of the student shall be calculated considering the offline and online attendance of the student.
viii. For induction programme attendance shall be maintained as per AICTE norms.

22. Promotion Rules

The following academic requirements must be satisfied in addition to the attendance requirements mentioned in **section 18**.

i. A student shall be promoted from first year to second year if he/she fulfils the minimum attendance requirement as per College norms.
ii. A student will be promoted from II to III year if he/she fulfils the academic requirement of securing 40% of the credits (any ***decimal*** fraction should be ***rounded off*** to ***lower*** digit) up to in the subjects that have been studied up to III semester
iii. A student shall be promoted from III year to IV year if he/she fulfils the academic requirements of securing 40% of the credits (any ***decimal*** fraction should be ***rounded off*** to ***lower*** digit) in the subjects that have been studied up to V semester. And in case a student is detained for want of credits for a particular academic year by ii) & iii) above, the student may make up the credits through supplementary examinations and only after securing the required credits he/she shall be permitted to join in the V semester or VII semester respectively as the case may be.
iv. When a student is detained due to lack of credits/shortage of attendance he/she may be re-admitted when the semester is offered after fulfillment of academic regulations. In such case, he/she shall be in the academic regulations into which he/she is readmitted.

23. Grading

As a measure of the student's performance, a 10-point Absolute Grading System using the following Letter Grades and corresponding percentage of marks shall be followed:

After each course is evaluated for 100 marks, the marks obtained in each course will be converted to a corresponding letter grade as given below, depending on the range in which the marks obtained by the student fall.

Structure of Grading of Academic Performance

Range in which the marks in the subject fall	Grade	Grade points Assigned
90 & above	S(Superior)	10
80 – 89	A(Excellent)	9
70 – 79	B(Very Good)	8
60 – 69	C (Good)	7
50 – 59	D (Average)	6
40 – 49	E (Pass)	5
< 40	F (Fail)	0
Absent	Ab (Absent)	0

A student obtaining Grade 'F' or Grade 'Ab' in a subject shall be considered failed and will be required to reappear for that subject when it is offered the next supplementary examination.

For non-credit audit courses, "Satisfactory" or "Unsatisfactory" shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA/Percentage.

Computation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA)

The Semester Grade Point Average (SGPA) is the ratio of sum of the product of the number of credits with the grade point scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.,

$$SGPA = \sum_{i=1}^{n}(C_i \times G_i) \Big/ \sum_{i=1}^{n} C_i$$

Where, C_i is the number of credits of the ith subject, G_i is the grade point scored by the student in the ith course and n is the no. of subjects. The Cumulative Grade Point Average (CGPA) will be computed in the same manner taking into account all the courses undergone by a student over all the semesters of aprogramme, i.e.

$$CGPA = \sum_{i=1}^{n}(C_i \times S_i) \Big/ \sum_{i=1}^{n} C_i$$

Where S_i is the SGPA of the ith semester, C_i is the total number of credits in that semester and n is the no. of semesters. Both SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts. While computing the SGPA the subjects in which the student is awarded Zero grade points will also be included. Grade Point: It is a numerical weight allotted to each letter grade on a 10- point scale. Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by the letters S, A, B, C, D, E and F.

24. Award of Class

After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree, he/she shall be placed in one of the following four classes:

Class Awarded	CGPA Secured
First Class with Distinction	≥ 7.5
First Class	≥ 6.5 < 7.5
Second Class	≥ 5.5 < 6.5
Pass Class	≥ 5.0 < 5.5

CGPA to Percentage Conversion Formula – (CGPA – 0.5) x 10

25. Recounting / Revaluation

Students shall be permitted to apply for Recounting /Revaluation of the end examination answer scripts within a stipulated period after payment of the prescribed fee. After completion of the process of Recounting /Revaluation, the records are updated with changes if any, and the student shall be issued a revised grade sheet. If there are no changes, the student shall be intimated the same through a notice.

The Revaluation shall be carried out by an expert not less than Associate Professor cadre, as per the scheme of evaluation supplied by the examination branch in the presence of Principal/Controller of Examinations. Neither the students nor his parents shall be permitted to the present during the valuation.

26. Supplementary Examinations

In addition to the regular end examinations conducted, the college may also schedule and conduct supplementary examinations for all the subjects of other semesters when feasible for the benefit of students. Such candidates writing supplementary examinations may have to write more than one examination per day. For eighth semester advanced supplementary examinations will be conducted.

27. Withholding of Results

In case of indiscipline or malpractice is pending against the candidate, the result of the candidate shall be withheld and he/she shall not be allowed/promoted to the next higher semester.

28. Re-Registration for Improvement of Internal Marks

Following are the conditions to avail the benefit of improvement of internal marks.

i. The candidate should have completed the 4 years of B.Tech. course work and obtained examinations results from I semester to VIII semester.
ii. He/she should have passed all the subjects for which the internal evaluation marks secured are more than 50%
iii. Out of the subjects the candidate has failed in the examinations due to internal evaluation marks secured being less than 50%, the candidate shall be given a chance for Theory subjects and for a maximum of **three** theory subjects for improvement of internal evaluation marks.
iv. This provision is only for Theory courses. The candidate has to re-register for the chosen courses and fulfil the academic requirements (i.e., a student has to attend the classes regularly and appear for the mid-examinations and satisfy the attendance requirements to become eligible for appearing at the semester-end examinations).
v. For each subject, the candidate has to pay a prescribed fee. In the event of availing the provision of Improvement of Internal evaluation marks, the internal evaluation marks as well as the Semester-end Examinations marks secured in the previous attempt(s) for the re-registered courses shall stand cancelled.

29. Multiple Entry / Exit Option

(a) Exit Policy

The students can choose to exit the four-year programme at the end of first/second/third year.

UG Certificate in (Field of study/discipline) - Programme duration: First year (first two semesters) of the undergraduate programme, 40 credits followed by an additional exit 10-credit bridge / Skill oriented course(s) lasting two months, including at least 6- credit job-specific internship/ apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.

UG Diploma (in Field of study/discipline) - Programme duration: First two years (first four semesters) of the undergraduate programme, 80 credits followed by an additional exit 10-credit bridge / Project oriented course(s) lasting two months, including at least 6- credit job-specific internship/ apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.

Bachelor of Science (in Field of study/discipline) i.e., **B.Sc. Engineering in (Field of study/discipline)**- Programme duration: First three years (first six semesters) of the undergraduate programme, 120 credits.

(b) Entry Policy

Modalities on multiple entry by the student into the B.Tech. programme will be provided in due course of time.
Note: The Universities shall resolve any issues that may arise in the implementation of Multiple Entry and Exit policies from time to time and shall review the policies in the light of periodic changes brought by UGC, AICTE and State government.

30. Gap Year Concept

Gap year concept for Student Entrepreneur in Residence is introduced and outstanding students who wish to pursue entrepreneurship / become entrepreneur are allowed to take a break of one year at any time after II year to pursue full-time entrepreneurship programme/to establish start-ups. This period may be extended to two years at the most and these two years would not be counted for the time for the maximum time for graduation. The principal of the respective college shall forward such proposals submitted by the students to the College. An evaluation committee constituted by the College shall evaluate the proposal submitted by the student and the committee shall decide whether to permit the student(s) to avail the Gap Year or not.

31. Transitory Regulations

Discontinued, detained, or failed candidates are eligible for readmission as and when the semester is offered after fulfillment of academic regulations. Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone the course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered, subject to **section 4. (c)** and they will follow the academic regulations into which they are readmitted.

Candidates who are permitted to avail Gap Year shall be eligible for re-joining into the succeeding year of their B.Tech. from the date of commencement of class work, subject to **section 4. (c)** and they will follow the academic regulations into which they are readmitted.

32. Minimum Instruction Days for a Semester

The minimum instruction days including exams for each semester shall be 90 days.

33. Medium of Instruction

The medium of instruction of the entire B. Tech undergraduate programme in Engineering & Technology (including examinations and project reports) will be in English only.

34. Student Transfers

Student transfers shall be as per the guidelines issued by the Government of Andhra Pradesh and the Universities from time to time.

35. General Instructions

The academic regulations should be read as a whole for purpose of any interpretation.

i. Malpractices **rules-nature** and punishments are appended.
ii. Where the words "he", "him", "his", occur in the regulations, they also include "she", "her", "hers", respectively.

iii. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Head of the institution is final.
iv. The College may change or amend the academic regulations or syllabi at any time and the changes or amendments shall be made applicable to all the students on rolls with effect from the dates notified by the College.
v. In the case of any doubt or ambiguity in the interpretation of the guidelines given, the decision of the Head of the institution is final.

36. Amendments to Regulations

The Academic Council of **Sri Venkateswara College of Engineering (Autonomous)** reserves the right to revise, amend, or change the Regulations, Scheme of Examinations, and / or Syllabi or any other policy relevant to the needs of the society or industrial requirements etc., with the recommendations of the concerned Board(s) of Studies.

NOTE: FAILURE TO READ AND UNDERSTAND THE RULES & REGULATIONS IS NOT AN EXCUSE

37. Rules for Disciplinary Action for Malpractices / Improper Conduct in Examinations

S No	Nature of Malpractices/ Improper conduct	Punishment
	If the candidate	
1. (a)	Possesses or keeps accessible in Examination Hall, any paper, note book, programmable calculators, Cell phones, Pager, Palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he/she is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination).	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the Exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he/she will be handed over to the police and a case is registered against him/her.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the notice of Principal.

S No	Nature of Malpractices/ Improper conduct	Punishment
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred for four consecutive semesters from class work and all End examinations. The continuation of the course by the candidate is subject to the Academic regulations in connection with forfeiture of seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practical's and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for four consecutive semesters from class work and all end examinations, if his/her involvement is established. Otherwise, the candidate is debarred for two consecutive semesters from class work and all End examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him/her.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all End examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in Cancellation of the performance in that subject only. The answer paper or in letters to the examiners or writes to the examiner requesting him/her to award pass marks.	Cancellation of the performance in that subject only.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant - Superintendent / any Officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already

S No	Nature of Malpractices/ Improper conduct	Punishment
	organizes a walk out or instigates others to walk out, or threatens the officer-In charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-In-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. If the candidate physically assaults the invigilator/ officer-In-charge of the Examinations, then the candidate is also debarred and forfeits his/her seat. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in **clause 6** to **8**.	Student of the college's expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person (s) who do not belong to the College will be handed over to police and, a police case will be registered against them .

S No	Nature of Malpractices/ Improper conduct	Punishment
10	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as during valuation or during special scrutiny.	Cancellation of the performance in that subject only or in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester / year examinations, depending on the recommendation of the committee.
12.	If any malpractice is detected which is not covered in the above **clauses 1** to **11** shall be reported to the Principal for further action and suitable punishment.	

Note: Whenever the performance of a student is cancelled in any subject/subjects due to malpractice, he has to register for End Examinations in that subject/subjects consequently and has to fulfill all the norms required for the award of Degree.

ACADEMIC REGULATIONS (R23)
FOR B.TECH. (LATERAL ENTRY SCHEME)

(Effective for the students admitted into II year through Lateral Entry Scheme from the Academic Year **2024-25** onwards)

1. Award of the Degree

(a) Award of the B.Tech. Degree / B.Tech. Degree with a Minor if he/she fulfils the following:

i. Pursues a course of study for not less than three academic years and not more than six academic years. However, for the students availing Gap year facility this period shall be extended by two years at the most and these two years would in addition to the maximum period permitted for graduation (Six years).
ii. Registers for 120 credits and secures all 120 credits.

(b) Award of B.Tech. Degree with Honors if he/she fulfils the following:

i. Student secures additional 15 credits fulfilling all the requisites of a B.Tech. program i.e., 120 credits.
ii. Registering for Honors is optional.
iii. Honors is to be completed simultaneously with B.Tech. programme.

2. Students, who fail to fulfil the requirement for the award of the degree within six consecutive academic years from the year of admission, shall forfeit their seat.

3. Minimum Academic Requirements:

The following academic requirements have to be satisfied in addition to the requirements mentioned in item no.**2**

i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, practical, design, drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the mid semester evaluation and end examination taken together.
ii. A student shall be promoted from III year to IV year if he/she fulfils the academic requirements of securing 40% of the credits (any decimal fraction should be rounded off to lower digit) in the subjects that have been studied up to V semester. And in case if student is already detained for want of credits for particular academic year, the student may make up the credits through supplementary exams of the above exams before the commencement of IV year I semester class work of next year.

4. Course Pattern:

i. The entire course of study is three academic years on semester pattern.
ii. A student eligible to appear for the end examination in a subject but absent at it or has failed in the end examination may appear for that subject at the next supplementary examination offered.
iii. When a student is detained due to lack of credits/shortage of attendance the student may be re-admitted when the semester is offered after fulfillment of academic regulations, the student shall be in the academic regulations into which he/she is readmitted.

5. All other regulations as applicable for B. Tech. Four-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme).

COURSE STRUCTURE

B.Tech. – I Year I Semester

S. No	Course Code	Course Name	Category	Contact Periods per Week				Credits	Scheme of Examination Max. Marks		
				L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
1	EE23AES101	Basic Electrical & ElectronicsEngineering	ES	3	0	0	3	3	30	70	100
2	CH23ABS101	Chemistry	BS	3	0	0	3	3	30	70	100
3	EG23AHS101	Communicative English	HS	2	0	0	2	2	30	70	100
4	CS23AES101	Introduction to Programming	ES	3	0	0	3	3	30	70	100
5	MA23ABS101	Linear Algebra & Calculus	BS	3	0	0	3	3	30	70	100
6	CH23ABS102	Chemistry lab	BS	0	0	2	2	1	30	70	100
7	EG23AHS102	Communicative English Lab	HS	0	0	2	2	1	30	70	100
8	CS23AES102	Computer Programming Lab	ES	0	0	3	3	1.5	30	70	100
9	EE23AES102	Electrical & Electronics Engineering Workshop	ES	0	0	3	3	1.5	30	70	100
10	CH23ABS106	NSS/NCC/Scouts & Guides/Community Service	BS	0	0	1	1	0.5	100	--	100
Total				**14**	**0**	**11**	**25**	**19.5**	**370**	**630**	**1000**

B.Tech. – I Year II Semester

S. No	Course Code	Course Name	Category	Contact Periods per Week				Credits	Scheme of Examination Max. Marks		
				L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
1	ME23AES101	Basic Civil and Mechanical Engineering	ES	3	0	0	3	3	30	70	100
2	MA23ABS201	Differential Equations & Vector Calculus	BS	3	0	0	2	3	30	70	100
3	ME23AES102	Engineering Graphics	ES	1	0	4	3	3	30	70	100
4	PH23ABS101	Engineering Physics	BS	3	0	0	3	3	30	70	100
5	EC23APC201	Network Analysis	PC	3	0	0	3	3	30	70	100
6	PH23ABS102	Engineering Physics Lab	BS	0	0	2	2	1	30	70	100
7	ME23AES103	Engineering Workshop	ES	0	0	3	3	1.5	30	70	100
8	CS23AES103	IT Workshop	ES	0	0	2	2	1	30	70	100
9	EC23APC202	Network Analysis and Simulation Laboratory	PC	0	0	3	3	1.5	30	70	100
10	CH23ABS105	Health and wellness, Yoga and Sports	BS	0	0	1	1	0.5	100	--	100
Total				**13**	**0**	**15**	**25**	**20.5**	**370**	**630**	**1000**

B.Tech. – II Year I Semester

S. No	Course Code	Course Name	Category	Contact Periods per Week				Credits	Scheme of Examination Max. Marks		
				L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
1	MA23ABS305	Probability and Complex Variables	BS	3	0	0	3	3	30	70	100
2	BA23AHS302	Universal Human Values	HS	2	1	0	3	3	30	70	100
3	EC23APC301	Digital Circuits Design	PC	3	0	0	3	3	30	70	100
4	EC23APC302	Electronic Devices and Circuits	PC	3	0	0	3	3	30	70	100
5	EC23APC303	Signals, Systems and Stochastic Processes	PC	3	0	0	3	3	30	70	100
6	EC23APC304	Digital Circuits and Signal Simulation Lab	PC	0	0	3	3	1.5	30	70	100
7	EC23APC305	Electronic Devices and Circuits Lab	PC	0	0	3	3	1.5	30	70	100
8	CS23ASC302	Python Programming	SC	0	1	2	3	2	30	70	100
9	CH23AMC301	Environmental Science	MC	2	0	0	2	0	30	--	30
Total				**16**	**2**	**8**	**26**	**20**	**270**	**560**	**830**

B.Tech. – II Year II Semester

S. No	Course Code	Course Name	Category	Contact Periods per Week				Credits	Scheme of Examination Max. Marks		
				L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
1	EE23AES401	Linear Control Systems	ES	3	0	0	3	3	30	70	100
2	BA23AHS403	Managerial Economics and Financial Analysis	HS	2	0	0	2	2	30	70	100
3	EC23APC401	Analog and Digital Communications	PC	3	0	0	3	3	30	70	100
4	EC23APC402	Electronic Circuit Analysis	PC	3	0	0	3	3	30	70	100
5	EC23APC403	EM Waves and Transmission Lines	PC	3	0	0	3	3	30	70	100
6	CS23AES301	Design Thinking and Innovation	ES	1	0	2	3	2	30	70	100
7	EC23APC404	Analog and Digital Communications Lab	PC	0	0	3	3	1.5	30	70	100
8	EC23APC405	Electronic Circuit Analysis Lab	PC	0	0	3	3	1.5	30	70	100
9	EG23ASC401	Soft Skills	SC	0	1	2	3	2	30	70	100
Total				**15**	**1**	**10**	**26**	**21**	**270**	**630**	**900**
Mandatory Community Service Project Internship of 08 Weeks Duration during Summer Vacation											

I Year B.Tech. ECE – I Semester

L	T	P	C
3	0	0	3

(EE23AES101) BASIC ELECTRICAL & ELECTRONICS ENGINEERING

PART A: BASIC ELECTRICAL ENGINEERING

COURSE OBJECTIVES:

The objective of this course are to:

- To gain the knowledge about various laws, simplification techniques and principles associated with electrical circuits.
- To acquire basic knowledge about the Electric machines, their principle of operation and the concept of measuring instruments.
- To understand the concept of Power Generation, Electricity Bill and Safety Measures.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Apply the knowledge of theorems/laws to analyze the simple AC and DC circuits.
CO 2: Illustrate the operating principles of various electrical machines and electrical measuring equipment's.
CO 3: Understand the basic concepts of electrical power generation, Electricity Bill and Safety Measures.

UNIT I: (8 Periods)

DC Circuits: Electrical circuit elements (R, L and C), Ohm's Law and its limitations, KCL & KVL, series, parallel, series-parallel circuits, Super Position theorem, Simple numerical problems.

AC Circuits: A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor, Voltage and current relationship with phasor diagrams in R, L, and C circuits, Concept of Impedance, Active power, reactive power and apparent power, Concept of power factor (Simple Numerical problems).

UNIT II: (7 Periods)

Machines: Construction, principle and operation of (i) DC Motor, (ii) DC Generator, (iii) Single Phase Transformer, (iv) Three Phase Induction Motor and (v) Alternator, Applications of electrical machines.

Measuring Instruments: Construction and working principle of Permanent Magnet Moving Coil (PMMC), Moving Iron (MI) Instruments and Wheat Stone Bridge.

UNIT III: (7 Periods)

Energy Resources, Electricity Bill & Safety Measures Energy Resources: Conventional and non-conventional energy resources; Layout and operation of various Power Generation systems: Hydel, Nuclear, Solar & Wind power generation.

Electricity Bill: Power rating of household appliances including air conditioners, PCs, Laptops, Printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers.

TEXT BOOKS:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition.
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013.
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition.

REFERENCES:

1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Mc Graw Hill, 2019, Fourth Edition.
2. Principles of Power Systems, V.K. Mehtha, S.Chand Technical Publishers,2020.
3. Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press, 2017.
4. Basic Electrical and Electronics Engineering, S.K.Bhatacharya, Person Publications, 2018, Second Edition.

PART B: BASIC ELECTRONICS ENGINEERING

COURSE OBJECTIVES:

The objective of this course are to:

- To understand the working principle of various electronic devices.
- To acquire knowledge on the operating conditions of a DC power supply system, amplifiers and general electronic instrumentation system.
- To learn basic techniques in the design of a logic circuit.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Apply the concept of science and mathematics to understand the working principles of electronic devices.
CO 2: Analyze the working principle of a DC power supply system and Amplifiers.
CO 3: Solve digital logic circuits and implement using different logic gates.

UNIT I: (7 Periods)

Semiconductor Devices: Introduction - Evolution of electronics - Characteristics of PN Junction Diode - Zener Effect- Zener Diode and its Characteristics. Bipolar Junction Transistor - CB, CE, CC Configurations and Characteristics - Elementary Treatment of Small Signal CE Amplifier.

UNIT II: (8 Periods)

Basic Electronic Circuits and Instrumentation: Rectifiers and power supplies: Block diagram description of a dc power supply, working of a full wave bridge rectifier, capacitor filter (no analysis), working of simple Zener voltage regulator. Amplifiers: Block diagram of Public Address system, Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response. Electronic Instrumentation: Block diagram of an electronic instrumentation system.

UNIT III: (8 Periods)

Digital Electronics: Overview of Number Systems, Logic gates including Universal Gates, BCD codes, Excess-3 code, Gray code, Hamming code. Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR. Simple combinational circuits–Half and Full Adder, Introduction to sequential circuits, Flip flops, Registers and counters (Elementary Treatment only).

Total Periods: 45

TEXT BOOKS:

1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill,2009

REFERENCES:

1. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S. Chand &Co, 2010.
2. SantiramKal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India, 2002.
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education,2009.

I Year B.Tech. ECE – I Semester

L	T	P	C
3	0	0	3

(CH23ABS101) CHEMISTRY

COURSE OBJECTIVES:
The objective of this course are to:
- To familiarize engineering chemistry and its applications.
- To train the students on the principles and applications of electrochemistry and polymers.
- To introduce instrumental methods

COURSE OUTCOMES:
At the end of the course, the students will be able to:
- **CO 1:** Understand Schrodinger Wave equation, MOT, energy level diagrams Apply the knowledge of linear differential equations related to various engineering fields.
- **CO 2:** Apply the principle of Band diagrams in the application of conductors and semiconductors.
- **CO 3:** Compare the materials for construction of a battery and electrochemical sensors.
- **CO 4:** Explain the preparation, properties, and applications of thermoplastics & thermosetting & elastomers conducting polymers.
- **CO 5:** Explain the principles of spectrometry and separation of solid and liquid mixtures by chromatography

UNIT I: (8 Periods)
Structure and Bonding Models: Fundamentals of Quantum Mechanics-Plank's quantum theory, de-Broglie's hypothesis, Heisenberg uncertainty principle, Schrodinger Wave equation, significance of Ψ and Ψ2, molecular orbital theory – bonding in homo- and hetero nuclear diatomic molecules – energy level diagrams of O2 and CO, etc. π-molecular orbitals of butadiene and benzene, calculation of bond order.

UNIT II: (10 Periods)
Modern Engineering materials: Crystal field theory, d- orbital's splitting in tetra hedral and octa hedral complexes, Semiconductors – Introduction, doping concept, application, Super Conductors- Introduction basic concept, applications. Super capacitors-: Introduction, Basic Concept-Classification – applications. Nano materials: Introduction, classification, properties and applications of Fullerenes, carbon Nano tubes and Graphenes

UNIT III: (10 Periods)
Electrochemistry and Applications: Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, potentiometry- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations).
Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples Primary cells – Zinc-air battery, Secondary cells –lithium-ion batteries- working of the batteries including cell reactions; Fuel cells, hydrogen-oxygen fuel cell– working of the cells. Polymer Electrolyte Membrane Fuel cells (PEMFC).

UNIT IV: (8 Periods)
Polymer Chemistry: Introduction to polymers, functionality of monomers, Tactility, chain growth and step growth polymerization, co- polymerization, with specific examples and mechanisms of polymer formation.
Plastics–Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6, 6.
Elastomers–Processing and vulcanization of natural rubber, Buna-S, Buna-N– preparation, properties and applications.
Conducting polymers – poly acetylene, poly aniline, – mechanism of conduction and applications. Bio-Degradable polymer - Poly Glycolic Acid (PGA).

UNIT V: **(9 Periods)**

Instrumental Methods and Applications: Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. UV- Visible Spectroscopy- electronic transition, Instrumentation and applications, IR spectroscopy- principle, Instrumentation and applications. Chromato graphy-Basic Principle, Classification-HPLC: Principle, Instrumentation and Applications.

Total Periods: 45

TEXT BOOKS:

1. Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical.Chemistry,10/e, Oxford University Press, 2010.
3. Vogel's quantitative chemical analysis, 6th edition-2009.

REFERENCES:

1. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson,2007.
2. J.D. Lee, Concise Inorganic Chemistry, 5th Edition, Wiley Publications, Feb.2008
3. Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition
4. Chemistry Mc GrawHill, K.N.Jayaveera, G.V. Subba Reddy and C. Rama Chandraiah

I Year B.Tech. ECE – I Semester

L	T	P	C
2	0	0	2

(EG23AHS101) COMMUNICATIVE ENGLISH

COURSE OBJECTIVES:
The objective of this course are to:

- To facilitate effective listening, Reading, Speaking and Writing skills among the students.
- It enhances the same in their comprehending abilities, oral presentations, reporting useful information and providing knowledge of grammatical structures and vocabulary.
- This course helps the students to make them effective in speaking and writing skills and to make them industry ready.

COURSE OUTCOMES:
After successful completion of the course, students will be able to:

CO 1: Understand the context, topic, and pieces of specific information from socialor Transactional dialogues.
CO 2: Apply grammatical structures to formulate and correct word forms.
CO 3: Analyze discourse markers to speak clearly on a specific topic in informal discussions.
CO 4: Evaluate reading/listening texts and write summaries based on global comprehension of these texts.
CO 5: Create a coherent paragraph, essay, and resume.

UNIT I: **(6 Periods)**
Lesson: HUMAN VALUES: The Gift of the Magi (Short Story)
Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.
Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.
Reading: Skimming to get the main idea of a text; scanning to look for specific pieces of information. Writing: Mechanics of Writing-Capitalization, Spellings, Punctuation-Parts of Sentences.
Grammar: Parts of Speech, Basic Sentence Structures-forming questions.
Writing: Synonyms, Antonyms, Affixes (Prefixes/Suffixes), Root words.

UNIT II: **(7 Periods)**
Lesson: NATURE: The Brook by Alfred Tennyson (Poem)
Listening: Answering a series of questions about main ideas and supporting ideas after listening to audio texts.
Speaking: Discussion in pairs/small groups on specific topics followed by short structure talks.
Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.
Writing: Structure of a paragraph - Paragraph writing (specific topics)
Grammar: Cohesive devices - linkers, use of articles and zero article; prepositions.
Vocabulary: Homonyms, Homophones, Homographs.

UNIT III: **(6 Periods)**
Lesson: BIOGRAPHY: Elon Musk
Listening: Listening for global comprehension and summarizing what is listened to.
Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed.

Reading: Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension.

Writing: Summarizing, Note-making, paraphrasing.
Grammar: Verbs - tenses; subject-verb agreement; Compound words, Collocations.
Vocabulary: Compound words, Collocation.

UNIT IV: **(5 Periods)**
Lesson: INSPIRATION: The Toys of Peace by Saki
Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.
Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.
Reading: Studying the use of graphic elements in texts to convey information, reveal trends / patterns / relationships, communicate processes or display complicated data.
Writing: Letter Writing: Official Letters, Resumes
Grammar: Reporting verbs, Direct & Indirect speech, Active & Passive Voice.
Vocabulary: Words often confused, Jargons.

UNIT V: **(6 Periods)**
Lesson: MOTIVATION: The Power of Intrapersonal Communication (An Essay)
Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension.
Speaking: Formal oral presentations on topics from academic contexts
Reading: Reading comprehension.
Grammar: Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement).
Vocabulary: Technical Jargons

Total Periods: 30

TEXT BOOKS:

1. Pathfinder: Communicative English for Undergraduate Students, 1st Edition, Orient Black Swan, 2023 (Units 1,2 & 3).
2. Empowering with Language by Cengage Publications, 2023 (Units 4 & 5).

REFERENCES:

1. Dubey, Sham Ji & Co. English for Engineers, Vikas Publishers, 2020
2. Bailey, Stephen. Academic writing: A Handbook for International Students. Routledge, 2014.
3. Murphy, Raymond. English Grammar in Use, Fourth Edition, Cambridge University Press, 2019.
4. Lewis, Norman. Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary. Anchor, 2014.

ONLINE RESOURCES:
Grammar:

1. www.bbc.co.uk/learningenglish
2. https://dictionary.cambridge.org/grammar/british-grammar/
3. www.eslpod.com/index.html
4. https://www.learngrammar.net/
5. https://english4today.com/english-grammar-online-with-quizzes/
6. https://www.talkenglish.com/grammar/grammar.aspx

Vocabulary:

1. https://www.youtube.com/c/DailyVideoVocabulary/videos
2. https://www.youtube.com/channel/UC4cmBAit8i_NJZE8qK8sfpA

I Year B.Tech. ECE – I Semester

L	T	P	C
3	0	0	3

(CS23AES101) INTRODUCTION TO PROGRAMMING

COURSE OBJECTIVES:
The objective of this course are to:
- To learn how to solve a given problem.
- To illustrate the basic concepts of C programming language.
- To discuss the concepts of Functions, Arrays, Pointers and Structures.
- To familiar with Dynamic memory allocation concepts.
- To apply concepts of structures and files to solve real word problems.

COURSE OUTCOMES:
After successful completion of the course, students will be able to:
- **CO 1:** Solve computational problems.
- **CO 2:** Select the features of C language appropriate for solving a problem.
- **CO 3:** Design computer programs for real world problems.
- **CO 4:** Organize the data which is more appropriated for solving a problem.
- **CO 5:** Understanding the basic concept of structures and file handling.

UNIT I: (10 Periods)
Introduction to Problem Solving: Problem Solving Aspect, Problem Identification, Problem Understanding, Algorithm Development, Solution Planning, characteristics of algorithm, Top-down approach, Bottom-up approach, Time and space complexities of algorithms, Flowchart.
Overview of C: History of C, C Language Elements, Basic Structure of C Program, C Tokens-Variables and Data Types, Operators, Expressions and Type Conversions.

UNIT II: (8 Periods)
Control Statements: Selection Statements- if and switch statements.
Iterative Statements: for, while and do-while statements.
Jump Statements: break, continue, go to statements.

UNIT III: (8 Periods)
Arrays: Declaration, accessing array elements, Storing values, Operations on arrays, multi-dimensional arrays.
Functions: Introduction, Using Functions, Function declaration, Function definition and Function call, Parameter passing, Passing arrays to functions, Recursion, Storage classes.

UNIT IV: (10 Periods)
Pointers: Declaration and Initialization of pointer variables, Pointer arithmetic, Pointers and arrays, Pointer to pointer, Array of pointers, Pointers and functions, Dynamic Memory Allocation.
Strings: Introduction to Strings, String handling functions, Preprocessor Directives.

UNIT V: (9 Periods)
Structures: Introduction, Nested Structures, Array of Structures, Structures and Functions, Unions.
Files in C: Using Files in C, read data from Files, Writing data to Files, Random access to files, Command-line Arguments

Total Periods: 45

TEXT BOOKS:
1. B. A. Forouzan and R. F. Gilberg, Computer Science: A Structured Programming Approach Using C, 3/e, Cengage Learning, 2007.

2. Problem solving with C, M.T.Somashekara, PHI

REFERENCES:

1. Jeri R. Hanly, Ellot B. Koffman, Problem Solving and Program Design in C, 5/e, Pearson
2. Brian W Kernighan and Dennis M Ritchie, The C Programming Language, Second Edition, Prentice Hall Publication.
3. Reema Thareja, Programming in C, Oxford University Press, AICTE Edition, 2018.
4. R.G. Dromey, "How to Solve it by Computer". 2014, Pearson.

I Year B.Tech. ECE – I Semester

L	T	P	C
3	0	0	3

(MA23ABS101) LINEAR ALGEBRA & CALCULUS

COURSE OBJECTIVES:
The objective of this course are to:

- This course will illuminate the students in the concepts of calculus and linear algebra.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

COURSE OUTCOMES:
After successful completion of the course, students will be able to:

CO 1: Understanding the concepts of matrix algebra techniques to solve the system of linear equations.
CO 2: Develop the use of matrix algebra techniques that is needed by engineers for practical applications.
CO 3: Apply mean value theorems to solve real life problems in engineering.
CO 4: Make use of partial differentiation to solve optimization problems.
CO 5: Familiarize with double and triple integrals of functions of several variables in two dimensions using Cartesian and polar coordinates and in three dimensions using cylindrical and spherical coordinates.

UNIT I: (8 Periods)
Matrices: Rank of a matrix by echelon form, normal form, Cauchy–Binet formulae (without proof). Inverse of Non- singular matrices by Gauss-Jordan method, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Jacobi and Gauss Seidel Iteration Methods.

UNIT II: (10 Periods)
Eigenvalues, Eigenvectors and Orthogonal Transformation: Eigenvalues, Eigenvectors and their properties, Diagonalization of a matrix, Cayley- Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley- Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT III: (7 Periods)
Calculus: Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem with their geometrical interpretation, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof), Problems and applications on the above theorems.

UNIT IV: (10 Periods)
Partial differentiation and Applications (Multi variable calculus): Functions of several variables: Continuity and Differentiability, Partial derivatives, total derivatives, chain rule, Taylor's and Maclaurin's series expansion of functions of two variables. Jacobians, Functional dependence, maxima and minima of functions of two variables, method of Lagrange multipliers.

UNIT V: (10 Periods)
Multiple Integrals (Multi variable Calculus): Double integrals, triple integrals, change of order of integration, change of variables to polar, cylindrical and spherical coordinates. Finding areas (by double integrals) and volumes (by double integrals and triple integrals).

Total Periods: 45

TEXT BOOKS:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers,2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.

REFERENCES:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
3. GlynJames, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 2011.
4. B. V. Ramana, Higher Engineering Mathematics, McGraw Hill Education
5. H. k Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand.
6. N. Bali, M. Goyal, C. Watkins, Advanced Engineering Mathematics, Infinity Science Press.

I Year B.Tech. ECE – I Semester

L	T	P	C
0	0	2	1

(CH23ABS102) CHEMISTRY LAB

COURSE OBJECTIVES:
The objective of this course are to:
- Verify the fundamental concepts with experiments.

COURSE OUTCOMES:
At the end of the course, the students will be able to:
CO 1: To verify Beer Lambert's law
CO 2: To analyse the IR and NMR spectra of some organic compounds
CO 3: To apply electro analytical techniques foe sample analysis.
CO 4: To measure the strength of an acid present in the samples.
CO 5: To prepare advanced polymer materials.

List of Experiments:
1. Measurement of 10Dq by spectrophotometric method
2. Conductometric titration of strong acid vs. strong base
3. Conductometric titration of weak acid vs. strong base
4. Determination of cell constant and conductance of solutions
5. Potentiometry - determination of redox potentials and emfs
6. Determination of Strength of an acid in Pb-Acid battery
7. Preparation of Bakelite
8. Verify Lambert-Beer's law
9. Wavelength measurement of sample through UV-Visible Spectroscopy
10. Identification of simple organic compounds by IR
11. Preparation of nanomaterials by precipitation method
12. Estimation of Ferrous Iron by Dichrometry

REFERENCES:
1. "Vogel's Quantitative Chemical Analysis 6th Edition 6th Edition" Pearson Publications by J. Mendham, R.C. Denney, J.D. Barnes and B. Sivasankar.

I Year B.Tech. ECE – I Semester

L	T	P	C
0	0	2	1

(EG23AHS102) COMMUNICATIVE ENGLISH LAB

COURSE OBJECTIVES:

The objective of this course are to:

- To expose the students to a variety of self-instructional, learner friendly modes of language learning.
- The students will get trained in basic communication skills and also make them ready to face job interviews.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Understand the different aspects of the English language proficiency with an emphasis on LSRW skills.
CO 2: Apply communication skills through various language learning activities.
CO 3: Analyze the English speech sounds, stress, rhythm, intonation, and syllable division for better listening and speaking comprehension.
CO 4: Evaluate and exhibit professionalism in participating in debates and group discussions.
CO 5: Create effective Course Objectives.

List of Topics:

1. Vowels & Consonants
2. Neutralization/Accent Rules
3. Communication Skills & JAM
4. Role Play or Conversational Practice
5. E-mail Writing
6. Resume Writing, Cover letter, SOP
7. Group Discussions-methods & practice
8. Debates - Methods & Practice
9. PPT Presentations/ Poster Presentation
10. Interviews Skills

Suggested Software:

- Walden InfoTech
- Young India Films

REFERENCES:

1. Raman Meenakshi, Sangeeta-Sharma. Technical Communication Oxford Press.2018.
2. Taylor Grant: English Conversation Practice, Tata McGraw-Hill Education India, 2016.
3. Hewing's, Martin. Cambridge Academic English (B2). CUP, 2012.
4. J. Sethi & P.V. Dhamija. A Course in Phonetics and Spoken English, (2nd Ed), Kindle, 2013

ONLINE RESOURCES:

Spoken English:

1. www.esl-lab.com
2. www.englishmedialab.com
3. www.englishinteractive.net
4. https://www.britishcouncil.in/english/online
5. http://www.letstalkpodcast.com/
6. https://www.youtube.com/c/mmmEnglish_Emma/featured
7. https://www.youtube.com/c/ArnelsEverydayEnglish/featured
8. https://www.youtube.com/c/engvidAdam/featured

9. https://www.youtube.com/c/EnglishClass101/featured
10. https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists
11. https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw

VOICE AND ACCENT:

1. https://www.youtube.com/user/letstalkaccent/videos
2. https://www.youtube.com/c/EngLanguageClub/featured
3. https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc
4. https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_IA

I Year B.Tech. ECE – I Semester

L	T	P	C
0	0	3	1.5

(CS23AES102) COMPUTER PROGRAMMING LAB

COURSE OBJECTIVES:
The objective of this course are to:

- To use basic data types, operators, expressions and expression evaluation mechanisms using C Programming Language.
- To implement control flows, construct in C Programming Language and understand the syntax, semantics and usability contexts of these different constructs.
- To develop composite data types in C and constructs available to develop their datatypes, utilize them to model things and dealing with data from and to external files.
- To design programs with different variations of the constructs available for practicing modular programming and understand the pros and cons of using different variants and apply optimization.

COURSE OUTCOMES:
After successful completion of the course, students will be able to:

CO 1: Read, understand and trace the execution of programs written in C language.
CO 2: Select the right control structure for solving the problem.
CO 3: Develop C programs which utilize the memory efficiently using programming constructs like pointers.
CO 4: Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.

WEEK 1:
Objective: Getting familiar with the programming environment on the computer and writing the first program.
Activities:
Tutorial 1: Problem-solving using Computers.
Lab1: Familiarization with programming environment

- Basic Linux environment and its editors like Vi, Vim & Emacs etc.
- Exposure to Turbo C, gcc.
- Writing simple programs using printf (), scanf ()

WEEK 2:
Objective: Getting familiar with how to formally describe a solution to a problem in a series of finite steps both using textual notation and graphic notation.
Activities:
Tutorial 2: Problem-solving using Algorithms and Flow charts.
Lab 1: Converting algorithms/flow charts into C Source code. Developing the algorithms/flowcharts for the following sample programs

- Sum and average of 3 numbers
- Conversion of Fahrenheit to Celsius and vice versa
- Simple interest calculation

WEEK 3:
Objective: Learn how to define variables with the desired data-type, initialize them with appropriate values and how arithmetic operators can be used with variables and constants.
Activities:
Tutorial 3: Variable types and type conversions:
Lab 2: Simple computational problems using arithmetic expressions.

- Finding the square root of a given number
- Finding compound interest

- Area of a triangle using heron's formulae
- Distance travelled by an object

WEEK 4:
Objective: Explore the full scope of expressions, type-compatibility of variables & constants and operators used in the expression and how operator precedence works.
Activities:
Tutorial 4: Operators and the precedence and as associativity:
Lab 3: Simple computational problems using the operator precedence and associativity

i) Evaluate the following expressions.
   a. A+B*C+(D*E) + F*G
   b. A/B*C-B+A*D/3
   c. A+++B---A
   d. J= (i++) + (++i)

ii) Find the maximum of three numbers using conditional operator.
iii) Take marks of 5 subjects in integers, and find the total, average in float

WEEK 5:
Objective: Explore the full scope of different variants of "if construct" namely if- else, null-else, if-else if*-else, switch and nested-if including in what scenario each one of them can be used and how to use them. Explore all relational and logical operators while writing conditionals for "if construct".
Suggested Experiments/Activities:
Tutorial 5: Branching and logical expressions:
Lab 4: Problems involving if-then-else structures.

i. Write a C program to find the max and min of four numbers using if-else.
ii. Write a C program to generate electricity bill.
iii. Find the roots of the quadratic equation.
iv. Write a C program to simulate a calculator using switch case.
v. Write a C program to find the given year is a leap year or not.

WEEK 6:
Objective: Explore the full scope of iterative constructs namely while loop, do- while loop and for loop in addition to structured jump constructs like break and continue including when each of these statements is more appropriate to use.
Activities:
Tutorial 6: Loops, while and for loops
Lab 5: Iterative problems e.g., the sum of series

i. Find the factorial of given number using any loop.
ii. Find the given numberis a prime or not.
iii. Compute sine and cos series.
iv. Checking a number palindrome.
v. Construct a pyramid of numbers.

WEEK 7:
Objective: Explore the full scope of Arrays construct namely defining and initializing 1-D and 2-D and more generically n-D arrays and referencing individual array elements from the defined array. Using integer 1-D arrays, explore search solution linear search.
Activities:
Tutorial 7: 1 D Arrays: searching.
Lab 6:1D Array manipulation, linear search

i. Find the min and max of a 1-D integer array.
ii. Perform linear search on1Darray.
iii. The reverse of a 1D integer array
iv. Find 2's complement of the given binary number.
v. Eliminate duplicate elements in an array.

WEEK 8:
Objective: Explore the difference between other arrays and character arrays that can be used as Strings by using null character and get comfortable with string by doing experiments that will reverse a string and concatenate two strings. Explore sorting solution bubble sort using integer arrays.
Activities:
Tutorial 8: 2 D arrays, sorting and Strings.
Lab 7: Matrix problems, String operations, Bubble sort

i. Addition of twomatrices
ii. Multiplication two matrices
iii. Sort array elements using bubble sort
iv. Concatenate two strings without built-in functions
v. Reverse a string using built-in and without built-in string functions

WEEK 9:
Objective: Explore the Functions, sub-routines, scope and extent of variables, doing some experiments by parameter passing using call by value. Basic methods of numerical integration
Activities:
Tutorial 9: Functions, call by value, scope and extent,
Lab 8: Simple functions using call by value, solving differential equations using Eulers theorem

i. Write a C function to calculate NCR value
ii. Write a C function to find the length of a string
iii. Write a C function to transpose of a matrix
iv. Write a C function to demonstrate numerical integration of differential equations using Euler's method

WEEK 10:
Objective: Explore how recursive solutions can be programmed by writing recursive functions that can be invoked from the main by programming at-least five distinct problems that have naturally recursive solutions.
Activities:
Tutorial 10: Recursion, the structure of recursive calls
Lab 9: Recursive functions

i. Write a recursive function to generate Fibonacci series
ii. Write a recursive function to find the lcm of two numbers
iii. Write arecursive function to find the factorial of a number
iv. Write a C Program to implement Ackermann function using recursion
v. Write a recursive function to find the sum of series.

WEEK 11:
Objective: Explore the basic difference between normal and pointer variables, Arithmetic operations using pointers and passing variables to functions using pointers
Activities:
Tutorial 11: Call by reference, dangling pointers
Lab 10: Simple functions using Call by reference, Dangling pointers

i. Write a C program to swap two numbers using call by reference
ii. Demonstrate Dangling pointer problem using a C program
iii. Write a C program to copy one string into another using pointer
iv. Write a C program to find no of lowercase, uppercase, digits and other characters using pointers.

WEEK 12:
Objective: Explore pointers to manage a dynamic array of integers, including memory allocation & value initialization, resizing changing and reordering the contents of an array and memory de-allocation using malloc (), calloc (), realloc () and free () functions. Gain experience processing command-line arguments received by C.

Suggested Experiments/Activities:
Tutorial 12: Pointers, structures and dynamic memory allocation
Lab 11: Pointers and structures, memory dereference.

i. Write a C program to find the sum of a 1D array using malloc()
ii. Write a C program to find the total, average of n students using structures
iii. Enter n students data using calloc() and display failed students list
iv. Read student name and marks from the command line and display the student details along with the total.
v. Write a C program to implement realloc()

WEEK 13:
Objective: Experiment with C Structures, Unions, bit fields and nested structures
Activities:
Tutorial 13: Bit fields, Self-Referential Structures, Linked lists
Lab 12: Bit fields, linked lists Read and print a date using dd/mm/yyyy format using bit-fields and differentiate the same without using bit- fields

i. Demonstrate the differences between structures and unions using a C program
ii. Write a C program to shift/rotate using bitfields.
iii. Write a C program to copy one structure variable to another structure of the same type.

WEEK14:
Objective: To understand data files and file handling with various file I/O functions. Explore the differences between text and binary files.
Activities:
Tutorial 14: File handling
Lab 13: File operations

i. Write a C program to write and read text into a file.
ii. Write a C program to write and read text into a binary file using fread() and fwrite().
iii. Copy the contents of one file to another file.
iv. Write a C program to merge two files into the third file using command-line arguments.
v. Find no. of lines, words and characters in a file
vi. Write a C program to print last n characters of a given file.

TEXT BOOKS:

1. Ajay Mittal, Programming in C: A practical approach, Pearson.
2. Byron Gottfried, Schaum' s Outline of Programming with C, McGraw Hill.

REFERENCES:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice- Hall of India.
2. C Programming, A Problem-Solving Approach, Forouzan, Gilberg, Prasad, Cengage.

I Year B.Tech. ECE – I Semester

L	T	P	C
0	0	3	1.5

(EE23AES102) ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP

PART A: ELECTRICAL ENGINEERING LAB

COURSE OBJECTIVES:

The objective of this course are to:

- To gain the practical knowledge about various laws/theorems for the given circuit.
- To acquire knowledge about various electrical measuring instruments and safety measures.
- To obtain the performance characteristics of DC generator.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Understand the concept of KCL, KVL and Theorems practically for the given circuit.
CO 2: Evaluate the resistance, power and power factor of circuit elements by using measuring instruments.
CO 3: Obtain the Magnetization Characteristics of DC shunt Generator

List of Experiments:

1. Verification of KCL and KVL
2. Verification of Superposition theorem
3. Measurement of Resistance using Wheat stone bridge
4. Magnetization Characteristics of DC shunt Generator
5. Measurement of Power and Power factor using Single-phase wattmeter
6. Measurement of Earth Resistance using Megger
7. Calculation of Electrical Energy for Domestic Premises

REFERENCES:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition.
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013.
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition.

Note: Minimum Six Experiments to be performed.

PART B: ELECTRONICS ENGINEERING LAB

COURSE OBJECTIVES:

The objective of this course are to:

- To gain hands on experience in testing various electronic components.
- To acquire knowledge related to the use of electronic measuring instruments for different applications.
- To design and simulate a RC coupled amplifier.
- To verify the operating conditions of combinational and sequential circuits.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Identify & Test various electronic components.
CO 2: Employ various electronic measuring instruments for different applications.
CO 3: Evaluate the biasing conditions of various diodes and BJTs.
CO 4: Examine the operating conditions of a digital circuit

List of Experiments:

1. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
2. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.
3. Implementation of half wave and full wave rectifiers
4. Plot Input & Output characteristics of BJT in CE and CB configurations
5. Frequency response of CE amplifier.
6. Simulation of RC coupled amplifier with the design supplied
   i. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
7. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs. Tools / Equipment Required: DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices.

REFERENCES:

1. R. L. Boylestad& Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education, 2009.

Note: Minimum Six Experiments to be performed. All the experiments shall be implemented using both Hardware and Software.

I Year B.Tech. ECE – I Semester

L	T	P	C
0	0	1	0.5

(CH23ABS106) NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVICE

COURSE OBJECTIVES:

The objective of this course are to:

- The objective of introducing this course is to impart discipline, character, fraternity, teamwork, social consciousness among the students and engaging them in selfless service.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Understand the importance of discipline, character and service motto.
CO 2: Solve some societal issues by applying acquired knowledge, facts, and techniques.
CO 3: Explore human relationships by analyzing social problems.
CO 4: Determine to extend their help for the fellow beings and downtrodden people.
CO 5: Develop leadership skills and civic responsibilities

UNIT I:

Orientation: General Orientation on NSS/NCC/ Scouts & Guides/Community Service activities, career guidance.

Activities:

i) Conducting –ice breaking sessions-expectations from the course- knowing personal talents and skills
ii) Conducting orientations programs for the students –future plans- activities-releasing road map etc.
iii) Displaying success stories-motivational biopics- award winning movies on societal issues etc.
iv) Conducting talent show in singing patriotic songs-paintings-any other contribution.

UNIT II:

Nature & Care

Activities:

i) Best out of waste competition.
ii) Poster and signs making competition to spread environmental awareness.
iii) Recycling and environmental pollution article writing competition.
iv) Organising Zero-waste day.
v) Digital Environmental awareness activity via various social media platforms.
vi) Virtual demonstration of different eco-friendly approaches for sustainable living.
vii) Write a summary on any book related to environmental issues.

UNIT III:

Community Service

Activities:

i) Conducting One Day Special Camp in a village contacting village-area leaders-Survey in the village, identification of problems- helping them to solve via media-authorities experts-etc.
ii) Conducting awareness programs on Health-related issues such as General Health, Mental health, Spiritual Health, HIV/AIDS,
iii) Conducting consumer Awareness. Explaining various legal provisions etc.
iv) Women Empowerment Programmes- Sexual Abuse, Adolescent Health and Population Education.
v) Any other programmes in collaboration with local charities, NGOs etc.

REFERENCES:

1. Nirmalya Kumar Sinha & Surajit Majumder, A Text Book of National Service Scheme Vol;.I, Vidya Kutir Publication, 2021 (ISBN 978-81- 952368-8-6)
2. Red Book - National Cadet Corps – Standing Instructions Vol I & II, Directorate General of NCC, Ministry of Defence, New Delhi
3. Davis M. L. and Cornwell D. A., "Introduction to Environmental Engineering", McGraw Hill, New York 4/e 2008
4. Masters G. M., Joseph K. and Nagendran R. "Introduction to Environmental Engineering and Science", Pearson Education, New Delhi. 2/e 2007 5. Ram Ahuja. Social Problems in India, Rawat Publications, New Delhi.

I Year B.Tech. ECE – II Semester

L	T	P	C
3	0	0	3

(ME23AES101) BASIC CIVIL & MECHANICAL ENGINEERING

PART A: BASIC CIVIL ENGINEERING

COURSE OBJECTIVES:

The objective of this course are to:

- Get familiarized with basic Construction Materials; the scope and importance of Civil Engineering specializations.
- Introduce the preliminary concepts of Structural and Geotechnical Engineering.
- Acquire preliminary knowledge on Surveying and Transportation Engineering.
- Get familiarized with the importance of Water Resources and Environmental Engineering.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society and the basic characteristics of Construction Materials.

CO 2: Gain knowledge regarding Structural and Geotechnical Engineering.

CO 3: Explain the concepts of surveying and Transportation Engineering, Water Resources and Environmental Engineering.

UNIT I: (8 Periods)

Basics of Civil Engineering: Role of Civil Engineers in Society- Various Disciplines of Civil Engineering- Structural Engineering- Geo-Technical Engineering- Transportation Engineering - Hydraulics and Water Resources Engineering - Environmental Engineering- Scope of each discipline.

Construction Materials - Cement – Sand - Aggregate - Bricks- Cement concrete – Steel - Timber.

UNIT II: (7 Periods)

Structural Engineering: Importance- Types of Structures and structural Members- Building Components –Building Planning principles.

Geotechnical Engineering: Types of Foundations-Functions and Requirement of a good foundation

UNIT III: (8 Periods)

Surveying & Transportation Engineering: Objectives and Principles of Surveying- Instruments used in Surveying-Importance of Transportation in Nation's economic development- Modes of Transportation- Types of Highway Pavements- Flexible Pavements and Rigid Pavements -Traffic signals and signs.

Water Resources and Environmental Engineering: Introduction to Hydrology– hydrological cycle- Sources of water- Quality of water- Specifications- Rainwater Harvesting- Water Storage and Conveyance Structures- Dams and Reservoirs-types and components.

TEXT BOOKS:

1. Basic Civil Engineering, M.S. Palanisamy, Tata Mc Graw Hill publications (India) Pvt., Ltd., Fourth Edition.
2. Introduction to Civil Engineering, S.S. Bhavikatti, New Age International Publishers, 2022, First Edition.
3. Basic Civil Engineering, Satheesh Gopi, Pearson Publications, 2009, First Edition.

REFERENCES:

1. Surveying, Vol – I and Vol - II, S.K.Duggal, Tata McGraw Hill Publishers2019, Fifth Edition.

2. Hydrology and Water Resources Engineering, Santosh Kumar Garg, Khanna Publishers, Delhi, 2016.
3. Irrigation Engineering and Hydraulic Structures –Santosh Kumar Garg, Khanna Publishers, Delhi 2023, 38thEdition.
4. Highway Engineering, S.K.Khanna, C.E.G.Justoand Veeraraghavan, Nemchandand Brothers Publications2019. 10thEdition.
5. Indian Standard DRINKING WATER — SPECIFICATIONIS 10500-2012.

PART B: BASIC MECHANICAL ENGINEERING

COURSE OBJECTIVES:

The objective of this course are to:

- Get familiarized with the scope and importance of Mechanical Engineering in different sectors and industries.
- Understand and familiarize the different engineering materials and different manufacturing processes.
- Get an overview of different thermal and mechanical transmission systems and introduce basics of robotics and its applications.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Understand the different manufacturing processes.
CO 2: Explain the basics of thermal engineering and its applications.
CO 3: Describe the working of different mechanical power transmission systems and power plants and describe the basics of robotics and its applications.

UNIT I: (7 Periods)

Introduction to Mechanical Engineering: Role of Mechanical Engineering in Industries and Society- Technologies in Different Sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine Sectors.

Engineering Materials: Metals-Ferrous and Non-Ferrous, Ceramics, Composites, Smart Materials.

UNIT II: (8 Periods)

Manufacturing Processes: Principles of Casting, Forming, Joining Processes, Machining, Introduction to CNC Machines, 3D Printing, and Smart Manufacturing.

Thermal Engineering – Working Principle of Boilers, Otto Cycle, Diesel Cycle, Refrigeration and Air-Conditioning Cycles, IC Engines, 2-Stroke and 4-Stroke Engines, SI/CI Engines, Components of Electric and Hybrid Vehicles.

UNIT III: (7 Periods)

Power Plants – Working Principle of Steam, Diesel, Hydro, Nuclear Power Plants.

Mechanical Power Transmission - Belt Drives, Chain, Rope drives, Gear Drives and their applications.

Introduction to Robotics - Joints & Links, Configurations and Applications of Robotics.

Total Periods: 45

TEXT BOOKS:

1. Internal Combustion Engines by V.Ganesan, By Tata McGraw Hill publications (India) Pvt. Ltd.
2. A Tear book of Theory of Machines by S.S. Rattan, Tata McGraw Hill Publications, (India) Pvt. Ltd.
3. An introduction to Mechanical Engg by Jonathan Wicker and Kemper Lewis, Cengage learning India Pvt. Ltd.

REFERENCES:

1. Appuu Kuttan KK, Robotics, I.K. International Publishing House Pvt. Ltd. Volume-I
2. 3D printing & Additive Manufacturing Technology- L. Jyothish Kumar, Pulak M Pandey, Springer publications
3. Thermal Engineering by Mahesh M Rathore Tata McGraw Hill publications (India) Pvt. Ltd.
4. G. Shanmugam and M.S.Palanisamy, Basic Civil and the Mechanical Engineering, Tata McGraw Hill publications (India) Pvt. Ltd.

I Year B.Tech. ECE – II Semester

L	T	P	C
3	0	0	3

(MA23ABS201) DIFFERENTIAL EQUATIONS & VECTOR CALCULUS

COURSE OBJECTIVES:

The objective of this course are to:

- To enlighten the learners in the concept of differential equations and multivariable calculus.
- To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real world applications.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Familiarize to solve the first and higher order differential equations.
CO 2: Apply the knowledge of linear differential equations related to various engineering fields.
CO 3: Identify solution methods for partial differential equations that model physical processes.
CO 4: Interpret the physical meaning of different operators such as gradient, curl and divergence.
CO 5: Evaluate the work done by force field, circulation and transformation between single, double and triple integrals using vector calculus.

UNIT I: (8 Periods)

Differential Equations: Linear differential equations – Bernoulli's equations- Exact equations and equations reducible to exact form. Applications: Newton's Law of cooling – Law of natural growth and decay, Electrical circuits.

UNIT II: (10 Periods)

Linear Differential Equations of Higher Order: Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskian, Method of variation of parameters. Simultaneous linear equations, Applications to L-C-R Circuit problems and Simple Harmonic motion.

UNIT III: (10 Periods)

Partial Differential Equations: Introduction, Formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order linear equations using Lagrange's method. Homogenous linear Partial Differential equations with constant coefficients.

UNIT IV: (8 Periods)

Vector Differentiation: Scalar and vector point functions, vector operator Del, Del applies to scalar point functions, Gradient, Directional derivative, del applied to vector point functions- Divergence and Curl, vector identities.

UNIT V: (9 Periods)

Vector Integration: Line integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and related problems.

Total Periods: 45

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, 44/e, Khanna publishers, 2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.

REFERENCES:

1. Dennis G. Zill and Warren S. Wright, Advanced Engineering Mathematics, Jones andBartlett,2011.
2. Michael Greenberg, Advanced Engineering Mathematics, 2/e, Pearson, 2018.
3. George B.Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
4. R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
5. B. V. Ramana, Higher Engineering Mathematics, McGraw Hill Education.
6. H. K Dass, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand.
7. N. Bali, M.Goyal, C. Watkins, Advanced Engineering Mathematics, Infinity Science Press.

I Year B.Tech. ECE – II Semester

L	T	P	C
1	0	4	3

(ME23AES102) ENGINEERING GRAPHICS

COURSE OBJECTIVES:
The objective of this course are to:
- Enable with various concepts like dimensioning, conventions and standards related to engineering drawing.
- Impart knowledge on the projection of points, lines and plane surfaces.
- Improve the visualization skills for better understanding of projection of solids.
- Develop the imaginative skills required to understand section of solids and developments of surfaces.
- Draw the viewing perception of a solid object in isometric and orthographic projections.

COURSE OUTCOMES:
After successful completion of the course, students will be able to:
CO 1: Draw various engineering curves, scales.
CO 2: Draw and Interpret orthographic projections of points, lines, planes.
CO 3: Draw the projection of solids in various positions.
CO 4: Draw and Explore the sections of solids and development of surfaces.
CO 5: Draw an isometric and orthographic views of simple solids.

UNIT I: (2 Periods and 8 Practical's)
Introduction to Engineering Drawing: Lines, Lettering and Dimensioning, Geometrical Constructions and Constructing Regular Polygons by General Methods.
Curves: Construction of Ellipse, Parabola and Hyperbola by General Method, Cycloids, Involutes, Normal and Tangent to Curves.
Scales: Plain Scales, Diagonal Scales and Vernier Scales.

UNIT II: (3 Periods and 12 Practical's)
Orthographic Projections: Reference Plane, Importance of Reference Lines or Plane, Projections of a Point Situated in any One of the Four Quadrants.
Projections of Straight Lines: Projections of Straight Lines Parallel to both Reference Planes, Perpendicular to One Reference Plane and Parallel to other Reference Plane, Inclined to one Reference Plane and Parallel to the other Reference Plane. Projections of Straight Line Inclined to both the Reference Planes.
Projections of Planes: Regular Planes Perpendicular to both Reference Planes, Parallel to One Reference Plane and Inclined to the other Reference Plane; Plane Inclined to both the Reference Planes.

UNIT III: (3 Periods and 12 Practical's)
Projections of Solids: Types of Solids: Polyhedra and Solids of Revolution. Projections of Solids in Simple Positions: Axis Perpendicular to Horizontal Plane, Axis Perpendicular to Vertical Plane and Axis Parallel to both the Reference Planes, Projection of Solids with Axis Inclined to One Reference Plane and Parallel to another Plane, Projection of Solids Inclined to both the Reference Planes.

UNIT IV: (3 Periods and 12 Practical's)
Sections of Solids: Perpendicular and Inclined Section Planes, Sectional Views and True Shape of Section, Sections of Solids in Simple Position only.
Development of Surfaces: Methods of Development: Parallel Line Development and Radial Line Development. Development of a Cube, Prism, Cylinder, Pyramid and Cone.

UNIT V: (4 Periods and 16 Practical's)

Conversion of Views: Conversion of Isometric Views to Orthographic Views of Simple Solids; Conversion of Orthographic Views to Isometric views of Simple Solids.

Computer Graphics: Creating 2D&3D Drawings of Objects Including Domain Specific Engineering Applications using Auto CAD (Not for end examination).

Total Periods: 15 Periods and 60 Practical's

TEXT BOOKS:

1. Engineering Drawing, K.L. Narayana and P. Kannaiah, Tata McGraw Hill, 2013.
2. N. D. Bhatt, Engineering Drawing, Charotar Publishing House, 54th Edition, 2023.

REFERENCES:

1. Engineering Drawing, M.B.Shah and B.C. Rana, Pearson Education Inc,2009.
2. Engineering Drawing with an Introduction to AutoCAD, Dhananjay Jolhe, Tata McGraw-Hill, 2017.
3. Engineering Drawing and Graphics by K. Venugopal, 4/e, New Age Publishers, 2004.
4. Engineering Drawing by Basant Agarwal & C.M. Agarwal, 2/e, Tata McGraw-Hill, 2013

I Year B.Tech. ECE – II Semester

L	T	P	C
3	0	0	3

(PH23ABS101) ENGINEERING PHYSICS

COURSE OBJECTIVES:
The objective of this course are to:

- To bridge the gap between the Physics in school at 10+2 level and UG level engineering courses by identifying the importance of the optical phenomenon like interference, diffraction etc, enlightening the periodic arrangement of atoms in crystalline solids and concepts of quantum mechanics, introduce novel concepts of dielectric and magnetic materials, physics of semiconductors.

COURSE OUTCOMES:
After successful completion of the course, students will be able to:

CO 1: Understand the intensity variation of light due to interference, diffraction and polarization.
CO 2: Apply the basic concepts of crystal structures and X-ray diffraction to study the behavior of materials for engineering applications.
CO 3: Summarize the fundamental properties of dielectric and magnetic materials for engineering applications.
CO 4: Analyze the properties of quantum particles to interpret the energy band formation and classification of solids
CO 5: Assess the current flow mechanism to understand the transport phenomenon of charge carriers in semiconductors.

UNIT I: (10 Periods)
Wave Optics Interference: Introduction - Principle of superposition –Interference of light Interference in thin films (Reflection Geometry) & applications - Colours in thin films- Newton's Rings, Determination of wavelength and refractive index. Diffraction: Introduction - Fresnel and Fraunhofer diffractions - Fraunhofer diffraction due to single slit, double slit & N-slits (Qualitative) – Diffraction Grating - Dispersive power and resolving power of Grating (Qualitative).
Polarization: Introduction -Types of polarization - Polarization by reflection, refraction and Double refraction - Nicol's Prism -Half wave and Quarter wave plates.

UNIT II: (8 Periods)
Crystallography: Space lattice, Basis, Unit Cell and lattice parameters – Bravais Lattices – crystal systems (3D) – coordination number - packing fraction of SC, BCC & FCC - Miller indices – separation between successive (hkl) planes.
X- ray diffraction: Bragg's law - X-ray Diffractometer – crystal structure determination by Laue's and powder methods.

UNIT III: (10 Periods)
Dielectric Materials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility, Dielectric constant and Displacement Vector – Relation between the electric vectors - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative)
- Lorentz internal field - Clausius- Mossotti equation – Frequency dependence of polarization – dielectric loss.
Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization- Magnetic susceptibility and permeability – Atomic origin of magnetism - Classification of magnetic materials: Dia, para, Ferro, anti-ferro &Ferri magnetic materials - Domain concept for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials- Applications of magnetic materials.

UNIT IV: **(9 Periods)**

Quantum Mechanics: Dual nature of matter – Heisenberg's Uncertainty Principle – Significance and properties of wave function – Schrodinger's time independent and dependent wave equations– Particle in a one-dimensional infinite potential well.

Free Electron Theory: Classical free electron theory (Qualitative with discussion of merits and demerits) – Quantum free electron theory – electrical conductivity based on quantum free electron theory - Fermi-Dirac distribution
- Density of states - Fermi energy

UNIT V: **(8 Periods)**

Semiconductors: Formation of energy bands – classification of solids - Intrinsic semiconductors: Density of charge carriers – Electrical conductivity – Fermi level – Extrinsic semiconductors: density of charge carriers (Qualitative) – dependence of Fermi energy on carrier concentration and temperature - Drift and diffusion currents – Einstein's equation – Hall effect and its applications - Direct and indirect bandgap semiconductors and its applications.

Total Periods: 45

TEXT BOOKS:

1. A Text book of Engineering Physics, M. N. Avadhanulu, P.G.Kshirsagar& TVS Arun Murthy, S. Chand Publications, 11th Edition 2019.
2. Engineering Physics - D.K.Bhattacharya and Poonam Tandon, Oxford press (2015).

REFERENCES:

1. Engineering Physics - B.K. Pandey and S. Chaturvedi, CengageLearning 2021.
2. Engineering Physics - Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018.
3. Engineering Physics" - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press.2010
4. Engineering Physics - M.R. Srinivasan, New Age internationalpublishers (2009).

ONLINE RESOURCES:

1. https://www.loc.gov/rr/scitech/selected-ternet/physics.html

I Year B.Tech. ECE – II Semester

L	T	P	C
3	0	0	3

(EC23APC201) NETWORK ANALYSIS

COURSE OBJECTIVES:
The objective of this course are to:
- To introduce basic laws, mesh & nodal analysis techniques for solving electrical circuits.
- To impart knowledge on applying appropriate theorem for electrical circuitanalysis.
- To explain transient and steady state behavior of different circuits
- To analyze the concepts of resonance and Magnetic circuits
- To understand open circuit, short circuit, transmission, hybrid parameters and their interrelationship.

Course Outcomes:
After successful completion of the course, students will be able to:
- **CO 1:** Apply the basic electrical concepts to different circuits along with network simplification Techniques
- **CO 2:** Determine the transient response of R-L, R-C, R-L-C circuits for D.C. and A.C excitations
- **CO 3:** Analyze steady state response for various Circuits for AC excitation.
- **CO 4:** Apply the concept of Resonance & Magnetic principles for different circuits.
- **CO 5:** Evaluate network parameters for different two port networks.

UNIT I:
Types of circuit components, Types of Sources and Source Transformations, Mesh analysis and Nodal analysis, problem solving with resistances only including dependent sources also. Principal of Duality with examples.
Network Theorems: Thevenin's, Norton's, Milliman's, Reciprocity, Compensation, Substitution, Superposition, Max Power Transfer, Tellegens - problem solving using dependent sources also.

UNIT II:
Transients: First order differential equations, Definition of time constants, R-L circuit, R-C circuit with DC excitation, evaluating initial conditions procedure, second order differential equations, homogeneous, non- homogenous, problem-solving using R-L-C elements with DC excitation and AC excitation, Response as related to s-plane rotation of roots.
Laplace Transform: Introduction, basic theorems, problem solving using Laplace Transform.

UNIT III:
Steady State Analysis of A.C Circuits: Impedance concept, phase angle, series R-L, R-C, R-L- C circuits problem solving. Complex impedance and phasor notation for R-L, R-C, R-L-C problem solving using mesh and nodal analysis, Star-Delta conversion, problem solving using Laplace transforms also.

UNIT IV:
Resonance: Introduction, Definition of Q, Series resonance, Bandwidth of series resonance, Parallel resonance, general case-resistance present in both branches, anti-resonance at all frequencies.
Coupled Circuits: Coupled Circuits: Self-inductance, Mutual inductance, Coefficient of coupling, analysis of coupled circuits, Natural current, Dot ruleof coupled circuits, conductively coupled equivalent circuits- problem solving.

UNIT V:
Two-port Networks: Relationship of two port networks, Z-parameters, Y- parameters, Transmission line parameters, h- parameters, Relationships Between Parameter Sets,

Parallel & series connection of two port networks, cascading of two port networks, problem solving using dependent sources also.

TEXT BOOKS:

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, revised 3rd Edition, 2019.
2. Engineering Circuit Analysis by William H. Hayt, Jack Kemmerly, Jamie Phillips, Steven M. Durbin, 9th Edition 2020.
3. Network lines and Fields by John. D. Ryder 2nd Edition, PHI.

REFERENCES:

1. D. Roy Choudhury, Networks and Systems, New Age International Publications,2013.
2. Joseph Edminister and Mahmood Nahvi, Electric Circuits, Schaum's Outline Series, 7th Edition, Tata McGraw Hill Publishing Company, NewDelhi, 2017.
3. Fundamentals of Electric Circuits by Charles K. Alexander and Matthew N.O. Sadiku, McGraw-Hill Education.

I Year B.Tech. ECE – II Semester

L	T	P	C
0	0	2	1

(PH23ABS102) ENGINEERING PHYSICS LAB

COURSE OBJECTIVES:

The objective of this course are to:

- To study the concepts of optical phenomenon like interference, diffraction etc., recognize the importance of energy gap in the study of conductivity, Hall effect in semiconductors, study the parameters and applications of dielectric and magnetic materials by conducting experiments.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Compare the wavelengths of different colours using diffraction grating.
CO 2: Utilize optical instruments like travelling microscope and spectrometer.
CO 3: Analyze the intensity of the magnetic field of circular coil carrying current with distance.
CO 4: Evaluate dielectric constant for a dielectric material.
CO 5: Estimate the band gap of a given semiconductor and the type of semiconductor using Hall effect.

List of Experiments:

1. Determination of radius of curvature of a given Plano-convex lens by Newton's rings.
2. Determination of wavelengths of different spectral lines in mercury spectrum using diffraction grating in normal incidence configuration.
3. Determination of dielectric constant using charging and discharging method.
4. Study the variation of B versus H by magnetizing the magnetic material (B- H curve).
5. Determination of wavelength of Laser light using diffraction grating.
6. Estimation of Planck's constant using photoelectric effect.
7. Determination of the resistivity of semiconductors by four probe methods.
8. Determination of energy gap of a semiconductor using p-n junction diode.
9. Magnetic field along the axis of a current carrying circular coil by Stewart Gee's Method.
10. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall effect.
11. Determination of temperature coefficients of a thermistor.
12. Sonometer: Verification of laws of stretched string.

Note: Any TEN of the listed experiments are to be conducted. Out of which any TWO experiments may be conducted in virtual mode.

REFERENCES:

1. A Textbook of Practical Physics - S. Balasubramanian, M.N. Srinivasan, S. Chand Publishers, 2017.

ONLINE RESOURCES:

1. www.vlab.co.inhttps://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype

I Year B.Tech. ECE – II Semester

L	T	P	C
0	0	3	1.5

(ME23AES103) ENGINEERING WORKSHOP

COURSE OBJECTIVES:

The objective of this course are to:

- Identify and explain safety practices and precautions relevant to workshop activities.
- Recognize and differentiate various types of woods and tools used in woodwork.
- Demonstrate the ability to create different wood joints, including half-lap, mortise and tenon, and dovetail joints.
- Familiarize students with sheet metal working tools and techniques.
- Enable students to develop sheet metal projects such as tapered trays, conical funnels, elbow pipes and brazing.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Fabricate sheet metal components manually.
CO 2: Construct wood joints such as half-lap, mortise, and tenon.
CO 3: Assemble the components to create joints like a V-fit.
CO 4: Demonstrate the plumbing, welding, foundry, and fitting jobs to form the components.
CO 5: Connect & check the basic house wiring circuit connections for various applications.

1. **Demonstration**: Safety Practices and Precautions to be Observed in the Workshop.
2. **Wood Working:** Familiarity with Different Types of Woods and Tools used in Wood Working and Making Following Joints.
   b) Half – Lap Joint
   c) Mortise and Tenon Joint
   d) Corner Dovetail Joint or Bridle Joint
3. **Sheet Metal Working**: Familiarity with Different Types of Tools used in Sheet Metal Working, Developments of Following Sheet Metal Job from GI Sheets.
   b) Tapered Tray
   c) Conical Funnel
   d) Elbow Pipe
   e) Brazing
4. **Fitting:** Familiarity with Different Types of Tools used in Fitting and do the Following Fitting Exercises.
   b) V-Fit
   c) Dovetail Fit
   d) Semi-Circular Fit
   e) Bicycle Tire Puncture and Change of Two-Wheeler Tyre
5. **Electrical Wiring**: Familiarity with Different Types of Basic Electrical Circuits and make the Following Connections.
   a) Parallel and Series
   b) Two-Way Switch
   c) Godown Lighting
   d) Tube Light
   e) Three Phase Motor
   f) Soldering of Wires
6. **Foundry Trade:** Demonstration and Practice on Moulding Tools and Processes, Preparation of Green Sand Moulds for Given Patterns.
7. **Welding Shop:** Demonstration and Practice on Arc Welding and Gas Welding. Preparation of Lap Joint and Butt Joint.

8. **Plumbing:** Demonstration and Practice of Plumbing Tools, Preparation of Pipe Joints with Coupling for Same Diameter and with Reducer for Different Diameters.

TEXT BOOKS:

1. Basic Workshop Technology: Manufacturing Process, Felix W.; Independently Published,2019. Workshop Processes, Practices and Materials; Bruce J. Black, Routledge Publishers, 5th Edn. 2015.
2. A Course in Workshop Technology Vol I. & II, B.S. Raghuwanshi, Dhanpath Rai & Co., 2015 & 2017.

REFERENCES:

1. Elements of Workshop Technology, Vol. I by S. K. Hajra Choudhury & Others, Media Promoters and Publishers, Mumbai, 2007, 14th edition.
2. Workshop Practice by H. S. Bawa, Tata-McGraw Hill, 2004.
3. Wiring Estimating, Costing and Contracting; Soni P.M. & Upadhyay P.A.; Atul Prakashan, 2021-22.

I Year B.Tech. ECE – II Semester

L	T	P	C
0	0	2	1

(CS23AES103) IT WORKSHOP

COURSE OBJECTIVES:
The objective of this course are to:
- To introduce the internal parts of a computer, peripherals, I/O ports, connecting cables.
- To teach basic command line interface commands on Linux.
- To teach the usage of Internet for productivity and self-paced life-long learning
- To introduce Compression, Multimedia and Antivirus tools and Office Tools such as Word processors, Spread sheets and Presentation tools.

COURSE OUTCOMES:
After successful completion of the course, students will be able to:
CO 1: Perform Hardware troubleshooting.
CO 2: Understand Hardware components and inter dependencies.
CO 3: Safeguard computer systems from viruses/worms.
CO 4: Document/ Presentation preparation.
CO 5: Perform calculations using spreadsheets

Hardware:
Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheraland submit to your instructor.
Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.
Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.
Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Internet & World Wide Web:
Task1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.
Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.
Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.
Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block activey downloads to avoid viruses and/or worms.

LaTeX and WORD:
Task 1: Word Orientation: The mentor needs to give an overview of La TeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of La TeX and MS office or equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using La TeXand word– Accessing, overview of toolbars, saving

files, Using help and resources, rulers, format painter in word.
Task 2: Using La TeX and Word to create a project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both La TeX and Word.
Task 3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.
Task 4: Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Excel:
Excel Orientation: The mentor needs to tell the importance of MS office or equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.
Task 1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text
Task 2: Calculating GPA - Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function,
LOOKUP/VLOOKUP
Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean andlogical operators, Conditional formatting

Power Point:
Task 1: Students will be working on basic power point utilities and toolswhich help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrowsin PowerPoint.
Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art,Audio, Video, Objects, Tables and Charts.
Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

AI Tools – ChatGPT:
Task 1: Prompt Engineering: Experiment with different types of prompts to see how the model responds. Try asking questions, starting conversations, or even providing incomplete sentences
to see how the model completes them.
Ex: Prompt: "You are a knowledgeable AI. Please answer the following question: What is the capital of France?"
Task 2: Creative Writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstorm creative ideas
Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this newreality."
Task 3: Code Generation: Test the model's ability to generate code by giving it partial code snippets and asking it to complete them. You can also ask the model to explain programming concepts or help you debug code.
Ex: Prompt: "Complete the following Python code to swap the values of two variables:\npython\na = 5\nb = 10\ntemp = a\na = b\nb = temp\n"
Task 4: Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it intoanother language. Compare the output to see how accurate and fluent the translations are.
Ex: Prompt: "Translate the following English sentence to French: 'Hello, how are you doing today?'".

Task 5: Summarization: Provide a long piece of text, such as an article or a blog post, and ask the model to summarize it. Compare the model's summary with the original text to assess its ability to condense information effectively.
Ex: Prompt: "Summarize the article titled 'Ramayanam' in 3-4 sentences."
Task 6: Futuristic Predictions: Have fun by asking the model to predict future technological advancements, societal changes, or even hypothetical scenarios. Compare its responses with your own ideas.
Ex: Prompt: "Predict how artificial intelligence will transform everyday life in the next 20 years."
Task 7: Technical Explanations: Challenge the model with technical questions from different domains. Ask it to explain scientific concepts, mathematical theorems, or complex algorithms in simple terms.
Ex: Prompt: "Explain the concept of neural networks in machine learning, including their layers and the process of backpropagation."

REFERENCES:

1. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dream tech
2. The Complete Computer upgrade and repair book, 3rd edition Cheryl A chmidt, WILEY Dream tech
3. Introduction to Information Technology, ITL EducationSolutions limited, Pearson Education.
4. PC Hardware - A Handbook – Kate J. Chase PHI (Microsoft)
5. LaTeX Companion – Leslie Lamport, PHI/Pearson.
6. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfins on and Ken Quamme. – CISCO Press, Pearson Education.
7. IT Essentials PC Hardware and Software Labs and Study Guide Third Edition by Patrick Regan– CISCO Press, Pearson Education.

I Year B.Tech. ECE – II Semester

L	T	P	C
0	0	3	1.5

(EC23APC202) NETWORK ANALYSIS AND SIMULATIONLABORATORY

COURSE OBJECTIVES:
The objectives of this course are to:

- To Gain Hands on Experience in Verifying Kirchhoff's Laws and network Theorems
- To analyze transient and steady state behavior of circuits
- To study resonance characteristics
- To determine two-port network Parameters

COURSE OUTCOMES:
After successful completion of the course, students will be able to:

- **CO 1:** Verify Kirchhoff's Laws and network Theorems
- **CO 2:** Analyze time domain and frequency response of RL & RC circuits
- **CO 3:** Analyze behavior of RLC circuit for different excitations
- **CO 4:** Design resonant circuit for given Specifications
- **CO 5:** Characterize and model the network in terms of all network Parameters

The following experiments need to be performed using both Hardware and simulation Software. The experiments need to be simulated using software and the same need to be verified using the hardware.

1. Study of components of a circuit and Verification of KCL and KVL.
2. Verification of mesh and nodal analysis for AC circuits.
3. Verification of Superposition, Thevenin's & Norton theorems for AC circuits.
4. Verification of maximum power transfer theorem for AC circuits.
5. Verification of Tellegen's theorem for two networks of the same topology.
6. Study of DC transients in RL, RC and RLC circuits.
7. To study frequency response of various 1st order RL & RC networks.
8. To study the transient and steady state response of a 2nd order circuit by varying its various parameters and studying their effects on responses.
9. Find the Q Factor and Bandwidth of a Series and Parallel Resonance circuit.
10. Determination of open circuit (Z) and short circuit (Y) parameters.
11. Determination of hybrid (H) and transmission (ABCD) parameters.
12. To measure two port parameters of a twin-T network and study its frequency response.

Hardware Requirements:
Regulated Power supplies, Analog/Digital Function Generators, Digital Multimeters, Decade Resistance Boxes/Rheostats, Decade Capacitance Boxes, Ammeters (Analog or Digital), Voltmeters (Analog or Digital), Active & Passive Electronic Components.

Software requirements:
Multisim/ Pspice/Equivalent simulation software tool, Computer Systems withrequired specifications

REFERENCES:

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, revised 3rd Edition, 2019.
2. Engineering Circuit Analysis by William H. Hayt, Jack Kemmerly, JamiePhillips, Steven M. Durbin, 9th Edition 2020.

I Year B.Tech. ECE – II Semester

L	T	P	C
0	0	1	0.5

(CH23ABS105) HEALTH AND WELLNESS, YOGA AND SPORTS

COURSE OBJECTIVES:
The objective of this course is:

- To make the students maintain their mental and physical wellness by balancing emotions in their life. It mainly enhances the essential traits required for the development of the personality.

COURSE OUTCOMES:
After successful completion of the course, students will be able to:

CO 1: Understand the importance of yoga and sports for Physical fitness and sound health.
CO 2: Demonstrate an understanding of health-related fitness components.
CO 3: Compare and contrast various activities that help enhance their health.
CO 4: Assess current personal fitness levels.
CO 5: Develop Positive Personality.

UNIT I:
Concept of health and fitness, Nutrition and Balanced diet, basic concept of immunity Relationship between diet and fitness, Globalization and its impact on health, Body Mass Index (BMI) of all age groups.
Activities:

i) Organizing health awareness programmes in community.
ii) Preparation of health profile.
iii) Preparation of chart for balance diet for all age groups.

UNIT II:
Concept of yoga, need for and importance of yoga, origin and history of yoga in Indian context, classification of yoga, Physiological effects of Asanas-Pranayama and meditation, stress management and yoga, Mental health and yoga practice.
Activities:
Yoga practices – Asana, Kriya, Mudra, Bandha, Dhyana, Surya Namaskar

UNIT III:
Concept of Sports and fitness, importance, fitness components, history of sports, Ancient and Modern Olympics, Asian games and Commonwealth games.
Activities:

i) Participation in one major game and one individual sport viz., Athletics, Volleyball, Basketball, Handball, Football, Badminton, Kabaddi, Kho-kho,Table tennis, Cricket etc. Practicing general and specific warm up, aerobics
ii) Practicing cardiorespiratory fitness, treadmill, run test, 9 min walk, skipping and running.

REFERENCES:

1. Gordon Edlin, Eric Golanty. Health and Wellness, 14th Edn. Jones &Bartlett Learning, 2022
2. T. K. V. Desikachar. The Heart of Yoga: Developing a Personal Practice
3. Archie J.Bahm. Yoga Sutras of Patanjali, Jain Publishing Company, 1993
4. Wiseman, John Lofty, SAS Survival Handbook: The Ultimate Guide to Surviving Anywhere Third Edition, William Morrow Paperbacks, 2014
5. The Sports Rules Book/ Human Kinetics with Thomas Hanlon. -- 3rd ed. Human Kinetics, Inc.2014 General

II Year B.Tech. ECE – I Semester

L	T	P	C
3	0	0	3

(MA23ABS305) PROBABILITY AND COMPLEX VARIABLES

COURSE OBJECTIVES:

The objective of this course are to:

- To describe continuity/differentiability/analyticity of a function and find the derivative of a function.
- To classify and explain complex power series, singularities, calculus of residues and its applications in the evaluation of integrals.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

- **CO 1:** Understand the concepts of Probability, Random Variables and their characteristics.
- **CO 2:** Learn how to deal with multiple random variables, conditional probability, joint distribution and statistical independence.
- **CO 3:** Formulate and solve engineering problems involving random variables.
- **CO 4:** Analyze the behavior of a complex function and understand Cauchy-Riemann equation in testing the analytic functions.
- **CO 5:** Apply Cauchy integral theorem, formula and residue theorem to evaluating the complex integrals.

UNIT I: (10 periods)

Probability & Random Variable: Probability through Sets and Relative Frequency: Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Joint Probability, Conditional Probability, Total Probability, Baye's Theorem, Independent Events. Random variables (discrete and continuous), mathematical expectation, Distribution and Density functions, Properties, Binomial, Poisson, Gaussian, Uniform, Exponential and Rayleigh distributions**.**

UNIT II: (10 Periods)

Operations on Random variable: Moments-moments about the origin, Central moments, Variance and Skew, Chebyshev's inequality, moment generating function, characteristic function.

Multiple Random Variables: Vector Random Variables, Joint Distribution Function, Properties of Joint Distribution, Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning, Interval conditioning, Statistical Independence.

UNIT III: (09 Periods)

Operations on Multiple Random variables: Operations on Multiple Random Variables: Expected Value of a Function of Random Variables, Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables: Two Random Variables case, N Random Variable case, Properties of Gaussian random variables.

UNIT IV: (08 Periods)

Complex Variable–Differentiation: Introduction to functions of complex variable-concept of Limit & continuity - Differentiation, Cauchy-Riemann equations, analytic functions harmonic functions, finding harmonic conjugate-construction of analytic function by Milne Thomson method.

UNIT V: (08 Periods)

Complex Variable–Integration: Line integral-Contour integration, Cauchy's integral theorem (without proof), Cauchy Integral formula, Power series expansions: Taylor's series and Maclaurin's series, zeros of analytic functions, singularities, Laurent's series, Residues, Cauchy Residue theorem (without proof). Evaluation of definite Integral involving sine and cosine.

Total Periods: 45

TEXT BOOKS:

1. Peyton Z. Peebles, "Probability, Random Variables & Random Signal Principles", 4th Edition, TMH, 2002.
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 2017, 44th Edition.

REFERENCES:

1. Athanasios Papoulis and S. Unnikrishna Pillai, "Probability, Random Variables and Stochastic Processes", 4th Edition, PHI, 2002.
2. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley India.
3. Henry Starkand John W. Woods, "Probability and Random Processes with Application to Signal Processing," 3rd Edition, Pearson Education, 2002.
4. B.V.Ramana, Higher Engineering Mathematics, McGraw Hill publishers.

ONLINE RESOURCES:

1. https://onlinecourses.nptel.ac.in/noc20_ma50/preview
2. https://onlinecourses.nptel.ac.in/noc21_ma66/preview#:~:text=This%20course%20provides%20random%20variable,and%20simple%20Markovian%20queueing%20models.

II Year B.Tech. ECE – I Semester

L	T	P	C
2	1	0	3

(BA23AHS302) UNIVERSAL HUMAN VALUES

COURSE OBJECTIVES:

The objective of this course is:

- To help the students appreciate the essential complementary between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Define the terms like Natural Acceptance, Happiness and Prosperity
CO 2: Identify one's self, and one's surroundings (family, society nature).
CO 3: Apply what they have learnt to their own self in different day-to-day settings in real life.
CO 4: Relate human values with human relationship and human society.
CO 5: Justify the need for universal human values and harmonious existence.
CO 6: Develop as socially and ecologically responsible engineers

UNIT I: **(7 Periods)**

Introduction to Value Education: Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education) – Understanding Value Education; Practice Session - Sharing about Oneself; Self-Exploration as the Process for Value Education - Continuous Happiness and Prosperity - the Basic Human Aspirations; Practice Session - Exploring Human Consciousness; Happiness and Prosperity – Current Scenario - Method to Fulfill the Basic Human Aspirations; Practice Session - Exploring Natural Acceptance.

UNIT II: **(6 Periods)**

Harmony in the Human Being: Understanding Human Being as the Co-existence of the Self and the Body - Distinguishing between the Needs of the Self and the Body; Practice Session - Exploring the difference of Needs of self and body; The Body as an Instrument of the Self - Understanding Harmony in the Self; Practice Session - Exploring Sources of Imagination in the Self; Harmony of the Self with the Body - Programme to ensure Self-regulation and Health; Practice Session - Exploring Harmony of Self with the Body.

UNIT III: **(6 Periods)**

Harmony in the Family and Society: Harmony in the Family – The Basic Unit of Human Interaction - 'Trust' – The Foundational Value in Relationship; Practice Session - Exploring the Feeling of Trust; 'Respect' – as the Right Evaluation; Practice Session - Exploring the Feeling of Respect; Other Feelings, Justice in Human-to-Human Relationship - Understanding Harmony in the Society - Vision for the Universal Human Order; Practice Session; Exploring Systems to fulfill Human Goal.

UNIT IV: (5 Periods)

Harmony in the Nature / Existence: Understanding Harmony in the Nature - Interconnectedness, Self-regulation and Mutual fulfillment among the Four Orders of Nature; Practice Session - Exploring the Four Orders of Nature; Realizing Existence as Co-existence at All Levels - The Holistic Perception of Harmony in Existence; Practice Session - Exploring Co-existence in Existence**.**

UNIT V: (6 Periods)

Implications of the Holistic Understanding – a Look at Professional Ethics: Natural Acceptance of Human Values - Definitiveness of (Ethical) Human Conduct; Practice Session - Exploring Ethical Human Conduct; A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order - Competence in Professional Ethics; Practice Session - Exploring Humanistic Models in Education; Holistic Technologies, Production Systems and Management Models-Typical Case Studies - Strategies for Transition towards Value-based Life and Profession; Practice Session - Exploring Steps of Transition towards Universal Human Order.

Total Periods: 30

TEXT BOOKS:

1. R R Gaur, R Asthana, G P Bagaria, A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
2. R R Gaur, R Asthana, G P Bagaria,Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

REFERENCES:

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. A.N. Tripathy, 2003, Human Values, New Age International Publishers. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi.
3. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
4. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.
5. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow, Reprinted 2008.

ONLINE RESOURCES:

1. https://www.studocu.com/in/document/kiet-group-of-institutions/universal-human-values/chapter-5-holistic-understanding-of-harmony-on-professional ethics/62490385
2. https://onlinecourses.swayam2.ac.in/aic22_ge23/preview

II Year B.Tech. ECE – I Semester

L	T	P	C
3	0	0	3

(EC23APC301) DIGITAL CIRCUITS DESIGN

COURSE OBJECTIVES:

The objective of this course are to:

- Understand the properties of Boolean algebra, logic operations, and minimization of Boolean functions.
- Analyze combinational and analyze sequential logic circuits.
- Understand the concepts of FSM and compare various Programmable logic devices.
- Model combinational and sequential circuits using HDLs.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

- **CO 1:** Understand the properties of Boolean algebra, logic operations and apply techniques for minimization of Boolean functions
- **CO 2:** Analyze and Design Combinational Circuits
- **CO 3:** Design and Model combinational circuits using HDLs
- **CO 4:** Design and Model Sequential circuits using HDLs
- **CO 5:** Design of FSM and Compare various Programmable logic devices.

UNIT I: (10 Periods)

Boolean algebra, logic operations, and minimization of Boolean functions: Review of Number Systems and Codes, Representation of unsigned and signed integers, Laws of Boolean Algebra, Theorems of Boolean Algebra, Realization of functions using logic gates, Canonical forms of Boolean Functions, Minimization of Functions using Karnaugh Maps.

UNIT II: (9 Periods)

Combinational Logic Circuits: Combinational circuits, Design with basic logic gates, design procedure, adders, subtractors, 4-bit binary adder/ subtractor circuit, BCD adder, carry look- a-head adder, binary multiplier, magnitude comparator, priority encoders, decoders, multiplexers, demultiplexers.

UNIT III: (8 Periods)

Hardware Description Language: Introduction to Verilog - structural specification of logic circuits, behavioral specification of logic circuits, hierarchical Verilog Code, Verilog for combinational circuits - conditional operator, if-else statement, case statement, for loop using sequential circuits with CAD tools.

UNIT IV: (8 Periods)

Sequential Logic Circuits: Basic architectural distinction between combinational and sequential circuits, Design procedure, latches, flip-flops, truth tables and excitation tables, conversion of flip- flops, design of counters, ripple counters, synchronous counters, ring counter, Johnson counter, registers, shift registers, universal shift register. Verilog constructs for sequential circuits, flip-flop with clear capability, using Verilog constructs for registers and counters.

UNIT V: (10 Periods)

Finite State Machines and Programmable Logic Devices: Types of FSM, capabilities and limitations of FSM, state assignment, realization of FSM using flip-flops, Mealy to Moore conversion and vice-versa, reduction of state tables using partition technique, Design of sequence detector. Types of PLD's: PROM, PAL, PLA, basic structure of CPLD and FPGA, advantages of FPGAs.

Total Periods: 45

TEXT BOOKS:

1. M. Morris Mano, "Digital Design", 3rd edition, PHI.
2. Stephen Brown and ZvonkoVranesic, "Fundamentals of Digital Logic with Verilog Design", 3rd edition, McGraw-Hill.

REFERENCES:

1. Charles H. Roth, Jr, "Fundamentals of Logic Design", 4th edition, Jaico Publishers.
2. ZviKohavi and NirajK.Jha, "Switching and Finite Automata Theory, 3rd edition, Cambridge University Press, 2010.
3. Samir Palnitkar, "Verilog HDL: A Guide to Digital Design and Synthesis", 2nd edition Prentice Hall PTR.
4. D.P. Leach, A.P. Malvino, "Digital Principles and Applications", TMH, 7th edition.

L	T	P	C
3	0	0	3

(EC23APC302) ELECTRONIC DEVICES AND CIRCUITS

COURSE OBJECTIVES:

The objective of this course are to:

- Understand the basic principles of all semiconductor devices.
- Analyze diode circuits, various biasing and small signal equivalent circuitsof amplifiers, compare the performance of BJTs and MOSFETs
- Design rectifier circuits and various amplifier circuits using BJTs andMOSFETs.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Design a Bridge rectifier using C-filter.
CO 2: Compare the performance of various BJT biasing circuits.
CO 3: Evaluate the various important specifications of three amplifier configurations.
CO 4: Analyze a MOSFET biasing circuit.
CO 5: Design a practical amplifier circuits using MOSFETS and discrete components.

UNIT I: (10 Periods)

PN junction diode: Review, diode current equation, Diode resistance, Transition and Diffusion Capacitance, effect of temperature on PN junction diode, Quantitative analysis of center-tap Full-wave and Bridge Rectifiers with C-filter**,** Ripple Factor and Regulation Characteristics, Clipping and Clamping circuits, Illustrative problems.
Special Diodes: Construction, operation and VI characteristics of Tunnel Diode, VaractorDiode, LED, LCD, Photo Diode, SCR and UJT.

UNIT II: (8 Periods)

Review of Bipolar Junction Transistors, Limits of Operation, BJT Specifications.
Biasing and Stabilization: Operating Point, DC and AC Load Lines, Importance of Biasing,Fixed Bias, Collector to Base Bias, Self-Bias, Bias Stability, Thermal Runaway, Thermal Stability, Illustrative problems.

UNIT III: (8 Periods)

BJT Small Signal Operation and Models: The transconductance, input resistance at the base, input resistance at the emitter, Voltage gain, separating the Signal and the DC Quantities, The Hybrid π Model, the T Model.
Single Stage BJT Amplifiers - Common-Emitter (CE) amplifier without and with emitterresistance, Common-Base (CB) amplifier, Common- Collector (CC) amplifier or EmitterFollower, Problem solving.

UNIT IV: (9 Periods)

Junction Field Effect Transistor (FET): Construction, Principle of Operation, V–I Characteristics, Comparison of BJT and FET, FET as Voltage Variable Resistor.
MOS Field Effect Transistors: Introduction, Device Structure and Physical Operation, CMOS, V - I Characteristics, MOSFET Circuits at DC, MOSFET as an Amplifier andas a Switch. Biasing in MOS Amplifier circuits - biasing by fixing VGS with and without source resistance, biasing using drain to gate feedback resistor, biasing using constant current source, body effect, Problem solving.

UNIT V: (10 Periods)

MOSFET Small Signal Operation Models: The dc bias, separating the DC analysis and the signal analysis, Small signal equivalent circuit models, the trans-conductance, the T-equivalent circuit model, Single stage MOS Amplifiers – common source (CS) amplifier without and with source resistance, common gate (CG) amplifier, source follower, Problem Solving.

Total Periods: 45

TEXT BOOKS:

1. Adel S. Sedra and Kenneth C. Smith, "Microelectronic Circuits – Theory andApplications", 6th edition, Oxford Press, 2013.
2. J. Milliman and C Halkias, "Integrated electronics", 2nd edition, Tata McGraw Hill,1991.

REFERENCES:

1. Donald A Neamen, "Electronic Circuits – analysis and design", 3rd edition, McGraw Hill (India), 2019.
2. Behzad Razavi, "Microelectronics", 2nd edition, Wiley, 2013.
3. R.L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuits," 9th edition, Pearson, 2006.
4. Jimmie J Cathey, "Electronic Devices and Circuits," Schaum's outlines series, 3rd edition, McGraw-Hill (India), 2010.

L	T	P	C
3	0	0	3

(EC23APC303) SIGNALS, SYSTEMS AND STOCHASTIC PROCESSES

COURSE OBJECTIVES:

The objective of this course are to:

- Understand the basics of signals and systems required for ECE courses.
- Learn concepts of signals and systems and its analysis using different transform techniques.
- Understand random processes which are essential for the random signals and systems encountered in communications and signal processing areas.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

- **CO 1:** Classify Signals and Systems (Continuous and Discrete) in time domain and apply Fourier series to represent signals in frequency domain.
- **CO 2:** Apply Continuous time Fourier Transform to Continuous time Signals and convert Continuous time signals to discrete time Signals using Sampling Theorem.
- **CO 3:** Analyze Signal Transmission to LTI Systems
- **CO 4:** Analyze Temporal Characteristics and its Properties.
- **CO 5:** Analyze Spectral Characteristics and its Properties.

UNIT I: (9 Periods)

Signals & Systems: Basic definitions and classification of Signals and Systems (Continuous time and discrete time), operations on signals, Concepts of Convolution and Correlation of signals, Analogy between vectors and signals-Orthogonality, mean square error.

Fourier series: Trigonometric & Exponential forms of Fourier series, Properties, Concept of discrete spectrum, Illustrative Problems.

UNIT II: (9 Periods)

Fourier Transform: Definition, Computation and properties of Fourier transform for different types of signals and systems, Inverse Fourier transform. Sampling: Sampling theorem – Statement and Proof of sampling theorem of low pass signals Illustrative Problems.

Laplace Transform: Definition, ROC, Properties, Inverse Laplace transforms, the s-plane and BIBO stability, Transfer functions, System Response to standard signals, Solution of differential equations with initial conditions, Illustrative Problems.

UNIT III: (10 Periods)

Signal Transmission through Linear Systems: Linear system, impulse response, Response of a linear system for different input signals, linear time-invariant (LTI) system, linear time variant (LTV) system, Transfer function of a LTI system. Filter characteristicsof linear systems. Distortion less transmission through a system, Signal bandwidth, System bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Paley-Wiener criterion for physical realization, Relationship between bandwidth and rise time, Energy and Power spectral densities, Illustrative Problems.

UNIT IV: (9 Periods)

Random Processes – Temporal Characteristics: The Random Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, concept of Stationarity and Statistical Independence. First -Order Stationary Processes, Second- Order and Wide-Sense Stationarity, (N-Order) and Strict Sense Stationarity, Time Averages and Ergodicity, Autocorrelation Function and Its Properties, Cross-Correlation Function and Its Properties, Covariance Functions, Gaussian Random Processes, Poisson Random Process.

UNIT V: **(8 Periods)**

Random Processes – Spectral Characteristics: The Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, The Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Spectrum and Cross correlation Function.

Total Periods: 45

TEXTBOOKS:

1. Peyton Z. Peebles, "Probability, Random Variables & Random Signal Principles" 4th edition,TMH, 2002.
2. A.V. Oppenheim, A.S. Willsky and S.H. Nawab, "Signals and Systems", 2nd edition, PHI, 2009.

REFERENCES:

1. Signals, Systems & Communications - B.P. Lathi, 2013, BSP.
2. Athanasios Papoulis and S. Unnikrishna Pillai, "Probability, Random Variables and Stochastic Processes", 4th edition, PHI, 2002
3. Simon Haykin and Van Veen, "Signals & Systems", 2nd edition, Wiley, 2005.
4. Matthew Sadiku and Warsame H. Ali, "Signals and Systems A primer with MATLAB", CRC Press, 2016.
5. Hwei Hsu, "Schaum's Outline of Signals and Systems", 4th edition, TMH, 2019.

II Year B.Tech. ECE – I Semester

L	T	P	C
0	0	3	1.5

(EC23APC304) DIGITAL CIRCUITS AND SIGNAL SIMULATION LAB

COURSE OBJECTIVES:

The objective of this course are to:

- Verify the truth tables of various logic circuits.
- Design sequential/combinational circuit using Hardware Description Language and verify their functionality.
- Simulate various Signals and Systems through MATLAB
- Analyze the output of a system when it is excited by different types of deterministic and random signals.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Verify the truth tables of various logic circuits.
CO 2: Understand how to simulate different types of signals and system response.
CO 3: Design sequential and combinational logic circuits and verify their functionality.
CO 4: Analyze the response of different systems when they are excited by different signals and plot power spectral density of signals.
CO 5: Generate different random signals for the given specifications.

List of Experiments:

PART A

1. Design a simple combinational circuit with four variables and obtain minimal SOP expression and verify the truth table using Digital Trainer Kit.
2. Verification of functional table of 3 to 8-line Decoder /De-multiplexer
3. 4 variable logic function verification using 8 to1 multiplexer.
4. Design full adder circuit and verify its functional table.
5. Design a four-bit ring counter using D Flip–Flops/JK Flip Flop and verify output.
6. Design a four-bit Johnson's counter using D Flip-Flops/JK Flip Flops and verify output
7. Verify the operation of 4-bit Universal Shift Register for different Modes ofoperation.
8. Draw the circuit diagram of MOD-8 ripple counter and construct a circuit using T-Flip- Flops and Test It with a low frequency clock and sketch the output waveforms.
9. Design MOD–8 synchronous counter using T Flip-Flop and verify the result and sketch the output waveforms.
10. (a) Draw the circuit diagram of a single bit comparator and test the output
    (b) Construct 7 Segment Display Circuit Using Decoder and7 Segment LED and test it.

Note:

1. Design and verify combinational and sequential circuits using Hardware Description Language
2. Verify the design with test bench for at least one experiment.

REFERENCES:

1. M. Morris Mano, "Digital Design", 3rd edition, PHI

PART B

1. Write a program to generate various Signals and Sequences: Periodic and Aperiodic, Unit Impulse, Unit Step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sinc function.
2. Perform operations on Signals and Sequences: Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.

3. Write a program to find the trigonometric & exponential Fourier series coefficients of a rectangular periodic signal. Reconstruct the signal by combining the Fourier series coefficients with appropriate weightings- Plot the discrete spectrum of the signal.
4. Write a program to find Fourier transform of a given signal. Plot its amplitude and phase spectrum.
5. Write a program to convolve two discrete time sequences. Plot all the sequences.
6. Write a program to find autocorrelation and cross correlation of given sequences.
7. Write a program to verify Linearity and Time Invariance properties of a given Continuous System.
8. Write a program to generate discrete time sequence by sampling a continuous time signal. Show that with sampling rates less than Nyquist rate, aliasing occurs while reconstructing the signal.
9. Write a program to find magnitude and phase response of first order low pass and high pass filter. Plot the responses in logarithmic scale.
10. Write a program to generate Complex Gaussian noise and find its mean, variance, Probability Density Function (PDF) and Power Spectral Density (PSD).
11. Generate a Random data (with bipolar) for a given data rate (say 10kbps). Plot the same for a time period of 0.2 sec.
12. To plot pole-zero diagram in S-plane of given signal/sequence and verify itsstability.

Note: Any 10 experiments. All the experiments are to be simulated using MATLAB or equivalent software.

REFERENCES:

1. Stephen J. Chapman, "MATLAB Programming for Engineers", Cengage, November 2012.

II Year B.Tech. ECE – I Semester

L	T	P	C
0	0	3	1.5

(EC23APC305) ELECTRONIC DEVICES AND CIRCUITS LAB

Course Objectives:
The objective of this course are to:
- Verify the theoretical concepts practically from all the experiments.
- Analyze the characteristics of Diodes, BJT, MOSFET, and UJT.
- Design the amplifier circuits from the given specifications.
- Model the electronic circuits using tools such as PSPICE/Multisim.

Course Outcomes:
After successful completion of the course, students will be able to:
- **CO 1:** Understand the basic characteristics and applications of basic electronic devices.
- **CO 2:** Observe the characteristics of electronic devices by plotting graphs.
- **CO 3:** Analyze the V-I characteristics of various diodes, BJT, JFET and MOSFET.
- **CO 4:** Design MOSFET / BJT based amplifiers for the given specifications.
- **CO 5:** Simulate all circuits in PSPICE / Multisim.

LIST OF EXPERIMENTS: (**Implement** / **Execute any 10 experiments**).
1. Verify various clipping and clamper circuits using PN junction diode and draw the suitable graphs.
2. Study and draw the Volt Ampere characteristics of UJT and determine η, IP, Iv, VP,& Vv from the experiment.
3. Verification of the input and output characteristics of BJT in Common Emitter configuration experimentally and find required parameters from the graphs.
4. Study and draw the input and output characteristics of BJT in Common Base configuration experimentally and determine required parameters from the graphs.
5. Verification of the input and output characteristics of BJT in Common Collector configuration experimentally and find required parameters from the graphs. Study and draw the V- I characteristics of JFET experimentally.
6. Study and draw the ***output*** and ***transfer*** characteristics of MOSFET (Enhance mode) in Common Source Configuration experimentally. Find ***Threshold voltage (VT), gm, & K*** from the graphs.
7. Study and draw the ***output*** and ***transfer*** characteristics of MOSFET (Depletion mode) or JFET in Common Source Configuration experimentally. Find ***IDSS, gm, & VP*** from the graphs.
8. Design and analysis of voltage- divider bias/self-bias circuit using BJT.
9. Design and analysis of self-bias circuit using MOSFET.
10. Design a suitable circuit for switch using MOSFET/BJT.
11. Design a small signal amplifier using MOSFET (common source) for the given specifications. Draw the frequency response and find the bandwidth.
12. Design a small signal amplifier using BJT (common emitter) for the given specifications. Draw the frequency response and find the bandwidth.

Tools / Equipment Required:
Software Toollike Multisim/ Pspice or Equivalent, DC Power supplies, Multi meters DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices.

II Year B.Tech. ECE – I Semester

L	T	P	C
0	1	2	2

(CS23ASC302) PYTHON PROGRAMMING

COURSE OBJECTIVES:
The objectives of this course are to:
- Introduce core programming concepts of Python programming language.
- Demonstrate about Python data structures like Lists, Tuples, Sets and dictionaries.
- Implement Functions, Modules and Regular Expressions in PythonProgramming and to create practical and contemporary applications using these

COURSE OUTCOMES:
After successful completion of the course, students will be able to:
- **CO 1:** Classify data structures of Python.
- **CO 2:** Apply Python programming concepts to solve a variety of computational problems.
- **CO 3:** Understand the principles of object-oriented programming (OOP) in Python, including classes, objects, inheritance, polymorphism, and encapsulation, and apply them to design and implement Python programs.
- **CO 4:** Become proficient in using commonly used Python libraries and frameworks such as JSON, XML, NumPy, pandas.
- **CO 5:** Exhibit competence in implementing and manipulating fundamental data structures such as lists, tuples, sets, dictionaries.
- **CO 6:** Propose new solutions to computational problems

UNIT I
History of Python Programming Language, Thrust Areas of Python, Installing Anaconda Python Distribution, Installing and Using Jupiter Notebook.
Parts of Python Programming Language: Identifiers, Keywords, Statements and Expressions, Variables, Operators, Precedence and Associativity, Data Types, Indentation, Comments, Reading Input, Print Output, Type Conversions, the type () Function and Is Operator, Dynamic and Strongly Typed Language.
Control Flow Statements: if statement, if-else statement, if.eif else, Nested if statement, while Loop, for Loop, continue and break Statements, Catching Exceptions Using try and except Statement.

Sample Experiments:
1. Write a program to find the largest element among three Numbers.
2. Write a Program to display all prime numbers within an interval
3. Write a program to swap two numbers without using a temporary variable.
4. Demonstrate the following Operators in Python with suitable examples.
    - Arithmetic Operators
    - Relational Operators
    - Assignment Operators
    - Logical Operators
    - Bit wise Operators Ternary Operator
    - Membership Operators Identity Operators
5. Write a program to print multiplication table of a given number.

UNIT II
Functions: Built-In Functions, Commonly Used Modules, Function Definition and Calling the function, return Statement and void Function, Scope and Lifetime of Variables, Default Parameters, Keyword Arguments, *args and **kwargs, Command Line Arguments.
Strings: Creating and Storing Strings, Basic String Operations, Accessing Characters in String by Index Number, String Slicing and Joining, String Methods, Formatting Strings.

Lists: Creating Lists, Basic List Operations, Indexing and Slicing in Lists.

Sample Experiments:

1. Write a program to define a function with multiple return values.
2. Write a program to define a function using default arguments.
3. Write a program to find the length of the string without using any library functions.
4. Write a program to check if the substring is present in a given string or not.
5. Write a program to perform the given operations on a list:
   i. Addition ii. Insertion iii. slicing
6. Write a program to perform any 5 built-in functions by taking any list

UNIT III

Dictionaries: Creating Dictionary, Accessing and Modifying key: value Pairs in Dictionaries, Built-In Functions Used on Dictionaries, Dictionary Methods, del Statement.

Tuples and Sets: Creating Tuples, Basic Tuple Operations, tuple() Function, Indexing and Slicing in Tuples, Built-In Functions Used on Tuples, Relation between Tuples and Lists, Relation between Tuples and Dictionaries.

Sample Experiments:

1. Write a program to create tuples (name, age, address, college) for at least two members and concatenate the tuples and print the concatenated tuples.
2. Write a program to count the number of vowels in a string (No control flow allowed).
3. Write a program to sum all the items in a given dictionary.

UNIT IV

Files: Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Python os and os.path Modules.

Object-Oriented Programming: Classes and Objects, Creating Classes in Python, Creating Objects in Python, Constructor Method, method overloading, constructor overloading, classes with Multiple Objects, Inheritance, Polymorphism.

Sample Experiments:

1. Write a program to create Classes and Objects in Python
2. Write a program to implement inheritance concept
3. Write a Python program to implement method overloading, constructor overloading

UNIT V

Introduction to Data Science: NumPy, Pandas, Matplotlib libraries.

Sample Experiments:

1. Python Program to demonstrate NumPy arrays creation using array () function.
2. Python program to demonstrate use of ndim, shape, size, dtype.
3. Python programs to demonstrate different ways to create Pandas Dataframe
4. Python programs to demonstrate various plots in matplotlib.

REAL TIME PROJECT:

Dice Rolling Simulator in Python

REFERENCES:

1. Gowrishankar S, Veena A., Introduction to Python Programming, CRC Press 1st Edition, 2018
2. Python Programming, S Sridhar, J Indumathi, V M Hariharan, 2nd Edition, Pearson, 2024
3. Introduction to Programming Using Python, Y. Daniel Liang, Pearson 1stEdition 2017.

ONLINE RESOURCES:

1. https://www.coursera.org/learn/python-for-applied-data-science-ai
2. https://www.coursera.org/learn/python?specialization=python#syllabus

II Year B.Tech. ECE – I Semester

L	T	P	C
2	0	0	0

(CH23AMC301) ENVIRONMENTAL SCIENCE

COURSE OBJECTIVES:

The objective of this course is:

- To make the students to get awareness on environment.
- To understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life.
- To save earth from the inventions by the engineers.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

- **CO 1:** Exploring different types of renewable and non-renewable energy sources.
- **CO 2:** Students will learn about the structure and function of different ecosystems.
- **CO 3:** Students will learn about different types of pollution and their sources, effects and control measures.
- **CO 4:** Exploring the science behind climate change, its evidence, and its impacts on ecosystems and human societies.
- **CO 5:** Understanding demographic factors and their environmental implications.

UNIT I: (6 Periods)

Multidisciplinary Nature of Environmental Studies: Definition, Scope and Importance – Need for Public Awareness.

Natural Resources: Energy Resources**-** Renewable and Non-Renewable Resources – Natural Resources and Associated Problems – Forest Resources – Use and Over – Exploitation, Deforestation, Case Studies – Timber Extraction – Mining, Dams and other effects on Forest and Tribal People Water Resources – Use and Over Utilization of Surface and Ground Water – Floods, Drought, conflicts over Water, Dams – Benefits and Problems – Mineral Resources: Use and Exploitation, Environmental Effects of extracting and using Mineral Resources, Case Studies – Food Resources, World Food Problems, changes caused by Agriculture and Overgrazing, Effects of Modern Agriculture, Fertilizer-Pesticide Problems, Water Logging, Salinity, Case Studies.

UNIT II: (7 Periods)

Ecosystems: Concept of an Ecosystem. – Structure and Function of an Ecosystem – Producers, Consumers and Decomposers – Energy flow in the Ecosystem – Ecological Succession – Food Chains, Food Webs and Ecological Pyramids – Introduction, Types, Characteristic Features, Structure and Function of the following Ecosystems:

a) Forest Ecosystem.
b) Grassland Ecosystem
c) Desert Ecosystem.
d) Aquatic Ecosystems (Freshwater - Ponds, Streams, Lakes, Rivers, Marine Ecosystem- Oceans, Estuaries)

Biodiversity and its Conservation : Introduction, Definition: Genetic, Species and Ecosystem Diversity – Bio-Geographical Classification of India – Value of Biodiversity: Consumptive use, Productive use, Social, Ethical, Aesthetic and Option Values – Biodiversity at Global, National and Local levels – India as a Mega-Diversity Nation – Hot-Spots of Biodiversity – Threats to Biodiversity: Habitat Loss, Poaching of Wildlife, Man-Wildlife Conflicts – Endangered and Endemic Species of India – Conservation of Biodiversity: In-situ and Ex-situ Conservation of Biodiversity. Specific Case Studies.

UNIT III: **(6 Periods)**

Environmental Pollution: Definition, Cause, Effects, and Control measures of: Air Pollution, Water Pollution, Soil Pollution, Marine Pollution, Noise Pollution, Thermal Pollution, Nuclear Hazards - Pollution Case Studies - Role of an Individual in the Prevention of Pollution - Solid Waste Management- Causes, Effects and Control Measures of Urban and Industrial Wastes - Disaster Management-Floods, Earthquakes, Cyclones and Landslides.

UNIT IV: **(5 Periods)**

Social Issues and the Environment: Sustainable Development Goals, From Unsustainable to Sustainable Development–Urban Problems related to Energy – Water Conservation, Rainwater Harvesting, Watershed Management –Resettlement and Rehabilitation of People; Its Problems and Concerns. Case Studies – Environmental Ethics: Issues and Possible Solutions – Climate Change, Global Warming, Acid Rain, Ozone Layer Depletion, Nuclear Accidents and Holocaust. Case Studies – Wasteland Reclamation. – Consumerism and Waste Products - Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and Control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in Enforcement of Environmental Legislation – Public Awareness.

UNIT V: **(6 Periods)**

Human Population and the Environment: Population Growth, Variation among Nations. Population Explosion – Family Welfare Programmes. – Environment and Human Health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of Information Technology in Environment and Human Health – Case Studies.

Field Work: Visit a Local Area to Document Environmental Assets River / Forest Grassland / Hill / Mountain – Polluted Site – Urban / Rural / Industrial / Agricultural - Study of Common Plants, Insects and Birds – River, Hill Slopes.

Total Periods: 30

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses Erach Bharucha for University Grants Commission, Universities Press, Third Edition, 2021.
2. K. Raghavan Nambiar, "Textbook of Environmental Studies for Undergraduate Courses as per UGC model syllabus", Scitech Publications (India), Pvt. Ltd. Second Edition, 2008.
3. Palaniswamy, "Environmental Studies", Pearson Education, Second Edition, 2014.
4. S. Azeem Unnisa, "Environmental Studies" Academic Publishing Company
5. A. Koushik & C. P. Koushik, Perspectives in Environmental Studies, New Age International,Fourth Edition, 2006.

REFERENCES:

1. Deeksha Dave and E. Sai Baba Reddy, "Textbook of Environmental Science", Cengage Publications, Second Edition, 2012.
2. M. Anji Reddy, "Textbook of Environmental Sciences and Technology", BS Publication, Second Edition, 2023.
3. J.P. Sharma, Comprehensive Environmental studies, Laxmi publications, Third Edition, 2009.
4. J. Glynn Henry and Gary W. Heinke, "Environmental Sciences and Engineering", Prentice Hall of India Private Limited, Second Edition, 2004.
5. G.R. Chatwal, "A Text Book of Environmental Studies" Himalaya Publishing House, Fourth Edition, 2014.
6. Gilbert M. Masters and Wendell P. Ela, "Introduction to Environmental Engineering and Science, Prentice Hall of India Private Limited, Third Edition, 2007.

II Year B.Tech. ECE – II Semester

L	T	P	C
3	0	0	3

(EE23AES401) LINEAR CONTROL SYSTEMS

COURSE OBJECTIVES:

The objective of this course is:

- Introduce the basic principles and applications of control systems.
- Learn the time response and steady state response of the systems.
- Know the time domain analysis and solutions to time invariant systems.
- Understand different aspects of stability analysis of systems in frequency domain.
- Understand the concept of state space, controllability and observability.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

- **CO 1:** Analyze and model various control systems transfer functions using differential equations, block diagram reduction techniques and signal flow graphs.
- **CO 2:** Evaluate the transient and steady-state response of control systems and the effects of different controllers.
- **CO 3:** Apply stability criteria and root locus methods to determine and analyze system stability.
- **CO 4:** Analyze frequency response using Bode, Polar, and Nyquist plots to assess system stability and performance.
- **CO 5:** Construct and solve state space models of continuous systems and evaluate their controllability and observability.

UNIT I: (9 periods)

Control Systems Concepts: Open loop and closed loop control systems and their differences- Examples of control systems- Classification of control systems, Feedback characteristics, Effects of positive and negative feedback, Mathematical models – Differential equations of translational and rotational mechanical systems and electrical systems, Analogous Systems, Block diagram reduction methods – Signal flow graphs - Reduction using Mason's gain formula. Controller components, DC Servomotor and AC Servo motor their transfer functions, Synchros.

UNIT II: (9 periods)

Time Response Analysis: Step Response - Impulse Response - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants, Study of effects of P, PI, PD and PID Controllers on second order system.

UNIT III: (9 periods)

Stability Analysis in Time Domain: The concept of stability – Routh's stability criterion – Stability and conditional stability - limitations of Routh's stability. The Root locus concept - construction of root loci-effects of adding poles and zeros to G(s) H(s) on the root loci.

UNIT IV: (9 periods)

Frequency Response Analysis: Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram - Stability Analysis from Bode Plots. Polar Plots- Nyquist Plots- Phase margin and Gain margin-Stability Analysis.

Compensation techniques – Study of Effects of Lag, Lead, Lag-Lead Compensators on a second order system.

UNIT V: **(9 periods)**

State Space Analysis of Continuous Systems: Concepts of state, state variables and state model - differential equations and Transfer function models - Block diagrams. Diagonalization, Transfer function from state model, solving the Time invariant state Equations- State Transition Matrix and its Properties. System response through State Space models. The concepts of controllability and observability.

Total Periods: 45

TEXT BOOKS:

1 Modern Control Engineering by Katsuhiko Ogata, Prentice Hall of India Pvt. Ltd., 5th edition, 2010.
2 Control Systems Engineering by I. J. Nagrath and M. Gopal, New Age International (P) Limited Publishers, 5th edition, 2007.
3 Control Systems by A. Nagoor Kani, RBA Publications, 3rd edition, 2017.

REFERENCES:

1. Control Systems Principles and Design by M.Gopal, 4th Edition, McGraw Hill Education, 2012.
2. Automatic Control Systems by B. C. Kuo and Farid Golnaraghi, John wiley and sons, 8th edition, 2003.
3. Feedback and Control Systems, Joseph J Distefano III, Allen R Stubberud and Ivan J Williams, 2nd Edition, Schaum's outlines, McGraw Hill Education, 2013.
4. Control System Design by Graham C. Goodwin, Stefan F. Graebe and Mario E. Salgado, Pearson, 2000.
5. Feedback Control of Dynamic Systems by Gene F. Franklin, J.D. Powell and Abbas Emami- Naeini, 6th Edition, Pearson, 2010.

II Year B.Tech. ECE – II Semester

L	T	P	C
2	0	0	2

(BA23AHS403) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

COURSE OBJECTIVES:

The objective of this course are to:

- To inculcate the basic knowledge of micro economics and financial accounting.
- To make the students learn how demand is estimated for different products, input-output relationship for optimizing production and cost.
- To Know the Various types of market structure and pricing methods and strategy.
- To give an over view on investment appraisal methods to promote the students to learn how to plan long-term investment decisions.
- To provide fundamental skills on accounting and to explain the process of preparing financial statements.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

- **CO 1:** Define the concepts related to Managerial Economics, financial accounting and management.
- **CO 2:** Understand the fundamentals of Economics viz., Demand, Production, cost, revenue and markets.
- **CO 3:** Apply the Concept of Production cost and revenues for effective Business decision.
- **CO 4:** Analyze how to invest their capital and maximize returns and evaluate the capital budgeting techniques.
- **CO 5:** Develop the accounting statements and evaluate the financial performance of business entity.

UNIT I: (6 Periods)

Managerial Economics: Introduction – Nature, meaning, significance, functions, and advantages. Demand-Concept, Function, Law of Demand- Demand Elasticity- Types– Measurement. Demand Forecasting- Factors governing Forecasting, Methods. Managerial Economics and Financial Accounting and Management.

UNIT II: (6 Periods)

Production and Cost Analysis: Introduction – Nature, meaning, significance, functions and advantages. Production Function– Least- cost combination– Short run and long run Production Function- Isoquants and Is costs, Cost & Break-Even Analysis - Cost concepts and Cost behaviour- Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems).

UNIT III: (6 Periods)

Business Organizations and Markets: Introduction – Forms of Business Organizations- Sole Proprietary- Partnership - Joint Stock Companies - Public Sector Enterprises. Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition Monopoly- Monopolistic Competition– Oligopoly-Price-Output Determination - Pricing Methods and Strategies

UNIT IV: (6 Periods)

Capital Budgeting: Introduction – Nature, meaning, significance. Types of Working Capital, Components, Sources of Short-term and Long-term Capital, Estimating Working capital requirements.

Capital Budgeting: Features, Proposals, Methods and Evaluation. Projects – Pay Back Method, Accounting Rate of Return (ARR) Net Present Value (NPV) Internal Rate Return (IRR) Method (sample problems)

UNIT V: **(6 Periods)**

Financial Accounting and Analysis: Introduction–Concepts and Conventions- Double-Entry Bookkeeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). Introduction to Financial Analysis -Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability.

Total Periods: 30

TEXT BOOKS:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand.
2. Aryasri: Business Economics and Financial Analysis,4/e, MGH.

REFERENCES:

1. Ahuja Hl Managerial economics Schand.
2. S.A.Siddiqui and A.S.Siddiqui: Managerial Economics and Financial Analysis, New Age International.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage.

ONLINE RESOURCES:

1. https://www.slideshare.net/123ps/managerial-economics-ppt
2. https://www.slideshare.net/rossanz/production-and-cost-45827016
3. https://www.slideshare.net/darkyla/business-organizations-19917607
4. https://www.slideshare.net/balarajbl/market-and-classification-of-market
5. https://www.slideshare.net/ruchi101/capital-budgeting-ppt-59565396
6. https://www.slideshare.net/ashu1983/financial-accounting

II Year B.Tech. ECE – II Semester

L	T	P	C
3	0	0	3

(EC23APC401) ANALOG AND DIGITAL COMMUNICATIONS

COURSE OBJECTIVES:

The objective of this course are to:

- Introduce various modulation and demodulation techniques of analog and digital communication systems.
- Analyze different parameters of analog and digital communication techniques.
- Understand function of various stages of AM, FM transmitters and Know characteristics of AM &FM receivers.
- Analyze the performance of various digital modulation techniques in the presence of AWGN.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

- **CO 1:** Recognize the basic terminology used in analog and digital communication technique for transmission of information/data.
- **CO 2:** Explain the basic operation of different analog and digital communication systems at Base band and passband level.
- **CO 3:** Compute various parameters of baseband and passband transmission schemes by applying basic engineering knowledge.
- **CO 4:** Analyze the performance of different modulation & demodulation techniques to solve complex problems in the presence of noise.
- **CO 5:** Evaluate the performance of analog and digital modulation techniques to know merits and demerits of each one in terms of bandwidth and power efficiency.

UNIT I: (10 Periods)

Amplitude Modulation: Need for modulation, Amplitude Modulation - Time and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves - Switching modulator, Detection of AM Waves - Envelope detector, DSBSC modulation - time and frequency domain description, Generation of DSBSC Waves - Balanced Modulators, Coherent detection of DSB-SC Modulated waves, COSTAS Loop, SSB modulation - time and frequency domain description, frequency discrimination and Phase discrimination methods for generating SSB, Demodulation of SSB Waves, principle of Vestigial side band modulation.

UNIT II: (9 Periods)

Angle Modulation: Basic concepts of Phase Modulation, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave using Bessel functions, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Signal- Armstrong Method, Detection of FM Signal: Balanced slope detector, Phase locked loop, Comparison of FM and AM., Concept of Pre-emphasis and de-emphasis

UNIT III: (8 Periods)

Transmitters: Classification of Transmitters, AM Transmitters, FM Transmitters Receivers: Radio Receiver - Receiver Types - Tuned radio frequency receiver, Superheterodyne receiver, RF section and Characteristics - Frequency changing and tracking,Intermediate frequency, Image frequency, AGC, Amplitude limiting, FM Receiver,Comparison of AM and FM Receivers.

UNIT IV: (9 Periods)

Introduction to Noise: Types of Noise, Receiver Model, Noise in AM, DSB, SSB, andFM Receivers.

Pulse Modulation: Types of Pulse modulation- PAM, PWM and PPM. Comparison of FDM and TDM. Pulse Code Modulation: PCM Generation and Reconstruction, Quantization Noise, Non-Uniform Quantization and Companding, Delta Modulation, DPCM, Noise in PCM and DM.

UNIT V: (9 Periods)

Digital Modulation Techniques: Coherent Digital Modulation Schemes – ASK, BPSK, BFSK, QPSK, Non-coherent BFSK, DPSK. M-ary Modulation Techniques, Power Spectra, Bandwidth Efficiency.

Baseband Transmission and Optimal Reception of Digital Signal: A Baseband Signal Receiver, Probability of Error, Optimum Receiver, Coherent Reception, ISI, Eye Diagrams.

Total Periods: 45

TEXTBOOKS:

1. Simon Haykin, "Communication Systems", John Wiley & Sons, 4th edition, 2004.
2. Wayne Tomasi - Electronics Communication Systems – Fundamentals through Advanced, 5th edition., PHI, 2009
3. B. P. Lathi, Zhi Ding ", Modern Digital and Analog Communication Systems", Oxfordpress, 2011.

REFERENCES:

1. Sam Shanmugam, "Digital and Analog Communication Systems", John Wiley & Sons,1999.
2. Bernard Sklar, F. J. Harris", Digital Communications: Fundamentals and Applications",Pearson Publications, 2020.
3. Taub and Schilling", Principles of Communication Systems", Tata McGraw Hill, 2007.

II Year B.Tech. ECE – II Semester

L	T	P	C
3	0	0	3

(EC23APC402) ELECTRONIC CIRCUIT ANALYSIS

COURSE OBJECTIVES:

The objective of this course are to:

- Understand the characteristics of Differential amplifiers, feedback and power amplifiers.
- Analyze the response of tuned amplifiers
- Categorize different oscillator circuits based on the application
- Design the electronic circuits for the given specifications and for a given application.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

- **CO 1:** Understand the working principle and characteristics of Multistage amplifiers, differential amplifiers.
- **CO 2:** Analyze the frequency response of multistage and differential amplifier circuits usingBJT & MOSFETs at low and high frequencies.
- **CO 3:** Apply basic principles to solve the problems related to oscillators and feedbackamplifiers.
- **CO 4:** Design different feedback amplifiers and power amplifier circuits based on the application.
- **CO 5:** Evaluate the performance of different tuned amplifiers and multivibrators.

UNIT I: (9 Periods)

Multistage & Differential Amplifiers: Introduction, Classification of Amplifiers, Distortion in amplifiers, Coupling Schemes, RC Coupled Amplifier using BJT, Cascaded RC Coupled BJT Amplifiers, Cascode amplifier, Darlington pair, the MOS Differential Pair, Small-Signal Operation of the MOS Differential Pair, the BJT Differential Pair.

UNIT II: (8 Periods)

Frequency Response: Low-Frequency Response of the CS and CE Amplifiers, Internal Capacitive Effects and the High-Frequency Model of the MOSFET and the BJT, High-Frequency Response of the CE, Emitter follower, CS, CD, f_β,f_T and gain bandwidth product.

UNIT III: (10 Periods)

Feedback Amplifiers: Introduction, The General Feedback Structure, Some Properties of Negative Feedback, The Four Basic Feedback Topologies, Series—Shunt, Series—Series, Shunt—Shunt, Shunt—Series.

Oscillators: General Considerations, Phase Shift Oscillator, Wien-Bridge Oscillator, LC Oscillators, Relaxation Oscillator, Crystal Oscillators, Illustrative Problems.

UNIT IV: (8 Periods)

Power Amplifiers: Introduction, Class A amplifiers (Series fed, Transformer coupled, Push pull), Second Harmonic distortion, Class B amplifiers (Push pull, Complementary symmetry), Crossover distortion and Class AB operation, Class C amplifiers.

UNIT V: (10 Periods)

Tuned Amplifiers: Introduction, single Tuned Amplifiers – Q-factor, frequency response, Double Tuned Amplifiers – Q-factor, frequency response, Concept of stagger tuning.

Multivibrators: Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using Transistors.

Total Periods: 45

TEXT BOOKS:

1. Adel. S. Sedra and Kenneth C. Smith, "Micro Electronic Circuits," 6th edition, Oxford University Press, 2011.
2. J. Millman, H. Taub and Mothiki S. PrakashRao - Pulse, Digital and Switching Waveforms –2nd edition., TMH, 2008.
3. Millman, C Chalkias, "Integrated Electronics", 4th edition, McGraw Hill Education (India) Private Ltd., 2015.

REFERENCES:

1. Behzad Razavi, "Fundamentals of Micro Electronics", Wiley, 2010.
2. Donald A Neamen, "Electronic Circuits – Analysis and Design," 3rd edition, McGraw Hill (India), 2019.
3. Robert L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuits Theory", 9th edition, Pearson/Prentice Hall, 2006.

II Year B.Tech. ECE – II Semester

L	T	P	C
3	0	0	3

(EC23APC403) EM WAVES AND TRANSMISSION LINES

COURSE OBJECTIVES:

The objective of this course are to:

- To understand and analyze different laws and theorems of electrostatic fields.
- To study and analyze different laws and theorems of magneto-static fields.
- Analyzing Maxwell's equations in different forms.
- To learn the concepts of wave theory and its propagation through various mediums.
- To get exposure to the properties of transmission lines.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

- **CO 1:** Learn the concepts of wave theory and its propagation through various mediums.
- **CO 2:** Understand the properties of transmission lines and their applications.
- **CO 3:** Apply the laws & theorems of electrostatic fields to solve the related problems.
- **CO 4:** Gain proficiency in the analysis and applications of magnetostatic laws and theorems.
- **CO 5:** Analyze Maxwell's equations in different forms.

UNIT I: (10 Periods)

Review of Co-ordinate Systems, **Electrostatics:** Coulomb's Law, Electric Field Intensity, Electric Flux Density, Gauss Law and Applications, Electric Potential, Maxwell's Two Equations for Electrostatic Fields, Energy Density, Illustrative Problems. Convection and Conduction Currents, Dielectric Constant, Poisson's and Laplace's Equations; Capacitance – Parallel Plate, Coaxial Capacitors, Illustrative Problems.

UNIT II: (10 Periods)

Magneto-statics: Biot-Savart Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law, Inductances and Magnetic Energy, Illustrative Problems**.**

Maxwell's Equations (Time Varying Fields): Faraday's Law and Transformer EMF, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements, Conditions at a Boundary Surface, Illustrative Problems.

UNIT III: (9 Periods)

EM Wave Characteristics: Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definition, All Relations Between E & H, Sinusoidal Variations, Wave Propagation in Lossy dielectrics, lossless dielectrics, free space, wave propagation in good conductors, skin depth, Polarization & Types, Illustrative Problems.

Reflection and Refraction of Plane Waves – Normal and Oblique Incidences, for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection,Surface Impedance, Poynting Vector and Poynting Theorem, Illustrative Problems.

UNIT IV: (8 Periods)

Transmission Lines - I : Types, Parameters, T & π Equivalent Circuits, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line, Lossless lines, distortion less lines, Illustrative Problems.

UNIT V: **(8 Periods)**

Transmission Lines – II: Input Impedance Relations, Reflection Coefficient, VSWR, Average Power, Shorted Lines, Open Circuited Lines, and Matched Lines, Smith Chart – Construction and Applications, Quarter wave transformer, Single Stub Matching, Illustrative Problems.

Total Periods: 45

TEXT BOOKS:

1. Elements of Electromagnetics, Matthew N.O. Sadiku, 4th edition, Oxford University Press, 2008.
2. Electromagnetic Waves and Radiating Systems, E.C. Jordan and K.G. Balmain, 2nd edition, PHI, 2000

REFERENCES:

1. Electromagnetic Field Theory and Transmission Lines, G. S. N. Raju, 2nd edition, Pearson Education, 2013.
2. Engineering Electromagnetics, William H. Hayt Jr. and John A. Buck, 7th edition, Tata McGraw Hill, 2006.
3. Electromagnetics, John D. Krauss, 3rd edition, McGraw Hill, 1988.
4. Networks, Lines, and Fields, John D. Ryder,2nd edition, PHI publications, 2012.

II Year B.Tech. ECE – II Semester

L	T	P	C
1	0	2	2

(CS23AES301) DESIGN THINKING AND INNOVATION

COURSE OBJECTIVES:

The objective of this course are to:

- The objective of this course is to familiarize students with design thinking process as a tool for breakthrough innovation.
- It aims to equip students with design thinking skills and ignite their minds to create innovative ideas, develop solutions for real-time problems.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Define the concepts related to design thinking.
CO 2: Explain the fundamentals of Design Thinking and innovation.
CO 3: Apply the design thinking techniques for solving problems in various sectors.
CO 4: Analyze to work in a multidisciplinary environment.
CO 5: Evaluate the value of creativity.
CO 6: Formulate specific problem statements of real-time issues.

UNIT I: **(2 Periods)**

Introduction to Design Thinking Introduction to elements and principles of Design, basics of design - dot, line, shape, form as fundamental design components. Principles of design. Introduction to design thinking, history of Design Thinking, new materials in Industry.

UNIT II: **(2 Periods)**

Design Thinking Process Design thinking process (empathize, analyze, idea & prototype), implementing the process in driving inventions, design thinking in social innovations. Tools of design thinking - person, customer, journey map, brainstorming, product development.

Activity: Every student presents their idea in three minutes. Every student can present the design process in the form of a flow diagram or flow chart, etc. Every student should explain about product development.

UNIT III: **(4 Periods)**

Innovation Art of innovation, difference between innovation and creativity, role of creativity and innovation in organizations - Creativity to Innovation - Teams for innovation - Measuring the impact and value of creativity.

Activity: Debate on innovation and creativity, flow and planning from idea to innovation, debate on value-based innovation.

UNIT IV: **(3 Periods)**

Product Design Problem formation, introduction to product design, product strategies, product value, product planning, product specifications - Innovation towards product design - Case studies.

Activity: Importance of modeling, how to set specifications, explaining their own product design.

UNIT V: **(4 Periods)**

Design Thinking in Business Processes Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business - Business challenges: Growth, Predictability, Change, Maintaining Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs - Design thinking for Startups - Defining and testing Business Models and Business Cases - Developing & testing prototypes.

Activity: How to market our own product, about maintenance, reliability and plan for startup.

Total Periods: 15

TEXT BOOKS:

1. Tim Brown, Change by Design, Harper Collins (2009)
2. Idris Mootee, Design Thinking for Strategic Innovation, 2013, John Wiley & Sons.

REFERENCES:

1. David Lee, Design Thinking in the Classroom, Ulysses Press
2. Shrutin N Shetty, Design the Future, Norton Press
3. William Lidwell, Universal Principles of Design - Kritinaholden, Jill Butter.
4. Chesbrough H, The Era of Open Innovation – 2013

ONLINE RESOURCES:

1. https://nptel.ac.in/courses/110/106/110106124/
2. https://nptel.ac.in/courses/109/104/109104109/
3. https://swayam.gov.in/nd1_noc19_mg60/preview

II Year B.Tech. ECE – II Semester

L	T	P	C
0	0	3	1.5

(EC23APC404) ANALOG AND DIGITAL COMMUNICATIONS LAB

COURSE OBJECTIVES:
The objectives of this course are to:
- Understand the basics of analog and digital modulation techniques.
- Integrate theory with experiments so that the students appreciate the knowledge gained from the theory course.
- Design and implement different modulation and demodulation techniques and their applications.
- Develop cognitive and behavioral skills for performance analysis of various modulation techniques.

COURSE OUTCOMES:
After successful completion of the course, students will be able to:
- **CO 1:** Know about the usage of equipment/components/software tools used to conduct experiments in analog and digital modulation techniques.
- **CO 2:** Conduct the experiment based on the knowledge acquired in the theory about modulation and demodulation schemes to find the important metrics of the communication system experimentally.
- **CO 3:** Analyze the performance of a given modulation scheme to find the important metrics of the system theoretically.
- **CO 4:** Compare the experimental results with that of theoretical ones and infer the conclusions.

List of Experiments:
Design the circuits and verify the following experiments taking minimum of six fromeach section shown below.

Section-A
1. AM Modulation and Demodulation
2. DSB-SC Modulation and Demodulation
3. Frequency Division Multiplexing
4. FM Modulation and Demodulation
5. Radio receiver measurements
6. PAM Modulation and Demodulation
7. PWM Modulation and Demodulation
8. PPM Modulation and Demodulation

Section-B
1. Sampling Theorem.
2. Time Division Multiplexing
3. Delta Modulation and Demodulation
4. PCM Modulation and Demodulation
5. BPSK Modulation and Demodulation
6. BFSK Modulation and Demodulation
7. QPSK Modulation and Demodulation
8. DPSK Modulation and Demodulation

Note: Faculty members (who are handling the laboratory) are requested to instruct the students not to use readymade kits for conducting the experiments. They are advised to make the students work in the laboratory by constructing the circuits and analyzing them during the lab sessions.

II Year B.Tech. ECE – II Semester

L	T	P	C
0	0	3	1.5

(EC23APC405) ELECTRONIC CIRCUIT ANALYSIS LAB

COURSE OBJECTIVES:

The objective of this course are to:

- Plot the characteristics of Differential amplifiers, feedback and power amplifiers.
- Analyze the response of tuned amplifiers and multivibrators.
- Categorize different oscillator circuits based on the application.
- Design the electronic circuits for the given specifications and for a given application.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

- **CO 1:** Evaluate gain and bandwidth of multistage amplifiers from its frequency response.
- **CO 2:** Analyze the operation of different feedback amplifiers and oscillators.
- **CO 3:** Evaluate the efficiency of power amplifiers.
- **CO 4:** Compute the resonant frequency of tuned amplifiers.
- **CO 5:** Simulate electronic circuits by using appropriate simulation software.

List of Experiments:

1. Design and Analysis of Darlington pair.
2. Frequency response of CE – CC multistage AmplifieR.
3. Design and Analysis of Cascode Amplifier.
4. Frequency Response of Differential Amplifier
5. Design and Analysis of any two topologies of feedback amplifies and find the frequency response of it.
6. Design and Analysis of Class A power amplifier.
7. Design and Analysis of Class AB amplifier.
8. Design and Analysis of RC phase shift oscillator.
9. Design and Analysis of LC Oscillator
10. Frequency Response of Single Tuned amplifier
11. Design a Bistable Multivibrator and analyze the effect of commutatingcapacitors and draw the wave forms at base and collector of transistors.
12. Design an Astable Multivibrator and draw the wave forms at base and collectorof transistors.
13. Design a Monostable Multivibrator and draw the input and output waveforms.
14. Draw the response of Schmitt trigger for gain of greater than and less than one

Note: At least 12 experiments shall be performed.

Faculty members who are handling the laboratory shall see that students are given design specifications for a given circuit appropriately and monitor the design and analysisaspects of the circuit.

II Year B.Tech. ECE – II Semester

L	T	P	C
0	1	2	2

(EG23ASC401) SOFT SKILLS

COURSE OBJECTIVES:

The objective of this course is:

- To encourage all round development of the students by focusing on soft skills.
- To make the students aware of critical thinking and problem-solving skills.
- To enhance healthy relationship and understanding within and outside an organization.
- To function effectively with heterogeneous teams.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: List out various elements of soft skills.
CO 2: Describe methods for building professional image.
CO 3: Apply critical thinking skills in problem solving.
CO 4: Analyze the needs of an individual and team for well-being.
CO 5: Assess the situation and take necessary decisions.
CO 6: Create a productive workplace atmosphere using social and work-life skills ensuring personal and emotional well-being

UNIT I:

Soft Skills & Communication Skills: Soft Skills - Introduction, Need - Mastering Techniques of Soft Skills – Communication Skills -Significance, process, types - Barriers of communication - Improving techniques.

Activities:

Intrapersonal Skills - Narration about self- strengths and weaknesses- clarity of thought – self-expression – articulating with felicity.

(The facilitator can guide the participants before the activity citing examples from the lives of the great, anecdotes and literary sources).

Interpersonal Skills - Group Discussion – Debate – Team Tasks - Book and film Reviews by groups - Group leader presenting views (non- controversial and secular) on contemporary issues or on a given topic.

Verbal Communication-Oral Presentations – Extempore - brief addresses and speeches – Convincing - Negotiating- Agreeing and disagreeing with professional grace.

Non - verbal communication - Public speaking - Mock interviews - presentations with an objective to identify non - verbal clues and remedy the lapses on observation.

UNIT II:

Critical Thinking: Active Listening – Observation – Curiosity – Introspection – Analytical Thinking – Open- mindedness – Creative Thinking - Positive thinking – Reflection.

Activities:

Gathering information and statistics on a topic - sequencing – assorting – reasoning – critiquing issues – placing the problem – finding the root cause - seeking viable solution – judging with rationale – evaluating the views of others - Case Study, Story Analysis.

UNIT III:

Problem Solving & Decision Making: Meaning & features of Problem Solving – Managing Conflict – Conflict resolution – Team building - Effective decision making in teams – Methods & Styles.

Activities:

Placing a problem which involves conflict of interests, choice and views - formulating the problem - exploring solutions by proper reasoning - Discussion on important professional, career and organizational decisions and initiate debate on the appropriateness of the decision. Case Study & Group Discussion.

UNIT IV:

Emotional Intelligence & Stress Management: Managing Emotions – Thinking before Reacting – Empathy for Others – Self-awareness – Self-Regulation – Stress factors – Controlling Stress – Tips.

Activities:

Providing situations for the participants to express emotions such as happiness, enthusiasm, gratitude, sympathy, and confidence, compassion in the form of written or oral presentations. Providing opportunities for the participants to narrate certain crisis and stress –ridden situations caused by failure, anger, jealousy, resentment and frustration in the form of written and oral presentation, Organizing Debates

UNIT V:

Corporate Etiquette: Etiquette- Introduction, concept, significance - Corporate etiquette - meaning, modern etiquette, benefits - Global and local culture sensitivity - Gender Sensitivity - Etiquette in interaction- Cell phone etiquette - Dining etiquette - Netiquette - Job interview etiquette - Corporate grooming tips - Overcoming challenges.

Activities

Providing situations to take part in the Role Plays where the students will learn about bad and good manners and etiquette - Group Activities to showcase gender sensitivity, dining etiquette etc. - Conducting mock job interviews - Case Study - Business Etiquette Games.

NOTE:

1. The facilitator can guide the participants before the activity citing examples from the lives of the great, anecdotes, epics, scriptures, autobiographies and literary sources which bear true relevance to the prescribed skill.
2. Case studies may be given wherever feasible for example for Decision Making- The decision of King Lear.

TEXT BOOKS:

1. Mitra Barun K, Personality Development and Soft Skills, Oxford University Press, Pap/Cdr edition 2012.
2. Dr Shikha Kapoor, Personality Development and Soft Skills: Preparing for Tomorrow, I K International Publishing House, 2018.

REFERENCE:

1. Sharma, Prashant, Soft Skills: Personality Development for Life Success, BPB Publications 2018.
2. Alex K, Soft Skills S.Chand& Co, 2012 (Revised edition)
3. Gajendra Singh Chauhan & Sangeetha Sharma, Soft Skills: An Integrated Approach to Maximise Personality Published by Wiley, 2013
4. Pillai, Sabina & Fernandez Agna, Soft Skills and Employability Skills, Cambridge University Press, 2018.
5. Soft Skills for a Big Impact (English, Paperback, Renu Shorey) Publisher: Notion Press.
6. Dr. Rajiv Kumar Jain, Dr. Usha Jain, Life Skills (Paperback English) Publisher: Vayu Education of India, 2014.
7. Jain Er. A. K, Bhatia, S R Pravin and Sheik A.M., Professional Communication Skills: Publisher: S Chand, Revised Edition 2014.

ONLINE RESOURCES:

1. https://youtu.be/DUlsNJtg2L8?list=PLLy_2iUCG87CQhELCytvXh0E_y-bOO1_q
2. https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHlsQFwJZel_j2PUy0pwjVUgj7KlJ
3. https://youtu.be/-Y-R9hDl7lU
4. https://youtu.be/gkLsn4ddmTs
5. https://youtu.be/2bf9K2rRWwo
6. https://youtu.be/FchfE3c2jzc
7. https://www.businesstrainingworks.com/training-resource/five-free-business- etiquette-training-games/
8. https://onlinecourses.nptel.ac.in/noc24_hs15/preview
9. https://onlinecourses.nptel.ac.in/noc21_hs76/preview

COMMUNITY SERVICE PROJECT

Experiential learning through community engagement

Introduction

- Community Service Project is an experiential learning strategy that integrates meaningful community service with instruction, participation, learning and community development.
- Community Service Project involves students in community development and service activities and applies the experience to personal and academic development.
- Community Service Project is meant to link the community with the college for mutual benefit. The community will benefit with the focused contribution of the college students for the village/ local development. The college finds an opportunity to develop social sensibility and responsibility among students and emerge as a socially responsible institution.

Objective

Community Service Project should be an integral part of the curriculum, as an alternativeto the 2 months of Summer Internships / Apprenticeships / On the Job Training, wheneverthere is an exigency when students cannot pursue their summer internships.

The specific objectives are;

- To sensitize students to the living conditions of the people who are around them'To help students to realize the stark realities of society.
- To bring about an attitudinal change in the students and help them to develop societal consciousness, sensibility, responsibility and accountability
- To make students aware of their inner strength and help them to find new /out ofbox solutions to social problems.
- To make students socially responsible citizens who are sensitive to the needs ofthe disadvantaged sections.
- To help students to initiate developmental activities in the community in coordination with public and government authorities.
- To develop a holistic life perspective among the students by making themstudy culture, traditions, habits, lifestyles, resource utilization, wastages and its management, social problems, public administration system and the roles and responsibilities of different persons across different social systems.

Implementation of Community Service Project

- Every student should put in 6 weeks for the Community Service Project during the summer vacation.
- Each class/section should be assigned with a mentor.
- Specific Departments could concentrate on their major areas of concern. For example, Dept. of Computer Science can take up activities related to Computer Literacy to different sections of people like - youth, women, housewives, etc
- A logbook must be maintained by each of the students, where the activities undertaken/involved to be recorded.
- The logbook has to be countersigned by the concerned mentor/faculty in charge.
- An evaluation to be done based on the active participation of the student and grade could be awarded by the mentor/faculty member.
- The final evaluation to be reflected in the grade memo of the student.The Community Service Project should be different from the regular programs of
- NSS/NCC/Green Corps/Red Ribbon Club, etc.
- Minor project reports should be submitted by each student. An internal Viva shallalso be conducted by a committee constituted by the principal of the college.
- Award of marks shall be made as per the guidelines of Internship/apprentice/ onthe job training.

Procedure

A group of students or even a single student could be assigned for a particular habitation or village or municipal ward, as far as possible, in the near vicinity of their place of stay, to enable them to commute from their residence and return back by evening or so.

The Community Service Project is a twofold one –

- First, the student/s could conduct a survey of the habitation, if necessary, in terms of their own domain or subject area. Or it can even be a general survey, incorporating all the different areas. A common survey format could be designed. This should not be viewed as a duplication of work by the Village or Ward volunteers, rather, it could be another primary source of data.
- Secondly, the student/s could take up a social activity, concerning their domain or subject area. The different areas, could be like
  - Agriculture Health
  - Marketing and Cooperation
  - Animal Husbandry
  - Horticulture
  - Fisheries Sericulture
  - Revenue and Survey
  - Natural Disaster Management
  - Irrigation
  - Law & Order
  - Excise and Prohibition
  - Mines and Geology
  - Energy
  - Internet
  - Free Electricity
  - Drinking Water

EXPECTED OUTCOMES

Benefits of Community Service Project To Students

Learning Outcomes

- Positive impact on students' academic learning
- Improves students' ability to apply what they have learned in "the real world"
- Positive impact on academic outcomes such as demonstrated complexity of understanding, problem analysis, problem-solving, critical thinking, and cognitive development.
- Improved ability to understand complexity and ambiguity

Personal Outcomes

- Greater sense of personal efficacy, personal identity, spiritual growth, and moral development
- Greater interpersonal development, particularly the ability to work well with others, and build leadership and communication skills.

Social Outcomes

- Reduced stereotypes and greater inter-cultural understanding
- Improved social responsibility and citizenship skills
- Greater involvement in community service after graduation

Career Development

- Connections with professionals and community members for learning and career opportunities
- Greater academic learning, leadership skills, and personal efficacy can lead to greater opportunity.

Relationship with the Institution
- Stronger relationships with faculty
- Greater satisfaction with college
- Improved graduation rates

Benefits of Community Service Project to Faculty Members
- Satisfaction with the quality of student learning
- New avenues for research and publication via new relationships between faculty and community
- Providing networking opportunities with engaged faculty in other disciplines or institutions
- A stronger commitment to one's research.

Benefits of Community Service Project to Colleges and Universities
- Improved institutional commitment.Improved student retention
- Enhanced community relations

Benefits of Community Service Project to Community
- Satisfaction with student participation
- Valuable human resources needed to achieve community goals.
- New energy, enthusiasm and perspectives applied to community Work. Enhanced community-university relations.

SUGGESTIVE LIST OF PROGRAMMES UNDER COMMUNITY SERVICE PROJECT

The following are the recommended list of projects for Engineering students. The lists are not exhaustive and open for additions, deletions, and modifications. Colleges are expected to focus on specific local issues for this kind of project. The students are expectedto carry out these projects with involvement, commitment, responsibility, and accountability. The mentors of a group of students should take the responsibility of motivating, facilitating, and guiding the students. They have to interact with local leadership and people and appraise the objectives and benefits of this kind of project. The project reports shall be placed in the college website for reference. Systematic, Factual, methodical and honest reporting should be ensured.

For Engineering Students
1. Water facilities and drinking water availability
2. Health and hygiene
3. Stress levels and coping mechanisms
4. Health intervention programmes
5. Horticulture
6. Herbal plants
7. Botanical survey
8. Zoological survey
9. Marine products
10. Aqua culture
11. Inland fisheries
12. Animals and species
13. Nutrition
14. Traditional health care methods
15. Food habits
16. Air pollution
17. Water pollution
18. Plantation
19. Soil protection
20. Renewable energy
21. Plant diseases

22. Yoga awareness and practice
23. Health care awareness programmes and their impact
24. Use of chemicals on fruits and vegetables
25. Organic farming
26. Crop rotation
27. Floury culture
28. Access to safe drinking water
29. Geographical survey
30. Geological survey
31. Sericulture
32. Study of species
33. Food adulteration
34. Incidence of Diabetes and other chronic diseases
35. Human genetics
36. Blood groups and blood levels
37. Internet Usage in Villages
38. Android Phone usage by different people
39. Utilization of free electricity to farmers and related issues
40. Gender ration in schooling level- observation.

Complementing the community service project the students may be involved to take up some awareness campaigns on social issues/special groups. The suggested list of programs are

Programs for School Children

1. Reading Skill Program (Reading Competition)
2. Preparation of Study Materials for the next class.
3. Personality / Leadership Development
4. Career Guidance for X class students
5. Screening Documentary and other educational films
6. Awareness Program on Good Touch and Bad Touch (Sexual abuse)
7. Awareness Program on Socially relevant themes.

Programs for Women Empowerment

1. Government Guidelines and Policy Guidelines
2. Women's Rights
3. Domestic Violence
4. Prevention and Control of Cancer
5. Promotion of Social Entrepreneurship

General Camps

1. General Medical camps
2. Eye Camps
3. Dental Camps
4. Importance of protected drinking water
5. ODF awareness camp
6. Swatch Bharath
7. AIDS awareness camp
8. Anti-Plastic Awareness
9. Programs on Environment
10. Health and Hygiene
11. Hand wash programmes
12. Commemoration and Celebration of important days

Programs for Youth Empowerment

1. Leadership
2. Anti-alcoholism and Drug addiction
3. Anti-tobacco
4. Awareness on Competitive Examinations
5. Personality Developmen

Common Programs

1. Awareness on RTI
2. Health intervention programmes
3. Yoga
4. Tree plantation
5. Programs in consonance with the Govt. Departments like –
    i. Agriculture
    ii. Health
    iii. Marketing and Cooperation
    iv. Animal Husbandry
    v. Horticulture
    vi. Fisheries
    vii. Sericulture
    viii. Revenue and Survey
    ix. Natural Disaster Management
    x. Irrigation
    xi. Law & Order
    xii. Excise and Prohibition
    xiii. Mines and Geology
    xiv. Energy

Role of Students:

- Students may not have the expertise to conduct all the programmes on their own. The students then can play a facilitator role.
- For conducting special camps like Health related, they will be coordinating with the Governmental agencies.
- As and when required the College faculty themselves act as Resource Persons.
- Students can work in close association with Non-Governmental Organizations like Lions Club, Rotary Club, etc or with any NGO actively working in that habitation.
- And also, with the Governmental Departments. If the program is rolled out, the District Administration could be roped in for the successful deployment of the program.
- An in-house training and induction program could be arranged for the faculty and participating students, to expose them to the methodology of Service Learning.

Timeline for the Community Service Project Activity

Duration: 8 weeks

1. Preliminary Survey (One Week)

- A preliminary survey including the socio-economic conditions of the allotted habitation to be conducted.
- A survey form based on the type of habitation to be prepared before visiting the habitation with the help of social sciences faculty. (However, a template could be designed for different habitations, rural/urban.
- The Governmental agencies, like revenue administration, corporation and municipal authorities and village secretariats could be aligned for the survey.

2. Community Awareness Campaigns (One Week)

- Based on the survey and the specific requirements of the habitation, different awareness campaigns and programmes to be conducted, spread over two weeks of time. The list of activities suggested could be taken into consideration.

3. Community Immersion Programme (Three Weeks)

- **Along with the Community Awareness Programmes**, the student batch can also work with any one of the below-listed governmental agencies and work in tandem with them. This community involvement programme will involve the students in exposing themselves to experiential learning about the community and its dynamics. Programs could be in consonance with the Govt. Departments.

4. Community Exit Report (One Week)

- During the last week of the Community Service Project, a detailed report of the outcome of the 8 weeks' works to be drafted and a copy shall be submitted to the local administration. This report will be a basis for the next batch of students visiting that habitation. The same report submitted to the teacher-mentor will be evaluated by the mentor and suitable marks are awarded for onward submission to the University. Throughout the Community Service Project, a daily logbook need to be maintained by the students batch, which should be countersigned by the governmental agency representative and the teacher-mentor, who is required to periodically visit the students and guide them.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

Karakambadi Road Tirupati-517 507



Department of Electronics & Communication Engineering

Course Structure

R 20 Regulations

SRI VENKATESWARA COLLEGE OF ENGINEERING
(Autonomous)
Karakambadi Road, TIRUPATI – 517507

Electronics and Communication Engineering

Semester-0
Induction Program
(Common for all branches)

S.No	Course Name	Category	L-T-P-C
1	Physical Activities - Sports, Yoga and Meditation, Plantation	MC	0-0-6-0
2	Career Counseling	MC	2-0-2-0
3	Orientation to all branches - career options, tools, etc.	MC	3-0-0-0
4	Orientation on admitted Branch - corresponding labs, tools and platforms	EC	2-0-3-0
5	Proficiency Modules & Productivity Tools	ES	2-1-2-0
6	Assessment on basic aptitude and mathematical skills	MC	2-0-3-0
7	Remedial Training in Foundation Courses	MC	2-1-2-0
8	Human Values & Professional Ethics	MC	3-0-0-0
9	Communication Skills - focus on Listening, Speaking, Reading, Writing skills	BS	2-1-2-0
10	Concepts of Programming	ES	2-0-2-0

Semester - 1 (Theory - 5, Lab 4, MC-1)					
S.No	Course No	Course Name	Category	L-T-P/D	Credits
1.	MA20ABS101	Linear Algebra and Calculus	BS	3-0-0	3
2.	PH20ABS103	Applied Physics	BS	3-0-0	3
3.	EG20AHS101	Communicative English	HS	3-0-0	3
4.	EE20AES103	Fundamentals of Electrical Circuits	ES	3-0-0	3
5.	ME20AES102	Engineering Drawing	ES	1-0-0/2	2
6.	ME20AES103	Engineering Graphics Lab	ES	0-0-2	1
7.	PH20ABS104	Applied Physics Lab	BS	0-0-3	1.5
8.	EG20AHS102	Communicative English Lab	HS	0-0-3	1.5
9.	EE20AES104	Fundamentals of Electrical Circuits Lab	ES	0-0-3	1.5
10.	MA20AMC101	Logical Skills for Professionals-I	MC	2-0-0	0
Total					19.5

Semester – 2 (Theory – 4, Lab –5 , MC-2)					
S.No	Course No	Course Name	Category	L-T-P	Credits
1.	MA20ABS201	Differential Equations and Vector Calculus	BS	3-0-0	3
2.	CH20ABS103	Chemistry	BS	3-0-0	3
3.	CS20AES101	Problem Solving using C	ES	3-0-0	3
4.	EC20AES201	Electronic Devices & Circuits	ES	3-0-0	3
5.	ME20AES101	Engineering Workshop	ES	0-0-3	1.5
6.	CS20AES103	IT Workshop	ES	0-0-3	1.5
7.	CS20AES102	Problem Solving using C Lab	ES	0-0-3	1.5
8.	CH20ABS104	Chemistry Lab	BS	0-0-3	1.5
9.	EC20AES202	Electronic Devices & Circuits Lab	ES	0-0-3	1.5
10.	CH20AMC201	Environmental Science	MC	2-0-0	0
11.	EG20AMC101	Speech & Oral Communication	MC	2-0-0	0
Total					19.5

Semester – 3 (Theory –5 , Lab –3, SC -1, MC-3)					
S.No	Course No	Course Name	Category	L-T-P	Credits
1.	MA20ABS302	Complex Variables & Transforms	BS	3-0-0	3
2.	EC20APC301	Digital Logic Design	PC	3-0-0	3
3.	EC20APC302	Electronic Circuit -Analysis and Design	PC	3-0-0	3
4.	EC20APC303	Signals & Systems	PC	3-0-0	3
5.	BA20AHS301	Managerial Economics and Financial Analysis	HS	3-0-0	3
6.	EC20APC304	Basic Simulation Lab	PC	0-0-3	1.5
7.	EC20APC305	Digital Logic Design Lab	PC	0-0-3	1.5
8.	EC20APC306	Electronic Circuit -Analysis and Design Lab	PC	0-0-3	1.5
9.	IT20ASC301	Skill oriented course- Application Development using Python	SC	1-0-2	2
10.	CH20AMC301	Mandatory course (AICTE suggested): Biology For Engineers	MC	2-0-0	0.0
11.	MA20AMC301	Logical Skills for Professionals -II	MC	2-0-0	0.0
12.	EG20AMC301	Enhancing English Language Skills (Lateral Entry Students only)	MC	2-0-0	0.0
Total					21.5

Semester – 4 (Theory – 5, Lab – 3,SoC-1, AC-1,MC-3)					
S.No	Course No	Course Name	Category	L-T-P	Credits
1.	CS20AES401	Data Structures using C	ES	3-0-0	3
2	MA20ABS402	Probability Theory and Stochastic Processes	BS	3-0-0	3
3	EC20APC401	Analog Communications	PC	3-0-0	3
4	EC20APC402	Electromagnetic Waves and Transmission Lines	PC	3-0-0	3
5	EC20APC403	Linear & Digital IC Applications	PC	3-0-0	3
6	EC20APC404	Analog Communications Lab	PC	0-0-3	1.5
7	CS20AES402	Data Structures using C Lab	ES	0-0-3	1.5
8	EC20APC405	Linear & Digital IC Applications Lab	PC	0-0-3	1.5
9	EG20ASC301	Skill oriented course-Soft Skills	SC	1-0-2	2
10	SH20AAC401	Extra Academic Activities (NSS/Yoga/Cultural/Games and Sports/ Societal Relationship)	AC	0-0-2	0.0
11	BA20AMC201	Mandatory course (AICTE suggested): Universal Human Values	MC	2-0-0	0.0
11	*BA20AHS201	Mandatory course (AICTE suggested): Universal Human Values	HS	3-0-0	*3
12.	MA20AMC401	Engineering Mathematics (Lateral Entry Students only)	MC	2-0-0	0.0
Total					21.5
13.	Community Service Project – After the end of IV Semester – 4 Weeks – 1.5 Credits				
14.	Honors / Minor courses (Hours distribution can be 3-0-2 or 3-1-0 also)			4-0-0	4

*UHV is considered as Credit Based Course from 2021 Batch

Semester – 5 (Theory – 5, Lab –2,Soc-1,MC-2,Ts-1,IP-1)					
S.No	Course No	Course Name	Category	L-T-P	Credits
1.	EC20APC501	Antennas and Wave Propagation	PC	3-0-0	3
2	EC20APC502	Digital Communications	PC	3-0-0	3
3	EC20APC503	Microprocessors & Microcontrollers	PC	3-0-0	3
4	Open Elective Course/ Job oriented elective-1		OE	3-0-0	3
	CE20AOE502	Principles of Waste Management			
	ME20AOE501	Industrial Automation			
	EE20AOE502	Programmable Logic Controllers			
	AM20AOE501	Introduction to Operating Systems			
	CS20AOE502	Computer Architecture & Organization			
	CH20AOE501	Chemistry of Polymers & Applications			
5	Professional Elective courses-1		PE	3-0-0	3
	EE20APE502	Control System Engineering.			
	EC20APE501	Mechatronics			
	EC20APE502	Nanoelectronics			
6	EC20APC504	Digital Communications Lab	PC	0-0-3	1.5
7	EC20APC505	Microprocessors & Microcontrollers Lab	PC	0-0-3	1.5
8.	EC20ASC501	Skill advanced course/ soft skill course* PCB Design and Prototype Development	SC	1-0-2	2
9.	BA20AMC501	Mandatory course (AICTE suggested) Constitution of India	MC	2-0-0	0
10.	IT20AMC501	Problem Solving and Programming (Lateral Entry Students only)	MC	2-0-0	0
11.	EC20ATS501	Technical Seminar Presentation-I	TS	0-0-0	0.5
12.	EC20ACS501	Evaluation of Community Service Project	CS	0-0-0	1.5
Total					22
13.	Honors/Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)			4-0-0	4
14.	MOOC/NPTEL Course			0-0-0	2

Semester – 6 (Theory – 5, Lab –3,SoC-1,MC-2,TS-1)					
S.No	Course No	Course Name	Category	L-T-P	Credits
1.	EC20APC601	Digital Signal Processing	PC	3-0-0	3
2.	EC20APC602	Microwave Engineering and Optical Communications	PC	3-0-0	3
3.	EC20APC603	VLSI Design	PC	3-0-0	3
4.	Professional Elective courses-2		PE	3-0-0	3
	EC20APE601	Electronic Measurements and Instrumentation			
	EC20APE602	Information Theory and Coding			
	EC20APE603	Introduction to Digital Signal Processing			
	EC20APE604	RADAR Systems.			
5.	Open Elective Course/Job oriented elective-2		OE	3-0-0	3
	CE20AOE601	Disaster Management			
	ME20AOE601	Fundamentals of Additive Manufacturing			
	EE20AOE603	Optimization Techniques through MATLAB			
	CS20AOE602	JAVA Programming			
	AM20AOE502	Web Technologies			
	EG20AOE601	Technical Communication & Presentation Skills			
6.	EC20APC604	Digital Signal Processing Lab	PC	0-0-3	1.5
7.	EC20APC605	Microwave and Optical Communications Lab	PC	0-0-3	1.5
8.	EC20APC606	VLSI Design Lab	PC	0-0-3	1.5
9.	EC20ASC601	Skill advanced course/ soft skill course* Graphical System Design Using Lab-view / CISCO	SC	1-0-2	2
10.	BA20AMC502	Mandatory course (AICTE) Intellectual Property Rights & Patents.	MC	3-0-0	0.0
11.	EC20ATS601	Technical Seminar Presentation-II	TS	0-0-0	0.5
12.	AM20AMC601	AI Tools Techniques and Applications (Lateral Entry Students only)	MC	2-0-0	0
13.	Industrial/Research Mini Project (Mandatory) 4 weeks during summer vacation.				
	Total				22
14.	Honors / Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)		4-0-0		4
15.	MOOC/NPTEL Course		0-0-0		2

Semester – 7 (Theory – 6,Soc-1,TS-1,PW-1,IP-1)					
S.No	Course No	Course Name	Category	L-T-P	Credits
1.	Professional Elective courses-3		PE	3-0-0	3
	EC20APE701	Analog and Digital IC Design			
	EC20APE702	FPGA Design			
	EC20APE703	Low Power VLSI Circuits and Systems			
2.	Professional Elective courses-4		PE	3-0-0	3
	EC20APE704	Digital Image Processing			
	EC20APE705	Electronic Defense Systems			
	EC20APE706	Smart Sensor Networks.			
3.	Professional Elective courses-5		PE	3-0-0	3
	EC20APE707	Data Communication and Networking			
	EC20APE708	Satellite Communications			
	EC20APE709	Wireless Sensor Networks.			
4.	Open Elective Course/Job oriented elective-3		OE	3-0-0	3
	CE20AOE701	Air Pollution and Quality Control			
	ME20AOE703	Introduction to Industrial Engineering			
	EE20AOE701	Embedded Systems			
	AM20AOE601	Machine Learning Tools and Techniques.			
	CS20AOE503	Structured Query Language			
	EE20AOE704	Introduction to Smart Grid & Electric vehicles			
	MA20AOE701	Numerical Methods for Engineers			
5.	Open Elective Course/Job oriented elective-4		OE	3-0-0	3
	CE20AOE704	Environmental Impact Analysis and Management			
	ME20AOE704	Introduction to Product Marketing			
	EE20AOE703	IoT applications in Electrical Engineering			
	AM20AOE701	Cyber Security Techniques			
	CS20AOE601	Data Analysis using 'R'			
	PH20AOE701	Nano Materials			
6.	*Humanities and Social Science Elective		HS	3-0-0	3
	BA20AHS703	Entrepreneurship and Incubation			
	BA20AHS704	Enterprise Resource Planning			
	BA20AHS705	Management Science			
7.	EC20ASC701	Skill advanced course/ soft skill course* IoT and Industrial Automation	SC	1-0-2	2
8.	EC20ATS701	Technical Seminar Presentation-III	TS	0-0-1	0.5
9.	EC20APW701	Project Work Stage-I	PW	0-0-0	2
10.	EC20AIP701	Evaluation of Industrial / Research Mini Project	IP	0-0-0	3
Total					25.5
11.	Honors/Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)			4-0-0	4

Semester – 8 (Project)					
S.No	Course No	Course Name	Category	L-T-P	Credits
1	EC20APW801	Project Work Stage-II / Full Internship in Industry	PW	0-0-0	8.5
Total credits					8.5

Open Elective/ Job Oriented Elective:
(Offered by Electronics & Communication Engineering Department
to other Department students)

S.No	Course No	Course Name	Category	L-T-P/D	Credits
1	EC20AOE501	Basic VLSI design	OE/JOE	3-0-0	3
2	EC20AOE502	Digital Electronics	OE/JOE	3-0-0	3
3	EC20AOE601	Electronic Instrumentation & Measurements	OE/JOE	3-0-0	3
4	EC20AOE602	Signal Processing	OE/JOE	3-0-0	3
5	EC20AOE701	IC Applications	OE/JOE	3-0-0	3
6	EC20AOE702	Principles of Communication Engineering	OE/JOE	3-0-0	3
7	EC20AOE703	Sensors & Systems	OE/JOE	3-0-0	3
8	EC20AOE704	Internet of Things	OE/JOE	3-0-0	3
9	EC20AOE705	Introduction to Image Processing	OE/JOE	3-0-0	3
10	EC20AOE706	Microcontroller & Applications	OE/JOE	3-0-0	3

Honors/Minors
(Offered by Electronics & Communication Engineering Department)

Note: Eligible and interested students can register either for Honors or for Minors in IV Semester as per the guidelines

B.Tech HONORS

S.No	Course No	Course Name	Category	L-T-P/D	Credits
1	EC20AHO401	Electronics Packaging	HO	4-0-0	4
2	EC20AHO402	Structured Digital System Design	HO	4-0-0	4
3	EC20AHO501	MEMS Technology	HO	4-0-0	4
4	EC20AHO502	Modern Communication Systems	HO	4-0-0	4
5	EC20AHO503	MOOC/NPTEL -I	HO	0-0-0	2
6	EC20AHO601	Advanced Computer Architecture	HO	4-0-0	4
7	EC20AHO602	Digital Speech Processing	HO	4-0-0	4
8	EC20AHO603	MOOC/NPTEL -II	HO	0-0-0	2
9	EC20AHO701	Digital Video Processing	HO	4-0-0	4
10	EC20AHO702	Testing & Testability	HO	4-0-0	4

Minor Degree for Circuit Branches (EEE, CSE, CSM, CSC, CSD, IT)

S.No	Course No	Course Name	Category	L-T-P/D	Credits
1	EC20AMI401	Communication Systems-I	MI	4-0-0	4
2	EC20AMI402	Electronic Instrumentation	MI	4-0-0	4
3	EC20AMI501	Automotive Electronics	MI	4-0-0	4
4	EC20AMI502	Communication Systems-II	MI	4-0-0	4
5	EC20AMI503	MOOC/NPTEL -I	MI	0-0-0	2
6	EC20AMI601	Digital Integrated Circuits	MI	4-0-0	4
7	EC20AMI602	Nanotechnology	MI	4-0-0	4
8	EC20AMI603	MOOC/NPTEL -II	MI	0-0-0	2
9	EC20AMI701	Digital Image & Video Processing	MI	4-0-0	4
10	EC20AMI604	Embedded System Design	MI	4-0-0	4

Minor Degree for Non-Circuit Branches (CIV, MECH)

S.No	Course No	Course Name	Category	L-T-P/D	Credits
1	EC20AMI403	Introduction to Signal Processing	MI	4-0-0	4
2	EC20AMI402	Electronic Instrumentation	MI	4-0-0	4
3	EC20AMI401	Communication Systems-I	MI	4-0-0	4
4	EC20AMI504	MATLAB Programming	MI	4-0-0	4
5	EC20AMI505	MOOC/NPTEL -I	MI	0-0-0	2
6	EC20AMI604	Embedded System Design	MI	4-0-0	4
7	EC20AMI605	Introduction to CMOS VLSI Design	MI	4-0-0	4
8	EC20AMI606	MOOC/NPTEL -II	MI	0-0-0	2
9	EC20AMI501	Automotive Electronics	MI	4-0-0	4
10	EC20AMI702	Introduction to IoT	MI	4-0-0	4

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech-I Sem

L	T	P	C
3	0	0	3

(MA20ABS101) LINEAR ALGEBRA & CALCULUS
(Common to All Branches)

Course Objectives:

- This course will illuminate the students in the concepts of calculus and linear algebra.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real-world problems and their applications.

Unit -1:

Matrices

Rank of a matrix by echelon form, normal form. Solving system of homogeneous and non-homogeneous linear equations. Eigen values and Eigen vectors and their properties, Cayley-

Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem, Diagonalisation of a matrix.

Learning Outcomes:

At the end of this unit, the student will be able to

- Solve systems of linear equations, using technology to facilitate row reduction determine the rank, eigen values and eigen vectors. (L3)
- Identify special properties of a matrix, such as positive definite, etc., and use this information to facilitate the calculation of matrix characteristics. (L3)

Unit -2:

Mean Value Theorems

Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof) related problems.

Learning Outcomes:

At the end of this unit, the student will be able to

- Translate the given function as series of Taylor's and Maclaurin's with remainders. (L3)
- Analyze the behavior of functions by using mean value theorems. (L3)

Unit -3:

Multivariable Calculus

Partial derivatives, total derivatives, chain rule, change of variables, Jacobian, maxima and minima of functions of two variables, method of Lagrange multipliers.

Learning Outcomes:

At the end of this unit, the student will be able to

- Find partial derivatives numerically and symbolically and use them to analyze and interpret the way a function varies. (L3)
- Acquire the Knowledge maxima and minima of functions of several variables. (L1)

Utilize Jacobian of a coordinate transformation to deal with the problems in change of variables. (L3)

Unit -4:

Multiple Integrals

Double integrals, change of order of integration, change of variables. Evaluation of triple integrals, change of variables between Cartesian, Cylindrical and Spherical polar co-ordinates.

Learning Outcomes:

At the end of this unit, the student will be able to

- Evaluate double integrals of functions of several variables in two dimensions using Cartesian and polar coordinates. (L5)
- Apply double integration techniques in evaluating areas bounded by region. (L4)
- Evaluate multiple integrals in Cartesian, cylindrical and spherical geometries. (L5)

Unit -5:

Beta and Gamma functions

Beta and Gamma functions and their properties, relation between beta and gamma functions,

Evaluation of definite integrals using beta and gamma functions. Evaluation of double and triple integrals using Beta and Gamma functions.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand Beta and Gamma functions and its relations. (L2)
- Conclude the use of Special function in evaluating definite integrals. (L4)

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.

Reference Books:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
3. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 2011.
4. B. V. Ramana, Higher Engineering Mathematics, McGraw Hill Education.
5. H. k Das, Er. RajnishVerma, Higher Engineering Mathematics, S. Chand.
6. N. Bali, M. Goyal, C. Watkins, Advanced Engineering Mathematics, Infinity Science Press.

Course Outcomes:

At the end of the course, the student will be able to

- Develop the use of matrix algebra techniques that is needed by engineers for practical applications. (L6)
- Utilize mean value theorems to real life problems. (L3)
- Familiarize with functions of several variables which are useful in optimization. (L3)
- Apply multiple integrals to find the area and volumes for different functions. (L3)
- Analyze the concepts of Beta and Gamma special function for different functions. (L4)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech I Sem

L	T	P	C
3	0	0	3

(PH20ABS103) APPLIED PHYSICS

(ECE, EEE, CSE, CSE (AI & ML), IT)

Course Objectives:

- To identify the importance of the optical phenomenon i.e., interference, diffraction and polarization related to its engineering applications.
- To understand the mechanisms of emission of light, the use of lasers as light sources for low and high energy applications, study of propagation of light wave through optical fibers along with engineering applications.
- To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging microdevices.
- To enlighten the concepts of Quantum Mechanics and to provide fundamentals of de 'Broglie waves, quantum mechanical wave equation and its applications, the importance of free electron theory and band theory of solids.
- Evolution of band theory to distinguish materials, basic concepts and transport phenomenon of charge carriers in semiconductors. To give an impetus on the subtle mechanism of superconductors using the concept of BCS theory and their fascinating applications.

Unit-1:

Wave Optics

Interference- Principle of superposition – Interference of light – Interference by division of wavefront and amplitude -Interference in thin films (Reflection Geometry) – Colors in thin films – Newton's Rings – Determination of wavelength and refractive index–Applications.

Diffraction- Introduction – Fresnel and Fraunhofer diffraction – Fraunhofer diffraction due to single slit, double slit and N-slits (qualitative) – Grating spectrum– Applications.

Polarization- Introduction – Types of polarization – Polarization by reflection, refraction and double refraction - Nicol's Prism - Half wave and Quarter wave plates– Applications.

Learning Outcomes:

At the end of this unit, the student will be able to

- Explain the need of coherent sources and the conditions for sustained interference. (L2)
- Identify engineering applications of interference. (L3)
- Analyze the differences between interference and diffraction with applications. (L4)
- Illustrate the concept of polarization of light and its applications. (L2)
- Classify ordinary polarized light and extraordinary polarized light. (L2)

Unit-2:

Lasers and Fiber optics

Lasers- Introduction – Characteristics of laser – Spontaneous and Stimulated emission of radiation – Einstein's coefficients – Population inversion – Lasing action – Pumping mechanisms – Nd-YAG laser–He-Ne laser– GaAs Laser – Applications of lasers.

Fiber optics- Introduction – Principle of optical fiber – Acceptance Angle – Numerical Aperture – Classification of optical fibers based on refractive index profile and modes – Propagation of electromagnetic wave through optical fibers – Attenuation – Optical fiber communication system – Applications.

Learning Outcomes:

At the end of this unit, the student will be able to

- Demonstrate the basic concepts of LASER light Sources. (L2)
- Apply the concepts to learn the types of lasers. (L3)
- Identifies the Engineering applications of lasers. (L3)
- Explain the working principle of optical fibers. (L2)
- Classify optical fibers based on refractive index profile and mode of propagation. (L2)
- Identify the applications of optical fibers in various fields. (L3)

Unit-3:

Dielectric and Magnetic Materials

Dielectric Materials- Introduction – Dielectric polarization – Dielectric polarizability, Susceptibility and Dielectric constant – Types of polarizations: Electronic, Ionic and Orientational polarizations (Qualitative) – Lorentz internal field – Clausius-Mossotti equation-Ferro electricity- Dielectric Loss-Applications.

Magnetic Materials- Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and Permeability – Origin of permanent magnetic moment – Classification of magnetic materials: (Dia, Para, Ferro Ferri, & Antiferro) - Domain theory of Ferromagnetism (Qualitative), – Hysteresis – Soft and Hard magnetic materials-Applications.

Learning Outcomes:

At the end of this unit, the student will be able to

- Explain the concept of dielectric constant and polarization in dielectric materials. (L2)
- Summarize various types of polarization of dielectrics. (L2)
- Interpret Lorentz field and Clausius-Mossotti relation in dielectrics. (L2)
- Classify the magnetic materials based on susceptibility and their temperature dependence. (L2)
- Explain the applications of dielectric and magnetic materials. (L2)
- Apply the concept of magnetism to magnetic devices. (L3)

Unit-4:

Quantum Mechanics, Free Electron Theory and Band theory of Solids

Quantum Mechanics- Dual nature of matter – de-Broglie hypothesis- Heisenberg uncertainty principle (Qualitative) – Significance of wave function- Schrodinger's time independent and dependent wave equation – Particle in a one-dimensional infinite potential well.

Free Electron Theory- Classical free electron theory (Merits and demerits) – Quantum free electron theory – Equation for electrical conductivity based on quantum free electron theory – Density of States–Fermi- Dirac distribution.

Band theory of Solids- Origin of energy bands- Classification of solids – Bloch's Theorem (Qualitative) – Kronig- Penney model (Qualitative) – E vs k diagram.

Learning Outcomes:

At the end of this unit, the student will be able to

- Explain the concept of dual nature of matter. (L2)
- Explain the significance of wave function. (L2)
- Interpret the concepts of classical and quantum free electron theories. (L2)
- Explain the importance of K-P model. (L2)
- Classify the materials based on band theory. (L2)

Unit-5:

Semiconductors and Superconductors

Semiconductors- Introduction – Intrinsic semiconductors – Density of charge carriers – Electrical conductivity – Fermi level – Extrinsic semiconductors – Density of charge carriers – Dependence of Fermi energy on carrier concentration and temperature – Drift and diffusion currents – Einstein's equation – Direct and indirect band gap semiconductors – Hall effect – Hall coefficient – Applications of Hall effect.

Superconductors- Introduction – Concept & Properties of superconductors – Meissner effect – Type I and Type II superconductors – BCS theory – Josephson effects (AC and DC) – High T_c superconductors – Applications of superconductors.

Learning Outcomes:

At the end of this unit, the student will be able to

- Interpret the direct and indirect band gap semiconductors. (L2)
- Identify the type of semiconductor using Hall effect. (L2)
- Identify applications of semiconductors in electronic devices. (L2)
- Explain how electrical resistivity of solids changes with temperature. (L2)
- Classify superconductors based on Meissner's effect. (L2)

Text books:

1. A text book of Engineering Physics – Dr. M.N. Avadhanulu & Dr. P.G. Kshirsagar, S. Chand and Company, 11 Edition, 2019
2. Engineering Physics – B.K. Pandey and S. Chaturvedi, Cengage Learning, 2013

Reference Books:

1. Engineering Physics – Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018
2. Engineering Physics – K. Thyagarajan, McGraw HillPublishers, 2019
3. Engineering Physics - Sanjay D. Jain, D. Sahasrambudhe and Girish, University Press, 2010
4. Semiconductor physics and devices- Basic principle - Donald A, Neamen, McGraw Hill, 2011
5. Solid State Physics, A.J. Dekker, Macmillan Education UK, 1969
6. Kittel's Introduction to Solid State Physics, Charles Kittel ,Wiley India Edition Paperback, 2019

Course Outcomes:

- Apply the different realms of physics and their applications in both scientific and technological systems through physical optics. (L3)
- understand the mechanisms of emission of light, the use of lasers as light sources for low and high energy applications. (L2)
- Understands the response of dielectric and magnetic materials to the applied electric and magnetic fields. (L2)
- Apply the quantum mechanical picture of subatomic world along with the discrepancies between the classical estimates and laboratory observations of electron transportation phenomena by free electron theory and band theory. (L3)
- Elaborate the physical properties exhibited by materials through the understanding of properties of semiconductors and superconductors. (L5)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech I Sem

L	T	P	C
3	0	0	3

(EG20AHS101) COMMUNICATIVE ENGLISH
(Common to all Branches)

Course Objectives:

- To give inputs to students regarding effective listening skills for better comprehension of academic lectures and English spoken by native speakers.
- To make students aware of reading strategies for comprehension of various academic texts and authentic materials.
- To improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations.
- To impart effective strategies for good writing and demonstrate the same in summarizing, writing well-organized essays, record and report useful information.
- To offer relevant inputs regarding grammatical structures and vocabulary and encourage their appropriate use in speech and writing.

Unit-1:

Lesson: On the Conduct of Life: William Hazlitt

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.

Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.

Reading: Skimming to get the main idea of a text; scanning to look for specific pieces of information. Reading for Writing: Beginnings and endings of paragraphs - introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph.

Grammar and Vocabulary: Parts of Speech, Prepositions, Word formation-I: Introduction to Word formation, Clauses and Sentences.

Learning Outcomes:

At the end of the module, the learners will be able to

- Understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information

- Ask and answer general questions on familiar topics and introduce oneself/others
- Employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
- Recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
- Form sentences using proper grammatical structures and correct word forms

Unit-2:

Lesson: The Brook: Alfred Tennyson

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts.

Speaking: Discussion in pairs/small groups on specific topics followed by short structured talks. Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Writing: Paragraph writing (specific topics) using suitable cohesive devices; mechanics of writing - punctuation, capital letters.

Grammar and Vocabulary: Articles, Word formation-II: Root words from other languages, Punctuation.

Learning Outcomes:

At the end of the module, the learners will be able to

- Comprehend short talks on general topics.
- Participate in informal discussions and speak clearly on a specific topic using suitable discourse markers.
- Understand the use of cohesive devices for better reading comprehension.
- Write well-structured paragraphs on specific topics.
- Identify basic errors of grammar/ usage and make necessary corrections in short texts.

Unit-3:

Lesson: The Death Trap: Saki

Listening: Listening for global comprehension and summarizing what is listened to.

Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed.

Reading: Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension.

Writing: Summarizing, Paragraph Writing.

Grammar and Vocabulary: Noun-pronoun agreement, Subject-verb agreement, Word formation-III: Prefixes & suffixes from other languages. Principles of Good writing.

Learning Outcomes:

At the end of the module, the learners will be able to

- Comprehend short talks and summarize the content with clarity and precision.
- Participate in informal discussions and report what is discussed.
- Infer meanings of unfamiliar words using contextual clues.
- Write summaries based on global comprehension of reading/listening texts
- Use correct tense forms, appropriate structures and a range of reporting verbs in speech and writing.

Unit -4:

Lesson: Muhammad Yunus

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.

Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.

Reading: Studying use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communication processe or display complicated data.

Writing: Letter writing, Essay writing.

Grammar and Vocabulary: Misplaced Modifiers, Synonyms and Antonyms, Essay writing.

Learning Outcomes:

At the end of the module, the learners will be able to

- Infer and predict content of spoken discourse.
- Understand verbal and non-verbal features of communication and hold formal/informal conversations.
- Interpret graphic elements used in academic texts.
- Produce a coherent paragraph interpreting a figure/graph/chart/table.
- Use appropriate language for description and interpretation of graphical elements.

Unit-5:

Lesson: Politics and the English Language: George Orwell

Listening: Identifying key terms, understanding concepts and answering a series of relevant questions.

Speaking: Formal oral presentations on topics from academic contexts - without the use of PPT slides.

Reading: Reading for comprehension.

Writing: Summary writing, Note making.

Grammar and Vocabulary: Clichés, Redundancies, Common Abbreviations, Writing a summary.

Learning Outcomes:

At the end of the module, the learners will be able to

- Take notes while listening to a talk/lecture and make use of them to answer questions.
- Make formal oral presentations using effective strategies.
- Comprehend, discuss and respond to academic texts orally and in writing.
- Produce a well-organized essay with adequate support and detail.
- Edit short texts by correcting Common Errors.

Web links

1. www.englishclub.com
2. www.easyworldofenglish.com
3. www.languageguide.org/english
4. www.bbc.co.uk/learningenglish
5. www.eslpod.com/index.html
6. www.myenglishpages.com

Text Books:

1. Language and Life: A Skills Approach- I Edition 2019, Orient Black-Swan.

Reference Books:

1. Bailey, Stephen. Academic writing: A Handbook for International Students, Routledge, 2014.
2. Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking, Heinley ELT; 2nd Edition, 2018.

3. Raymond Murphy's English Grammar in Use, Fourth Edition (2012)E-book.
4. Hewings, Martin. Cambridge Academic English (B2). CUP, 2012.
5. Oxford Learners Dictionary, 12th Edition, 2011.
6. Norman Lewis Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary Goyal Reprint edition 2011.
7. Speed Reading with the Right Brain: Learn to Read Ideas Instead of Just Words by David Butler; 2nd edition 2014.

Course Outcomes:

- Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English. (L2)
- Apply grammatical structures to formulate sentences and correct word forms. (L3)
- Analyze discourse markers to speak clearly on a specific topic in informal discussions. (L4)
- Evaluate reading/listening texts and to write summaries based on global comprehension of these texts. (L5)
- Create a coherent paragraph interpreting a figure/graph/chart/table. (L6)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech I/I Sem

L	T	P	C
3	0	0	3

(EE20AES103) FUNDAMENTALS OF ELECTRICAL CIRCUITS
(Common to ECE & EEE)

Course Objectives:

To make the student learn about

- Basic characteristics of R, L, C parameters, their Voltage and Current Relations and Various combinations of these parameters.
- The
- Single-Phase AC circuits and concepts of real power, reactive power, complex power, phase angle and phase difference
- Network theorems and their applications
- Network Topology and concepts like Tree, Cut-set, Tie-set, Loop, Co-Tree.
- To know the analysis of three phase balanced and unbalanced circuits and to measure active and reactive powers in three phase circuits.

Unit- I Introduction to Electrical & Magnetic Circuits

Electrical Circuits: Circuit Concept – Types of elements - Source Transformation-Voltage-Current Relationship for Passive Elements. Kirchhoff's Laws – Network Reduction Techniques-Series, Parallel, Series Parallel, Star-to-Delta or Delta-to-Star Transformation. Examples. Loop and Nodal Methods of Analysis of Networks & Independent Voltage and Current Sources.

Magnetic Circuits: Faraday's Laws of Electromagnetic Induction-Concept of Self and Mutual Inductance-Dot Convention-Coefficient of Coupling-Composite Magnetic Circuit-Analysis of Series and Parallel Magnetic Circuits, MMF Calculations.

Learning Outcomes:

- Know about Kirchhoff's Laws in solving series, parallel, non-series-parallel configurations in DC networks (L2)
- Know about voltage source to current source and vice-versa transformation in their representation (L2)
- Understand Faraday's laws (L1)
- Distinguish analogy between electric and magnetic circuits(L3)
- Understand the analysis of series and parallel magnetic circuits (L1)

Unit- II Single Phase A.C Circuits

R.M.S, Average Values and Form Factor for Different Periodic Wave Forms – Sinusoidal Alternating Quantities – Phase and Phase Difference – Complex and Polar Forms of Representations, j-Notation, Steady State Analysis of R, L and C (In Series, Parallel and Series Parallel Combinations) with Sinusoidal Excitation- Phasor diagrams - Concept of Power Factor-Concept of Reactance, Impedance, Susceptance and Admittance-Apparent Power, Active and Reactive Power, Examples.

Learning Outcomes: The student will be able to

- Understand fundamental definitions of 1-φAC circuits(L2)
- Distinguish between scalar, vector and phasor quantities(L3)
- Understand voltage, current and power relationships in 1-φAC circuits with basic elements R, L, and C. (L2)
- Understand the basic definitions of complex admittances and complex power (L2)
- Solve 1-φAC circuits with series and parallel combinations of electrical circuit elements R, L and C. (L5)

Unit- III Network Theorems

Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer, Millmann's, Tellegen's, and Compensation Theorems for D.C and Sinusoidal Excitations.

Learning Outcomes: The student will be able to

- Understand that the electrical circuits are 'heart' of electrical engineering subjects and network theorems are main part of it. (L1)
- Distinguish between various theorems and inter-relationship between various theorems(L4)
- know about applications of certain theorems to DC circuit analysis (L2)
- Understands about applications of certain theorems to AC network analysis (L1)
- Know about applications of certain theorems to both DC and AC network analysis(L2)

Unit- IV Network Topology

Definitions – Graph – Tree, Basic Cut set and Basic Tie set Matrices for Planar Networks–Duality & Dual Networks. Nodal Analysis, Mesh Analysis.

Learning Outcomes: The student will be able

- To understand basic graph theory definitions which are required for solving electrical circuits(L1)
- To understand about loop current method(L1)
- To understand about nodal analysis methods(L1)
- To understand about principle of duality and dual networks(L1)
- To identify the solution methodology in solving electrical circuits based on the topology(L4)

Unit- V Three Phase A.C. Circuits

Introduction - Analysis of Balanced Three Phase Circuits – Phase Sequence- Star and Delta Connection - Relation between Line and Phase Voltages and Currents in Balanced Systems - Measurement of Active and Reactive Power in Balanced and Unbalanced Three Phase Systems.

Analysis of Three Phase Unbalanced Circuits - Loop Method - Star Delta Transformation Technique – for balanced and unbalanced circuits - Measurement of Active and reactive Power – Advantages of Three Phase System.

Learning Outcomes:

The student will be able to

- To know about advantages of 3-φcircuits over 1-φcircuits (L2)
- To distinguish between balanced and unbalanced circuits (L4)
- To know about phasor relationships of voltage, current, power in star and delta connected balanced and unbalanced loads (L2)
- To know about measurement of active, reactive powers in balanced circuits (L2)
- To understand about analysis of unbalanced circuits and power calculations (L2)

Text Books:

1. Circuit Theory (Analysis & Synthesis) A. Chakrabarti, Dhanpat Rai & Sons, 7th Revised Edition, 2018.
2. Fundamentals of Electric Circuits Charles K. Alexander and Matthew. N. O. Sadiku, McGraw Hill, 5th Edition, 2013.

Reference Books:

1. Engineering circuit analysis William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 7th Edition, 2006.
2. Network Analysis M.E Van Valkenberg, Prentice Hall (India), 3rd Edition, 1999.
3. Electrical Engineering Fundamentals V. Del Toro, Prentice Hall International, 2nd Edition, 2019.

4. Electric Circuits- Schaum's Series, Mc Graw Hill, 5th Edition, 2010.
5. Electrical Circuit Theory and Technology John Bird, Routledge, Taylor & Francis, 5th Edition, 2014.

Course Outcomes:

After completing the course, the student should be able to do the following

- Given a network, able to find equivalent impedance by using network reduction techniques and determine the current through any element and voltage across and power through any element. (L5)
- Given a circuit and the excitation, determine the real power, reactive power, power factor etc, (L5)
- Apply the network theorems suitably to analyze complex circuits and determine the effective voltages and currents in the circuit. (L6)
- Determine the Dual of the Network, develop the Cut Set and Tie-set Matrices for a given Circuit. (L5)
- Analyze the three-phase balanced and unbalanced circuits and to measure active and reactive powers in three phase circuits. (L5)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech I/I Sem

L	T	P/D	C
1	0	0/2	2

(ME20AES102) ENGINEERING DRAWING
(Common to all Branches of Engineering)

Engineering drawing being the principal method of communication for engineers

Course Objectives:

To introduce and make the students

- To use drawing instruments and to draw polygons, engineering curves.
- To draw orthographic projections of points, lines & planes.
- To draw the projections of the various types of solids in different positions inclined to one and both the planes.
- To draw the projections of sectional views of various types of right regular solids.
- To draw the development of regular solids.

Unit-1:

Introduction to Engineering Drawing:

Principles of Engineering Drawing and its Significance-Conventions in drawing-lettering – BIS conventions.

a) Conic sections (General Method only) including Rectangular Hyperbola.
b) Cycloid, Epicycloid and Hypocycloid.
c) Involutes.

Learning Outcomes:

At the end of this unit the student will be able to

- Understand the significance of engineering drawing. (L2)
- Identify and draw curves obtained in different conic sections. (L3)
- Draw different curves such as cycloids and involutes. (L3)

Unit-2:

Projection of Points, Lines and Planes: Projection of Points in any quadrant, lines inclined to one or both planes, finding true lengths, angle made by line. Projections of regular plane surfaces inclined to one or both the planes.

Learning Outcomes:

At the end of this unit the student will be able to

- Understand the meaning of projection and draw the projections of points & lines. (L2)
- Differentiate between projected length and true length and find the true length of the lines. (L2)
- Draw the projection of regular plane surfaces. (L3)

Unit-3:

Projections of solids: Projections of regular solids inclined to one or both planes by rotational or auxiliary view method.

Learning Outcomes: At the end of this unit the student will be able to

- Understand the procedure to draw projection of solids. (L2)
- Draw the projection of solids inclined to one plane. (L3)
- Draw the projection of solids inclined to both the planes. (L3)

Unit-4:

Sections of solids: Section planes and sectional view of right regular solids- prism, cylinder, pyramid and cone. True shapes of the sections.

Learning Outcomes: At the end of this unit the student will be able to

- Understand different sectional views of regular solids. (L2)
- Obtain the true shapes of the sections of prism, cylinder, pyramid and cone. (L4)
- Draw the sectional views of prism, cylinder, pyramid and cone. (L3)

Unit-5:

Development of surfaces: Development of surfaces of right regular solids-prism, cylinder, pyramid, cone and their sectional parts.

Learning Outcomes:

At the end of this unit the student will be able to

- Understand the meaning of development of surfaces. (L2)
- Draw the development of regular solids such as prism, cylinder, pyramid and cone. (L3)
- Obtain the development of sectional parts of regular shapes. (L4)

Text Books:

1. K.L. Narayana & P. Kannaiah, Engineering Drawing, 3/e, SciTech Publishers, Chennai, 2012.
2. N.D. Bhatt, Engineering Drawing, 53/e, Charotar Publishers, 2016.

Reference Books:

1. Dr K. Prahlada Rao, Dr. S. Krishnaiah, Prof. A.V.S. Prasad, Engineering Graphics, Amaravati publications.
2. Dhanajay A Jolhe, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2009.
3. Venugopal, Engineering Drawing and Graphics, 3/e, New Age Publishers, 2000.
4. Shah and Rana, Engineering Drawing, 2/e, Pearson Education, 2009.
5. K.C. John, Engineering Graphics, 2/e, PHI, 2013.
6. Basant Agarwal & C.M. Agarwal, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2008.

Course Outcomes:

After completing the course, the student will be able to

- Draw basic geometrical constructions, curves used in engineering practices. (L1)
- Understand the concept of projection and acquire visualization skills, projection of points, Lines and Planes. (L2)
- Illustrate the projections of solids graphically. (L3)
- Draw and explore the sectional views of right regular solids.(L3)
  Draw the development of surfaces of solids. (L3)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

	L	T	P/D	C
B.Tech I/I Sem	0	0	2	1

(ME20AES103) ENGINEERING GRAPHICS LAB
(Common to all Branches of Engineering)

Course Objectives:

- Instruct the utility of drafting & modelling packages in orthographic and isometric drawings.
- Train the usage of 2D and 3D modelling.
- Develop the graphical skills for communication of concepts, ideas and design of engineering products through technical drawings

Introduction to AutoCAD: Basic drawing and editing commands: line, circle, rectangle, erase, view, undo, redo, snap, object editing, moving, copying, rotating, scaling, mirroring, layers, templates, polylines, trimming, extending, fillets, arrays, dimensions.

Exercises:

1. Practice exercise using basic drawing commands (4 No's).
2. Practice exercise using editing commands (4 No's).

Orthographic and Isometric Projections

Orthographic Projections: Systems of projections, conventions and application to orthographic projections.

Isometric Projections: Principles of isometric projection- Isometric scale; Isometric views: lines, planes, simple solids.

Exercises:

1. Practice exercises on Orthographic Projections (4 No's).
2. Practice exercises on Isometric Projections (4 No's).

Text Books:

1. K. Venugopal, V. Prabhu Raja, Engineering Drawing + Auto Cad, New Age International Publishers.
2. Engineering Drawing, ND Bhatt, Charotar Publishing House.
3. Engineering Drawing, K.L Narayana, SciTech Publishers.
4. D. M. Kulkarni, A. P. Rastogi, A. K. Sarkar, Engineering Graphics with AutoCAD, PHI Learning Private Limited, New Delhi, Revised edition, 2010.

Course Outcomes:

After completing the course using CAD package, the student will be able to

- Draw the basic views related to projections of Lines, Planes. (L1)
- Draw the basic views related to projections of Planes. (L1)
- Illustrate orthographic views of simple objects. (L3)
- Illustrate isometric projections of simple solids. (L3)
- Interpret and comprehend with drafting packages for engineering practice. (L2)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

	L	T	P	C
B.Tech I / I Sem	0	0	3	1.5

(PH20ABS104) APPLIED PHYSICS LAB
(ECE, EEE, CSE, CSE (AI & ML), IT)

Course Objectives:

- Understands the concepts of interference, diffraction and their applications.
- Understand the role of optical fiber parameters in communication.
- Recognize the importance of energy gap in the study of conductivity and Hall Effect in a semiconductor.
- Illustrates the magnetic and dielectric materials applications.
- Apply the principles of semiconductors in various electronic devices.

Note: In the following list, out of 12 experiments, any 10 experiments must be performed in a semester.

List of Applied Physics Experiments:

1. Determine the thickness of the wire using wedge shape method.
2. Determination of the radius of curvature of the lens by Newton's ring method.
3. Determination of wavelength by plane diffraction grating method.
4. Determination of dispersive power of prism.
5. Determination of wavelength of LASER light using diffraction grating.
6. Determination of particle size using LASER.
7. To determine the numerical aperture of a given optical fiber its acceptance angle.
8. Determination of dielectric constant by charging and discharging method.
9. Magnetic field along the axis of a circular coil carrying current– StewartGee's method.
10. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
11. To determine the energy gap of a semiconductor by temperature by Four-Probe Method.
12. Determination of thermistor negative temperature coefficient of resistance.

References:

1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- S Chand Publishers,2017.

2. http://vlab.amrita.edu/index.php -Virtual Labs, Amrita University.

Course Outcomes:

At the end of the course, the student will be able to

- Utilize optical instruments like microscope and spectrometer. (L3)
- Determine thickness of a hair/paper with the concept of interference. (L5)
- Estimate the wavelength of different colors using diffraction grating and resolving power. (L5)
- Organize the intensity of the magnetic field of circular coil carrying current with distance. (L3)
- Evaluate the acceptance angle of an optical fiber and numerical aperture. (L5)
- Determine the resistivity of the given semiconductor using four probe method. (L5)
- Identify the type of semiconductor i.e., n-type or p-type using hall effect. (L3)
- Determine the band gap of a given semiconductor. (L5)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech I/I Sem

L	T	P	C
0	0	3	1.5

(EG20AHS102) COMMUNICATIVE ENGLISH LAB
(Common to all Branches)

Course Objectives:

- To expose students to a variety of self-instructional, learner-friendly modes of language learning.
- To give inputs on better pronunciation through stress, intonation and rhythm.
- To make students aware of the impact of mother tongue on their use of English.
- To make students aware of the skills of using effective language in Interviews, Group Discussions and Public speaking.
- To equip students with knowledge of the use of computers in resume preparation, report writing, and format making etc.

Unit-1:

1. Phonetics (sounds symbols, transcription and Received Pronunciation (R.P), stress and intonation).
2. Describing objects/places/persons.

Unit-2:

1. Role Play/ Conversational Practice.
2. JAM.

Unit-3:

1. Group Discussion: Types, process, language and body language.
2. Debate: Arguing in favor of and against a topic- logical questioning.

Unit-4:

1. Oral/ Poster Presentations: Structure, preparation, visual aids and delivery.
2. Resume Writing: Definition, formats and practice.

Unit-5:

1. Interview Skills: Basics of interviews -kinds of interviews- preparation – and performance.
2. Film/book review: Structure, language and practice.

Suggested Software

Orel, Walden InfoTech, Young India Films.

Reference Books

1. Bailey, Stephen. Academic writing: A Handbook for International Students,

Routledge, 2014.
2. Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018.
3. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational. 2016.
4. Hewings, Martin. Cambridge Academic English (B2). Cambridge University Press, 2012.
5. T. Balasubramaniyan, A Textbook of English Phonetics for Indian Students, 3rd edition; Laxmi publications 2017.

Web Links

1. www.esllab.com
2. www.englishmedialab.com
3. www.englishinteractive.net

Course Outcomes:

After completing the course, the students will be:

1. Develop to handle and excel in a variety of self-instructional, learner-friendly modes of language learning. (L6)
2. Develop to employ better stress and intonation patterns and utter English sounds correctly. (L6)
3. Develop to avoid the impact of mother tongue in English and neutralize their accent. (L6)
4. Develop to participate with skill and confidence in Group Discussions, Interviews and Public Speaking. (L6)
5. Utilize the technical skills to prepare resume, report-writing, and format-making etc. (L3)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech I / I Sem

L	T	P	C
0	0	3	1.5

(EE20AES104) FUNDAMENTALS OF ELECTRICAL CIRCUITS LAB
(ECE & EEE)

Course Objectives:

- Remember, understand and apply various theorems and verify practically.
- Understand and analyze active, reactive power measurements in three phase balanced &unbalanced circuits.

List of Experiments:

1. Verification of KCL and KVL for DC circuits
2. Determination of Self, Mutual Inductances and Coefficient of Coupling
3. Verification of Superposition Theorem for DC Circuits
4. Maximum Power Transfer Theorem for DC and AC circuits
5. Verification of Compensation Theorem for DC circuits
6. Verification of Reciprocity, Millmann's Theorems for DC circuits
7. Measurement of Active Power for Star Connected Balanced Loads
8. Measurement of Reactive Power for Star Connected Balanced Loads
9. Measurement of Active Power for Delta Connected Balanced Loads
10. Measurement of Reactive Power for Delta Connected Balanced Loads
11. Measurement of 3-Phase Power by Two Wattmeter Method for Unbalanced Loads

Note: Minimum 10 experiments to be performed

Course Outcomes:

At the end of the course, students should be able to

- Distinguish analogy between electric and magnetic circuits and apply the principles to determine circuit parameters. (L5)
- Remember, understand and apply various theorems and verify practically. (L5)
- Understand and analyze active, reactive power measurements in three phase balanced & unbalanced circuit (L5)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech I/I Sem

L	T	P	C
2	0	0	0

(MA20AMC101) LOGICAL SKILLS FOR PROFESSIONALS-I

(Mandatory Course)

Course Objectives:

- To learn the basic methods to find averages, percentages, Time and Distance and Time and Work concepts extended to problems on trains, Boats and Streams and different shortcut techniques to find the solution in a stipulated time.
- To understand the logic behind the series, coding- decoding, Directions, Problems on ages, Analogy concepts.

Unit-1:

Averages:

- Find the averages on some quantities.
- Find the averages on speed and distance.

Ratio and Proportions:

- Ratio between quantities of the same kind.
- Comparison of two ratios and convert into equal fractions.
- Find the 4th, 3rd terms of proportions and mean proportions.

Profit and Loss:

- Find the Profit or Loss on Selling price, cost price and market price.

Unit-2:

Partnership:

- Ratio of division of gains.
- Working and sleeping partners.

Simple Interest and Compound Interest:

- Find the Principal, Rate of interest and time.
- Find the amount of compound interest when the compound interest is Annually or half-year or quarterly or daily.
- Find the difference between the simple and compound interests

Time and Distance:

- Find the time, speed and distance by using direct formula.
- Find the time, speed and distance by using ratios and averages.

Unit-3:

Time and Work:

- The relation between days taken by individuals to complete a given work independently and to complete while working simultaneously or alternately.
- Teams of men, women, children and time taken by the teams to complete work independently or while working simultaneously.

Problems on Trains:

- Time Taken by Train to Cross any stationary Body or Platform.
- Time Taken by 2 trains to cross each other.
- Distance covered when two trains are moving in the same/opposite directions.

Boats and streams:

- Find the speed of boat in upstream and downstream.
- Find the speed of boat in still water and average speed of

boat. Unit-4:

Series:

- Alphabet series
- Number series
- Alpha-Numeric series

Coding and Decoding:

- Letter coding
- Number/symbol coding
- Substitution coding

Blood relation:

- Based dialogue or conversation
- Based on puzzles

Unit-5:

Directions:

- The right and left directional movement
- The directional reference point
- The directions of sun rays and shadow

Problems on ages:

- Find the ages at present
- Find the ages in future
- Find the ages in post

Analogy:

- Alphabet analogy
- Number analogy

Text Books:

1. Quantitative Aptitude, 2012, Dr. R.S. Agarwal, S. Chand and Company Ltd, New Delhi.
2. A Modern Approach to Verbal and Non-Verbal Reasoning, 2012, Dr. R.S. Aggarwal, S. Chand and Company Ltd, New Delhi.

Reference Books:

1. Quantitative Aptitude for Competitive Examinations, 14/e, 2010, Abhijit Guha, Tata McGraw Hill Publishers, New Delhi.
2. Course in Mental Ability & Quantitative Aptitude, 3/e, 2012, Edgar Thorpe, Tata McGraw Hill Publishers, New Delhi.
3. Fast Track Objective Arithmetic, 2012, Rajesh Verma, Arihant Publications, Meerut.
4. Reasoning and Aptitude, 2013, Nem Singh, Made Easy Publications, New Delhi

Course Outcomes:

- Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of Averages - Percentages - Ratio. (L2)
- Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of Partnership - Simple Interest and Compound Interest and time and distance. (L2)
- Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of time ad work, problems on trains and Boats and streams. (L2)
- Analyze the techniques in series, coding and decoding and blood relations. (L3)
- Analyze the techniques in directions, problems on ages and analogy. (L3)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech I/II Sem

L	T	P	C
3	0	0	3

(MA20ABS201) DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS
(Common to All Branches)

Course Objectives:

- To enlighten the learners in the concept of differential equations and multivariable calculus.
- To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real world applications.

Unit -1:

Differential equations

Exact, Non-Exact Linear and Bernoulli equations. Applications to Newton's law of cooling and law of natural growth and decay.

Learning Outcomes:

At the end of this unit, the student will be able to

- Identify the essential characteristics of linear differential equations with constant coefficients. (L3)
- Solve the linear differential equations with constant coefficients by appropriate method. (L3)
- Classify and interpret the solutions of linear differential equations. (L3)

Unit -2:

Linear differential equations of higher order

Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, method of variation of parameters, Cauchy's and Legendre's linear equations. Applications to L-C-R Circuit.

Learning Outcomes:

At the end of this unit, the student will be able to

- Solve the linear differential equations with variable coefficients by appropriate method. (L3)
- Classify and interpret the solutions of linear differential equations of higher order. (L3)

- Formulate and solve the higher order differential equation by analyzing physical situations. (L3)

Unit 3:

Partial differential equations

Formation of a PDE, Linear partial differential equations of first order, non-linear PDEs of first order (standard forms). Solutions to homogenous linear partial differential equations with constant coefficients, rules for finding the complementary function and the particular integral.

Learning Outcomes:

At the end of this unit, the student will be able to

- Apply a range of techniques to find solutions of standard PDEs. (L3)
- Outline the basic properties of standard PDEs. (L2)

Unit-4:

Vector differentiation

Scalar and vector point functions, vector operator del, del applies to scalar point functions-Gradient, del applied to vector point functions-Divergence, Curl and their related properties.

Learning Outcomes:

At the end of this unit, the student will be able to

- Apply del to Scalar and vector point functions. (L3)
- Illustrate the physical interpretation of Gradient, Divergence and Curl. (L3)

Unit -5:

Vector integration

Line integral-circulation-work done by force, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof).

Learning Outcomes:

At the end of this unit, the student will be able to

- Find the work done in moving a particle along the path over a force field. (L4)
- Evaluate the rates of fluid flow along and across curves. (L4)

- Apply Green's, Stokes and Divergence theorem in evaluation of double and triple integrals. (L3)

Text Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.
2. B.S. Grewal, Higher Engineering Mathematics, 44/e, Khanna publishers, 2017.

Reference Books:

1. Dennis G. Zill and Warren S. Wright, Advanced Engineering Mathematics, Jones and Bartlett, 2011.
2. Michael Greenberg, Advanced Engineering Mathematics, 2/e, Pearson, 2018
3. George B.Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
4. R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
5. B. V. Ramana, Higher Engineering Mathematics, McGraw Hill Education.
6. H. k Das, Er. RajnishVerma, Higher Engineering Mathematics, S. Chand.
7. N. Bali, M.Goyal, C. Watkins, Advanced Engineering Mathematics, Infinity Science Press.

Course Outcomes:

At the end of the course, the student will be able to

- Solve the differential equations related to various engineering fields. (L6)
- Solve the linear differential equations of higher order related to various engineering fields. (L6)
- Identify solution methods for partial differential equations that model physical processes. (L3)
- Interpret the physical meaning of different operators such as gradient, curl and divergence. (L5)

  Estimate the work done against a field, circulation and flux using vector calculus. (L5)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech I/II Sem

L	T	P	C
3	0	0	3

(CH20ABS103) CHEMISTRY
(ECE, EEE, CSE, CSE (AI & ML), IT)

Course Objectives:

- To impart the concept of soft and hard waters, softening methods of hard water.
- To familiarize engineering chemistry and its applications.
- To train the students on the principles and applications of electrochemistry.
- To determine the polymer molecular weights and various applications of polymers.
- To introduce instrumental methods.

Unit 1: Water Technology

Introduction –Soft Water and hardness of water, Estimation of hardness of water by EDTA Method, Estimation of Dissolved Oxygen by Winkler's method -Boiler troubles– Priming, foaming, scale and sludge, Caustic embrittlement, Domestic treatment of water, specifications for drinking water, Bureau of Indian Standards (BIS) and World Health Organization (WHO) standards, Industrial water treatment, ion-exchange processes - desalination of brackish water, reverse osmosis.

Learning Outcomes:

At the end of this unit, the students will be able to

- List the differences between temporary and permanent hardness of water. (L1)
- Explain the principles of reverse osmosis and electrodialysis. (L2)
- Compare quality of drinking water with BIS and WHO standards. (L2)
- Illustrate problems associated with hard water - scale and sludge. (L2)
- Explain the working principles of different Industrial water treatment processes. (L2)

Unit 2: Modern Engineering materials

Understanding of materials: Crystal field theory – salient features – splitting in octahedral and tetrahedral geometry. Properties of coordination compounds- Oxidation state, coordination, magnetic and colour.

Semiconductor materials, super conductors- basic concept, band diagrams for conductors, semiconductors and insulators, Effect of doping on band structures. Super capacitors: Introduction, Basic Concept-Classification – Applications.

Nano chemistry: Introduction, classification of nanomaterials, properties and applications of Fullerenes, carbon nano tubes and Graphene's nanoparticles.

Learning Outcomes:

At the end of this unit, the students will be able to

- Explain splitting in octahedral and tetrahedral geometry of complexes. (L2)
- Discuss the magnetic behavior and colour of coordination compounds. (L3)
- Explain the band theory of solids for conductors, semiconductors and insulators. (L2)
- Demonstrate the application of Fullerenes, carbon nano tubes and Graphines nanoparticles. (L2)

Unit 3: Electrochemistry and Applications

Introduction to Electrochemistry: Electrodes – concepts, reference electrodes (Calomel electrode, Ag/AgCl electrode and glass electrode); Electrochemical cell, Nernst equation, cell potential calculations and numerical problems,

P^H metry, Potentiometry - potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations).

Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples.

Primary cells – Zinc-air battery, Secondary cells – Nickel-Cadmium (NiCad), and lithium ion batteries- working of the batteries including cell reactions; Principles and applications of Fuel cells: hydrogen-oxygen, methanol fuel cells

Learning Outcomes:

At the end of this unit, the students will be able to

- Apply Nernst equation for calculating electrode and cell potentials. (L3)
- Differentiate between P^h metry, potentiometric and conductometric titrations. (L2)
- Explain the theory of construction of battery and fuel cells. (L2)
- Solve problems based on cell potential. (L3)

Unit 4: Polymer Chemistry

Introduction to polymers, functionality of monomers, types of polymerization, chain growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation. Calculation of weight average molecular mass of polymers, polydispersity index (PDI).

Plastics - Thermoplastics and Thermosettings, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres.

Elastomers–Buna-S, Buna-N–preparation, properties and applications.

Conducting polymers–polyacetylene, polyaniline, polypyrroles–mechanism of conduction and applications.

Learning Outcomes:

At the end of this unit, the students will be able to

- Explain the different types of polymers and their applications. (L2)
- Explain the preparation, properties and applications of Bakelite, Nylon-6,6, and carbon fibres. (L2)
- Describe the mechanism of conduction in conducting polymers. (L2)
- Discuss Buna-S and Buna-N elastomers and their applications. (L2)

Unit 5: Instrumental Methods and Applications

Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. Principle, instrumentation and applications of UV-Visible, IR Spectroscopies.

Learning outcomes:

After completion of Unit IV, students will be able to:

- Explain the different types of spectral series in electromagnetic spectrum. (L2)
- Understand the principles of different analytical instruments. (L2)
- Explain the different applications of analytical instruments. (L2)

Text Books:

1. Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

Reference Books:

1. G.V.Subba Reddy, K.N.Jayaveera and C. Ramachandraiah, Engineering Chemistry, Mc Graw Hill, 2020.

2. D. Lee, Concise Inorganic Chemistry, 5/e, Oxford University Press, 2008.
3. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.

Course Outcomes:

At the end of the course, the students will be able to:

- Estimate the amount of hardness and DO present in water. (L2)
- Compare the materials of construction for battery and electrochemical sensors. (L2)
- Explain the preparation, properties, and applications of thermoplastics &thermosetting, elastomers & conducting polymers. (L2)
- Explain the principles of spectrometry. (L2)
- Apply the principle of Band diagrams in application of conductors and semiconductors. (L3)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

	L	T	P	C
B.Tech- I/II Sem	3	0	0	3

(CS20AES101) PROBLEM SOLVING USING C (Common to All Branches of Engineering)

Course Objectives:

- To learn how to solve a given problem.
- To illustrate the basic concepts of C programming language.
- To discuss the concepts of Functions, Arrays, Pointers and Structures.
- To familiar with Dynamic memory allocation concepts.
- To apply concepts of structures and files to solve real word problems.

UNIT-1:

Introduction to Problem Solving: Problem Solving Aspect, Problem Identification, Problem Understanding, Algorithm Development, Solution Planning, Flowcharts, flowgorithm.

Overview of C: History Of C, C Language Elements, Basic Structure of C Program, C Tokens-Variables and Data Types, Operators, Expressions and Type Conversions.

Learning Outcomes:

The students will be able to

- Develop solution through problem understanding and decomposition (L6).
- Develop basic flowcharts for performing input and output and computations (L3).
- Solve Numerical Problems using Flowgorithm (L3).
- Use C basic concepts to write simple C programs (L3).

UNIT-2:

Control Statements: Selection Statements- if and switch statements.

Iterative Statements: for, while and do-while statements.

Jump Statements: break and continue statements.

Learning Outcomes:

The students will be able to

- Implement C program using Conditional statements (L2).
- Implement C program using Iterative statements (L2).

UNIT-3:

Arrays: Declaration, accessing array elements, Storing values, Operations on arrays, Multi-dimensional arrays.

Functions: Introduction, Using Functions, Function declaration, Function definition and Function call, Parameter passing, Passing arrays to functions, Recursion, Storage classes.

Learning Outcomes: The students will be able to

- Writing Structured programs using Functions (L5).
- Apply arrays concepts on real time applications (L6).

UNIT-4:

Pointers: Declaration and Initialization of pointer variables, Pointer arithmetic, Pointers and arrays, Pointer to pointer, Array of pointers, Pointers and functions, Dynamic Memory Allocation.

Strings: Introduction to Strings, String handling functions, Preprocessor Directives.

Learning Outcomes: The students will be able to

- Use pointers to write c Programs (L3).
- Understand the concepts of preprocessors (L2).
- Apply Dynamic Memory Allocation concepts on real time applications (L6).

UNIT-5:

Structures: Introduction, Nested Structures, Array of Structures, Structures and Functions, Unions.

Files in C: Using Files in C, Read data from Files, Writing data to Files, Random access to files, Command-line Arguments

Learning Outcomes:

The students will be able to

- Use the concepts of Structures and Unions to write C programs (L3).
- Apply various operations on Files (L6).

Text Books:

1. Reema Thareja, Programming in C, Oxford University Press, AICTE Edition, 2018.
2. R.G. Dromey, “How to Solve it by Computer”. 2014, Pearson.

Reference Books:

1. Jeri R. Hanly, Ellot B. Koffman, Problem Solving and Program Design in C, 5/e, Pearson
2. B. A. Forouzan and R. F. Gilberg, Computer Science: A Structured Programming Approach Using C, 3/e, Cengage Learning, 2007.
3. Brian W Kernighan and Dennis M Ritchie, The C Programming Language, Second Edition, Prentice Hall Publication.
4. Paul Deitel, Harvey Deitel -C How to Program with an introduction to C++, Eighth Edition

Course Outcomes:

At the end of the course, the students will be able to:

- Solve computational problems (L3).
- Select the features of C language appropriate for solving a problem (L4)
- Design computer programs for real world problems (L6)
- Organize the data which is more appropriated for solving a problem

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech I/II Sem

L	T	P	C
3	0	0	3

(EC20AES201) ELECTRONIC DEVICES AND CIRCUITS

(ECE)

Course Objectives:

- To understand the basic principles of all semiconductor devices.
- To be able to solve problems related to diode circuits, and amplifier circuits.
- To analyze diode circuits, various biasing and small signal equivalent circuits of amplifiers.
- To be able to compare the performance of BJTs and MOSFETs.
- To design rectifier circuits and various amplifier circuits using BJTs and MOSFETs.

Unit 1

Diodes: Review of Semiconductors, the ideal diode- current voltage characteristics, Applications of diodes, Terminal characteristic of junction diodes- forward-bias, Reverse-bias and breakdown regions, Modeling the diode forward characteristics- The exponential model, Graphical analysis and Iterative analysis using the exponential model, The Piecewise-Linear model, Constant-voltage-drop model, Ideal-Diode model and Small signal model.

Learning outcomes:

- Remember and understand the basic characteristics of semiconductor diode. (L1)
- Understand iterative and graphical analysis of simple diode circuits. (L1)

Unit 2

Other Diodes and Bipolar Junction Transistors (BJTs):

Specifying and Modeling the Zener diode, Use of the Zener as a Shunt regulator, Temperature effects. Rectifier circuits- The Half-wave rectifier, The Full-Wave rectifier, The Bridge Rectifier without and with a Filter capacitor, Voltage doubler, The Schottky- barrier diode, Varactor diode, Photodiodes and Light-Emitting Diodes.

Bipolar Junction Transistors (BJTs): Device Structure and Physical operation- circuit symbol and conventions, Simplified structure and Modes of operation, Operation of NPN transistor in the Active mode, Structure of actual transistor, Ebers-Moll model, Operation in the Saturation mode, The PNP transistor, Graphical representation of transistor characteristics and Early effect.

Learning outcomes:

- Understand principle of operation of Zener diode and other special semiconductor diodes. (L1)
- Understand the V-I characteristics of BJT and its different configurations. (L1)
- Analyze various applications of diode and special purpose diodes. (L3)
- Design rectifier and voltage regulator circuits. (L4)

Unit 3

Bipolar Junction Transistors:

BJT circuits at DC, Biasing in BJT amplifier circuits- The classical discrete-circuit bias arrangement, A two power supply version, Biasing using a Collector-to-Base feedback resistor, The Hybrid-π model and T model, Performing small-signal analysis directly on the circuit diagram.

Basic BJT amplifier configurations: Three basic configurations- The Common Emitter amplifier without and with emitter resistance, Common Base amplifier and Common collector amplifier, Comparison of three configurations.

Learning outcomes:

- Solve problems on various biasing circuits using BJT. (L2)
- Analyze BJT based biasing circuits. (L3)
- Design an amplifier using BJT based on the given specifications. (L4)

Unit 4

JFET & MOS Field-Effect Transistors:

Operation of both N-channel and P-channel JFET-Drain characteristics and Transfer characteristics. Device structure and Physical Operation (both N-channel and P- channel MOSFET), Current – Voltage characteristics, MOSFET circuits at DC, Biasing in MOS amplifiers circuits: Biasing by fixing VGS, Biasing by fixing VG and connecting a resistance in the source and Biasing using a drain to gate feedback resistor. Learning outcomes:

- Understand the principle of operation of various types of JFET and MOSFET devices (L1)

- Understand the V-I characteristics of JFET and MOSFET devices and their configurations (L1)

Unit 5

MOSFET Small signal operation and Models:

The DC bias point, voltage gain, separating the DC analysis and the signal analysis, small signal equivalent circuit models, the trans conductance and T-equivalent circuit model. Basic MOSFET amplifier configurations-Three basic configurations, Characterizing amplifiers, Common source amplifier without and with source resistance, Common Gate amplifier, and Common Drain amplifier and Comparison of three configurations.

Learning outcomes:

- Solve problems on small signal equivalent of MOSFET devices. (L2)
- Analyze various biasing circuits based on different types of MOSFETs. (L3)
- Design an amplifier using MOSFET based on the given specifications. (L4)

Text Books:

1. Adel S. Sedra and Kenneth C. Smith, "Microelectronic Circuits – Theory and Applications", 6th Edition, Oxford Press, 2013.

2. Donald A Neamen, "Electronic Circuits–analysis and design",3rd McGrawHill (India),2019.

References:

1. J.Milliman and CHalkias,"Integrated electronics",2nd Edition, Tata McGrawHill, 1991.
2. Behzad Razavi, "Microelectronics", Second edition, Wiley, 2013.
3. R.L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuits," 9th Edition, Pearson, 2006.

Course Outcomes:

After the completion of the course, students will able to

- Understand principle of operation, characteristics and applications of Semi conductor diodes, Bipolar Junction Transistor and MOSFETs.
- Apply the basic principles for solving the problems related to Semiconductor diodes, BJTs, and MOSFETs.
- Analyze diode circuits for different applications such as rectifiers, clippers and clampers also analyze biasing circuits of BJTs, and MOSFETs.
- Design diode circuits and amplifiers using BJTs, and MOSFETs.
- Compare the performance of various semiconductor devices.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

	L	T	P	C
B.Tech I/II Sem	0	0	3	1.5

(ME20AES101) ENGINEERING WORKSHOP
(Common to all Branches)

Course Description:

This course will provide students with a hands-on experience on various basic engineering practices. This course will also provide an opportunity to the students to experience the various steps involved in the industrial product fabrication.

Course Objectives:

- To familiarize students with basic engineering applications in day-to-day life.

Wood Working: (Any 2)

To familiarize with different types of wood and tools used in wood working and make following joints;

1. Planning and Sawing of Wood
2. Half – Lap Joint
3. Mortise and Tenon Joint
4. Dovetail Joint or Bridle Joint

Sheet Metal Working: (Any 2)

To familiarize with different types of tools used in sheet metal working, developments of following sheet metal job from GI sheets;

1) Rectangular tray 2) Conical funnel 3) Open scoop

Fitting: (Any 1)

To familiarize with different types of tools used in fitting and do the following fitting exercises;

1) V-fit 2) Square fit 3) Dovetail fit

Electrical Wiring: (Any 2)

To familiarize with different types of basic electrical circuits and make the following connections;

1) Parallel and series 2) Two-way switch 3) Godown lighting 4) Soldering of wires.

Foundry Practice: (Any 1)

To familiarize with different types of tools used in Foundry and do the following exercises;

1. Preparation of a green sand mould using single piece pattern
2. Preparation of a green sand mould using split piece pattern with core and demonstration of casting.

Welding Practice: (Any 1)

To familiarize with different types of tools used in Welding and do the following exercises;

1. Lap joint, butt joint and T joint using arc welding.
2. Lap joint using resistance spot welding
3. Lap and butt joints using gas welding

Assembling/Disassembling Practice: (Any 1)

To familiarize with different types of tools used in Assembling/Disassembling and do the following exercises;

1. Bicycle
2. Clutch and carburetor
3. Two-wheeler engine parts

Manufacture of a Plastic Component (Any 1)

To familiarize with different types of tools used in Manufacture of a Plastic Component and do the following exercises;

1. Use of injection moulding machine
2. FRP composite preparation using hand layup method
3. Joining of plastic components

Reference Books/Laboratory Manuals:

1. P. Kannaiah and K. L. Narayana, Workshop Manual, SciTech Publishers, 2009.
2. K. Venkata Reddy, Workshop Practice Manual, BS Publications, 2008.
3. V. Ramesh Babu, Engineering Workshop Practice, V R B Publishers Private Limited, 2009.

Additional Learning Resources:

1. R. K. Jain, Production Technology, Khanna Publishers, 17th edition, 2012.
2. Kalpakjain, Serope, Manufacturing Engineering and Technology, Pearson Education, 7th edition, 2014.

Course Outcomes:

After completion of this lab the student will be able to

1. Identify tools, work material, measuring instruments useful for domestic applications (L3).
2. Apply wood working skills in real world applications. (L3)
3. Build different parts with metal sheets in real world applications. (L3)
4. Apply fitting operations in various applications for good strength. (L3)
5. Analyze different types of basic electric circuit connections. (L4)
6. Demonstrate soldering and brazing in joining circuits. (L2)

7. Make moulds for sand casting using standard equipment. (L3)
8. Develop different weld joints for various metals. (L3)
9. Inspect various parts of machine components. (L4)
10. Make plastic components using proper raw material. (L3)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

	L	T	P	C
B.Tech I/II Sem	0	0	3	1.5

(CS20AES103) IT Workshop
(Common to All Branches of Engineering)

Course Objectives:

- To make the students to know about the internal parts of computer, Generation of Computers
- To make the students to know how to assemble and disassemble a computer from its parts
- To make the students to install Operating system for a computer.
- To provide technical training to the students on productivity tool like Word Processor, Spread Sheets, Presentations and LaTeX
- To learn about networking of computers and use Internet facility for browsing and searching

Task 1:

Learn about Computer Hardware -1: Identifying the internal parts of computer with its peripherals, Block diagram of Computer, Generations of Computers. Write specifications for each part of a computer including peripherals and specifications of a system. Submit it in the form of report.

Task 2:

Learn about Computer Hardware-2: Assemble and disassemble the Personal Computer, Internal and external connections of the computer, Troubleshoot the computer by identifying working and non-working parts. Submit a report about the working and non-working parts in a computer.

Task 3:

Installation of Operating System: Linux, Windows 7/8/10 Installation, install both the operating system in a computer and make the system as Dual boot. Student should record the entire installation process.

Task 4:

Installation of Device drivers: install supported device drivers for the system-printer drivers, audio and video drivers, Graphic card drivers, USB drivers, install new application software and record the process of installations.

Task 5:

Networking: Connecting computers directly using a cable or wireless connectivity and share information, connecting computers using switch/hub or Local Area Network connection and share information, Wide Area Network Connection, crimpling activity, logical configuration. The entire process has to be documented.

Task 6:

Introduction to Web Design: Introduction to Web Design, Introduction to HTML tags, Cascading Style sheets and Applications using HTML and CSS.

Task 7:

Introduction to Virus and Antivirus: Types of Virus, virus engine, Antivirus-download freely available Anti-virus software, install it and use it to check for the threats to the computer being used. Student should submit information about the features of the installation process and antivirus used.

Task 8:

Introduction to Microsoft Office-1: Microsoft word, Operations on text data in word- inserting, deleting, Aligning, header, footer, font style, font type, bulleting and numbering, hyperlinking, inserting images, page setup, inserting images, writing equations, formatting Paragraphs, spell checking etc. Student should submit a user manual of the word processor

Task 9:

Introduction to Microsoft Office-2: Microsoft Excel, Operation on data in Excel-creating, opening, saving the document as per the requirement, inserting, deleting the cell data, format the cell, creation of pivot table, applying the formulas and functions, preparing charts, converting .xls to csv, etc., Student should submit a user manual of the Spreadsheet.

Task 10:

Introduction to Microsoft Office-3: Microsoft PowerPoint Presentation, creating, opening, saving the presentations, inserting and deleting the slides, styles for slides, formatting the slides with different fonts, colours, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyper linking, running the slideshow, Setting the timing for slide show. Student should submit a user manual of the PowerPoint presentation.

Task 11:

Introduction to LaTeX: LaTeX and its installation and different IDEs, Creating the document using Latex, content into sections using article and book class of Latex.

Styling Pages: Reviewing and customizing different paper sizes and formats. Formatting text, creating basic table, adding simple and dashed border, merging rows

and columns, referencing and indexing. Student should submit a user manual of the LaTeX.

References:

1. Introduction to Computers, Peter Norton, McGraw Hill
2. PC Hardware, Maintenance & Troubleshooting In-Depth, Reddy N.S.
3. MOS study guide for Word, Excel, PowerPoint & Outlook Exams, Joan Lambert, Joyce Cox, PHI
4. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
5. Networking your computers and devices, Rusen, PHI
6. Lamport L. LaTeX: a document preparation system: user's guide and reference manual. Addison-Wesley: 1994

Course Outcomes:

- Identify the Internal parts of computers and Generation of Computers. (L1)
- Assemble and disassemble a computer from its parts and prepare the computer ready to use.(L3)
- Installation process of different types Operating system for a computer by their own.(L3)
- Interconnect two or more computers for information sharing.(L4)
- Access the Internet and browse it for required information.(L1)
- Prepare the documents using Word Processor, prepare spread sheets for calculations using Excel, and documents for LaTeX.(L3)
- Prepare slide presentation using the presentation tool.(L4)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech I / II Sem

L	T	P	C
0	0	3	1.5

(CS20AES102) PROBLEM SOLVING USING C LAB
(Common to All Branches of Engineering)

Course Objectives:

- To learn how to solve a given problem.
- To illustrate the basic concepts of C programming language.
- To discuss the concepts of Functions, Arrays, Pointers and Dynamic Memory Allocation.
- To understand and implement Structures and Unions.
- To familiarize with Files and File Operations.

Week-1: Draw flowcharts for fundamental algorithms.

Week-2: C Programs to demonstrate C-tokens.

Week-3: C Programs on usage of operators.

Week-4: C Programs to demonstrate Decision making and branching (Selection).

Week-5: C Programs to demonstrate different loops.

Week-6: C Programs to demonstrate 1-D arrays.

Week-7: C Programs to demonstrate multi-dimensional arrays.

Week-8: C Programs to demonstrate functions.

Week-9: C Programs on pointers.

Week-10: C Programs to perform operations on Strings with String handling functions and without String handling functions.

Week-11: C Programs on Structures and Unions.

Week-12: C Programs to demonstrate Files.

Text Books:

1. R.G. Dromey, How to Solve it by Computer, 1/e, Pearson Education, 2006.
2. Reema Thareja, Programming in C, Oxford University Press, AICTE Edition, 2018.

Reference Books:

1. B. A. Forouzan and R. F. Gilberg, Computer Science: A Structured Programming Approach Using C, 3/e, Cengage Learning, 2007.
2. Pradip Dey, Manas Ghosh, Programming in C, Oxford University Press, AICTE Edition,
3. B. Gottfried, Programming with C, 3/e, Schaum's outlines, McGraw Hill (India), 2017.
4. Jeri R. Hanly, Ellot B. Koffman, Problem Solving and Program Design in C, 5/e, Pearson.

Course Outcomes:

Upon successful completion of the course, the student will be able to

- Build algorithm and flowchart for simple problems.
- Use suitable control structures to solve problems.
- Use suitable iterative statements, arrays and modular programming to solve the problems.
- Implement Programs using pointers and String handling Functions.
- Develop code for complex applications using structures, unions and file handling features.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech I/II Sem

L	T	P	C
0	0	3	1.5

(CH20ABS104) CHEMISTRY LAB
(ECE, EEE, CSE, CSE (AI & ML), IT)

Course Objectives:

- Verify the fundamental concepts with experiments

Note: In the following list, out of 12 experiments, any 10 experiments must be performed in a semester

List of Chemistry Experiments:

1. Determination of Hardness of a groundwater sample.
2. Estimation of Dissolved Oxygen by Winkler's method.
3. Conductometric titration of (i) strong acid vs. strong base, (ii) weak acid vs. strong base.
4. Determination of cell constant and conductance of solutions.
5. Potentiometry - determination of redox potentials and emfs.
6. Determination of Strength of an acid in Pb-Acid battery.
7. Preparation of Bakelite
8. Verify Lambert-Beer's law.
9. Thin layer chromatography.
10. Identification of simple organic compounds by IR.
11. Preparation of nano material's by precipitation.
12. Estimation of Ferrous Iron by Dichro metry.
13. P^H metric titration of (i) strong acid vs. strong base, (ii) weak acid vs. strong base

Reference Books:

1. Vogel's Text book of Quantitative Chemical Analysis, Sixth Edition – Mendham J et al, Pearson Education, 2012.
2. Chemistry Practical– Lab Manual, First edition, Chandra Sekhar KB, Subba Reddy GV and Jayaveera KN, SM Enterprises, Hyderabad, 2014.
3. Chemistry Laboratory Manual, Sri Krishna Hitech Publishing Company Pvt.Ltd,2nd Edition, A Ravi Krishanan, B Tirumalarao, 2020-2021.

Course Outcomes:

At the end of the course, the students will be able to

- Determine the cell constant and conductance of solutions.(L3)
- Prepare advanced polymer- Bakelite. (L2)
- Measure the strength of an acid present in secondary batteries.(L3)
- Analyse the IR of some organic compounds.(L3)
- Estimate the amount of dissolved oxygen in water.(L3)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech I / II Sem

L	T	P	C
0	0	3	1.5

(EC20AES202) ELECTRONIC DEVICES & CIRCUITS LAB

(ECE)

Course Objectives:

- To verify the theoretical concepts practically from all the experiments.
- To analyse the characteristics of Diodes, BJT and MOSFET
- To design the amplifier circuits from the given specifications.
- To Model the electronic circuits using tools such as PSPICE / Multisim.

PART A: Electronic Workshop Practice

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Coils, Gang Condensers, Relays, Bread Boards.
2. Identification, Specifications and Testing of active devices, Diodes, BJTs, JFETs, LEDs, LCDs, SCR, UJT.
3. Soldering Practice- Simple circuits using active and passive components.
4. Study and operation of Ammeters, Voltmeters, Transformers, Analog and Digital Multimeter, Function Generator, Regulated Power Supply and CRO.

PART B: List of Experiments: (Execute any 8 experiments).

Note: All the experiments shall be implemented using both Hardware and Software.

1. Verification of Volt- Ampere characteristics of a PN junction diode and find static, dynamic resistances under forward bias and reverse bias of the diode from the graphs obtained.
2. Verification of Volt- Ampere characteristics of a Zener diode and find Breakdown voltage, static and dynamic resistances of the diode from the graphs obtained.
3. Design a full wave rectifier for the given specifications with and without filters, and verify the given specifications experimentally. Vary the load and find ripple factor. Draw suitable graphs.
4. Design a Zener diode-based voltage regulator against variations of supply and load. Verify the same from the experiment.

5. Verification of the input and output characteristics of BJT in Common Emitter configuration experimentally and find required h – parameters from the graphs.
6. Verification of the input and output characteristics of BJT in Common Base configuration experimentally, and determine required h – parameters from the graphs.
7. Verification of the output and transfer characteristics of MOSFET (Enhancement mode) in Common Source Configuration experimentally. Find Threshold voltage V_T, g_m, μ & r_d.
8. Verification of the output and transfer characteristics of MOSFET (Depletion mode) in Common Source Configuration experimentally. Find Threshold voltage V_T, g_m, μ & r_d.
9. Design and analysis of self-bias circuit using BJT.
10. Design and analysis of self-bias circuit using MOSFET.
11. Design a BJT switch.
12. Design a small signal amplifier using BJT (common emitter) for the given Specifications. Draw the frequency response and find the bandwidth.
13. Design a small signal amplifier using MOSFET (common source) for the given specification. Draw the frequency response and find the bandwidth.

Tools/Equipment Required: Software Tools like Multisim/P Spice or Equivalent, DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices.

Course Outcomes:

After the completion of the course students will able to:

- Understand the basic characteristics and applications of basic electronic devices. (L1)
- Observe the characteristics of electronic devices by plotting graphs.(L2)
- Analyze the Characteristics of UJT, BJT, MOSFET (L3).
- Design MOSFET/ BJT based amplifiers for the given specifications. (L4)
- Simulate all circuits in PSPICE/Multisim. (L5).

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech I/II Sem

L	T	P	C
2	0	0	0

(CH20AMC201) ENVIRONMENTAL SCIENCE

(Common to All Branches)

Course Objectives:

- To make the students to get awareness on environment.
- To understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day-to-day activities of human life.
- To save earth from the inventions by the engineers.

UNIT – I

Multidisciplinary Nature of Environmental Studies: – Definition, Scope and Importance – Need for Public Awareness.

Natural Resources:

Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. Energy resources.

Learning outcomes:

At the end of this unit, the students will be able to

- Understanding the importance of public awareness. (L2)
- Understanding about the various resources. (L2)

UNIT – II

Ecosystems:

Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession

– Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem.
b. Grassland ecosystem.
c. Desert ecosystem.
d. Aquatic ecosystems. (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and Its Conservation:

Introduction: Definition, genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-spots of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Learning outcomes:

At the end of this unit, the students will be able to

- Understanding about various ecosystems and their characteristics. (L2)
- Understanding the biodiversity and its conservation. (L2)

UNIT – III

Environmental Pollution: Definition, Causes, effects and control measures of

a. Air Pollution
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes –Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

Learning outcomes:

At the end of this unit, the students will be able to

- Understanding about the various sources of pollution. (L2)
- Understanding about the various sources of solid waste and preventive measures. (L2)
- Understanding about the different types of disasters and their managerial measures. (L2)

UNIT – IV

Social Issues and the Environment:

From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management –Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products Environment Protection Act. – Air (Prevention and Control of Pollution) Act. –Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act –Issues involved in enforcement of environmental legislation – Public awareness.

Learning outcomes:

At the end of this unit, the students will be able to

- Understanding about the social issues related to environment and their protection acts. (L2)
- Understanding about the various sources of conservation of natural resources. (L2)
- Understanding about the wild life protection and forest conservation acts. (L2)

UNIT – V

Human Population and The Environment:

Population growth, variation among nations. Population explosion – Family Welfare Programmes. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

Field Work: Visit to a local area to document environmental assets River/ forest/ grass/ hill/ mountain–Visit to a local polluted site- Urban/Rural/Industrial/Agricultural Study of common plants, insects, and birds – river, hill slopes.

Learning outcomes:

At the end of this unit, the students will be able to

- Understanding about the population explosion and family welfare programmes. (L2)
- To identify the natural assets and related case studies. (L3)

Text Books:

1. Text book of Environmental Studies for Undergraduate Courses ErachBharucha for University Grants Commission, Universities Press.
2. Palaniswamy, “Environmental Studies”, Pearson education.
3. S.AzeemUnnisa, “Environmental Studies” Academic Publishing Company.
4. K.Raghavan Nambiar, “Text book of Environmental Studies for Undergraduate Courses as per UGC model syllabus”, Scitech Publications (India), Pvt. Ltd.

References:

1. Deeksha Dave and E.Sai Baba Reddy, “Textbook of Environmental Science”, Cengage Publications.
2. M.Anji Reddy, “Text book of Environmental Sciences and Technology”, BS Publication.
3. J.P.Sharma, Comprehensive Environmental studies, Laxmi publications.
4. J. Glynn Henry and Gary W. Heinke, “Environmental Sciences and Engineering”, Prentice hall of India Private limited.
5. G.R.Chatwal, “A Text Book of Environmental Studies” Himalaya Publishing House.
6. Gilbert M. Masters and Wendell P. Ela, “Introduction to Environmental Engineering and Science, Prentice hall of India Private limited.

Course Outcomes:

At the end of the course, the student will be able to

- Understanding multidisciplinary nature of environmental studies and various renewable and nonrenewable resources. (L2)
- Understand flow and bio-geo- chemical cycles and ecological pyramids. (L2)
- Understand various causes of pollution and solid waste management and related preventive measures. (L2)
- Apply the rainwater harvesting, watershed management, ozone layer depletion and waste land reclamation. (L3)
- Apply the concepts of population explosion, value education and welfare programmes in society. (L3)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech II Sem

L	T	P	C
2	0	0	0

(EG20AMC101) SPEECH AND ORAL COMMUNICATION (Mandatory Course)
(Common to All Branches)

Course Objectives:

- To improve the language proficiency of the students in English by practicing with his/her peers.
- To impart creative skills for professional development.
- To develop the communication skills of the students in both formal and informal situations.
- To develop extensive speaking skills and comprehension for career growth.

Detailed Syllabus:

Unit-1:

Story Telling (Narrate a story)

1. Biography description (Describe a freedom fighter/politician/athlete/celebrity etc.)
2. Speech sounds
3. Formal Conversation (Enact official Telephone conversation/Telephone interview etc.)
   Verb forms, Subject -Verb agreement, Vocabulary).

Unit-2:

1. Stress in Speech
2. English Puzzle solving (Finding cross words from table)
3. Fun with English (Speech through grammar-changing tense, voice of the sentences)
4. Open Talk with CM (Funny interview with class mates) Voice, Speech.

Unit-3:

1. Intonation
2. If I'm a..... What would I do? (Students enact as… and describe their choices what they would do?)
3. Language Translation (Dialogues/jokes/proverbs/quotations-Regional language to English)

4. Mock Assembly (Students enact as speaker, MLA, CM and opposition leaders in Assembly) Wh- Questions, Question tags.

Unit-4:

1. Tongue twisters / pronounce it…..
2. Humorous Play (Playing jokes/Telling funny dialogues in English)
3. Celebrity Interview (Enact Play), Spotting Errors, Etiquettes

Unit-5:

News Reader (Prepare funny news and read on Dias)

1. Film Review (A critique on regional language films by students)
2. Movie Script Narration (Subject -Verb agreement, Tenses)

Reference books:

1. K.R Lakshmi Narayanan, A Course book on English, SCITECH publications Pvt. Ltd,Hyd, 2009.
2. Sanjay Kumar & Pushp Lata, Communication skills, Oxford university press, New Delhi, 2019.
3. M Ashraf Rizvi, Effective Technical Communication, Tata McGraw- Hill, New Delhi, 2017.

Additional Learning Resources:

1. https://www.bbc.co.uk/skillswise/english
2. https://www.nonstopenglish.com
3. https://www.grammarly.com/blog/

Course Outcomes:

- Improve the neutral accent and be free from mother tongue influence. (L6)
- Hypothesizing small talks on general topics and learn critiquing skills by participating in Conversations. (L6)
- Applying Vocabulary and using it in their day-to-day life. (L4)
- Understanding and mastering in verbal and non-verbal communication. (L2)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech -III SEM

L	T	P	C
3	0	0	3

(MA20ABS302) COMPLEX VARIABLES AND TRANSFORMS (EEE & ECE)

Course Objectives:

- To understand the knowledge on functions of complex variables. (L2)
- To evaluate improper integrals of complex functions using Residue theorem. (L5)
- To apply the knowledge on Laplace transforms and its applications in solving ordinary differential equations. (L3)
- To determine Fourier series of given function in a given interval. (L5)
- To analyze the concepts of Z-transforms in solving Difference equations. (L4)

UNIT – I: Functions of complex variables – Differentiation

Introduction to functions of complex variables - concept of limit & continuity- Differentiation, Cauchy-Riemann equations in Cartesian and Polar coordinates (without proof), analytic functions, harmonic functions, finding harmonic conjugate - construction of analytic function by Milne- Thomson method.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand functions of complex variable and its properties.(L2)
- Find derivatives of complex functions.(L1)
- Understand the analyticity of complex functions.(L2)

UNIT – II: Functions of complex variables – Integration

Line Integral - Contour integration, Cauchy's integral theorem, Cauchy Integral formula, Cauchy Integral formula for derivatives (All theorems without Proof).

Power Series Expansions: Taylor's series and Laurent's series (without proof); zeros of analytic functions, singularities.

Residues: Evaluation of residue by formula and by Laurent's series, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand the integration of complex functions.(L2)

- Apply Cauchy's integral theorem and Cauchy's integral formula to solve complex integrals.(L3)
- Understand singularities of complex functions.(L2)
- Evaluate improper integrals of complex functions using Residue theorem.(L5)

UNIT – III: Laplace Transforms

Definition - Laplace transform of standard functions - existence of Laplace Transform – Inverse transform – First shifting theorem, Transforms of derivatives and integrals – Unit step function – Second shifting theorem – Dirac's delta function – Convolution theorem – Laplace transform of Periodic function. Differentiation and integration of transform – solving Initial value problems to ordinary differential equations with constant coefficients using Laplace transforms.

Learning Outcomes

At the end of this unit, the student will be able to

- Understand the concept of Laplace transforms and find the Laplace transforms of elementary functions.(L2)
- Find the Laplace transforms of general functions using its properties.(L3)
- Understand Laplace transforms of special functions (Unit step function, Unit Impulse & Periodic).(L2)
- Apply Laplace transforms to solve differential equations.(L3)

UNIT – IV: Fourier series

Fourier coefficients (Euler's formulae) – Dirichlet conditions for the existence of Fourier series – functions having discontinuity - Fourier series of even and odd functions – Fourier series in an arbitrary interval – Half-range Fourier sine and cosine expansions.

Learning Outcomes

At the end of this unit, the student will be able to

- Understand the Fourier series expansion of the given function.(L2)
- Determine Fourier coefficients (Euler's) and identify existence of Fourier series of the given function.(L5)
- Determine the Fourier series of given function in Half range interval.(L5)

UNIT – V: Fourier transforms & Z Transforms

Fourier Transforms: Fourier transform – Fourier sine and cosine transforms – Properties – Inverse transforms – convolution theorem – Finite Fourier Sine and Cosine transforms.

Z-transform –Z-transforms, Inverse Z-transform – Properties – Damping rule – Shifting rule – Initial and final value theorems. Convolution theorem – Solution of Difference equations by Z - transforms.

Learning Outcomes:

At the end of this unit, the student will be able to

- Find Fourier transforms of given functions.(L1)
- Apply properties of Fourier transforms to different functions.(L3)
- Apply Z transforms to solve difference equations.(L3)

Text Books:

1. B.S. Grewal, "Higher Engineering Mathematics", Khanna publishers, 44th edition.
2. Advanced Engineering Mathematics, R K Jain and S R K Iyengar, Narosa Publishing House, New Delhi.
3. Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley India

Reference Books:

1. B.V. Ramana, Higher, "Engineering Mathematics", McGraw Hill publishers.
2. Alan Jeffrey, "Advanced Engineering Mathematics", Elsevier.
3. Dr. S. Sreenadh, Dr. V. Ramesh Babu, S Ranganadham, Fourier Series and Transforms, S Chand Publications, 2014

Course Outcomes:

At the end of this Course the student will be able to

CO1:Apply Cauchy-Riemann equations to find the analyticity of complex functions.(L3)

CO2:Apply Cauchy's integral formula and Cauchy's integral theorem to evaluate

CO3:improper integrals along contours.(L3)

CO4:Analyze the concepts of Laplace Transforms to solve ordinary differential equations. (L4)

CO5:Examine the Fourier series for different functions in half and full range.(L4)

CO6:Analyze the concepts of Z transforms to solve Difference equations.(L4)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech -III SEM

L	T	P	C
3	0	0	3

(EC20APC301) DIGITAL LOGIC DESIGN

(ECE)

Course Objectives:

- To familiarize with the concepts of different number systems and Boolean algebra.
- To understand the design techniques of combinational, sequential logic circuits.
- To understand and analyze the concepts of FSM and PLD's
- To impart knowledge on operation, characteristics and various configurations of TTL and CMOS logic families.
- To outline procedures for the analysis and design of combinational and sequential logic circuits.
- To introduce programmable logic devices.

Unit I

Number Systems, Boolean algebra and Logic Gates: Number systems - binary numbers, octal, hexadecimal, other binary codes; complements, signed binary numbers, digital logic operations and gates, basic theorems and properties of Boolean algebra, Boolean functions, canonical and standard forms, complements of Boolean functions, two-level NAND and NOR Implementation of Boolean functions.

Learning Outcomes:

- Summarize advantages of using different number systems. (L2)
- Explain usefulness of different coding schemes and functionality of logic gates. (L2)
- Apply basic laws and De Morgan's theorems to simplify Boolean expressions. (L3)

Unit II

Minimization of Boolean functions and Combinational Logic Circuits: The

Karnaugh map method (up to five variables), product of sums simplifications, don't care conditions, Tabular method, Introduction, Combinational circuits, design procedure, adders, subtractors, 4-bit binary adder/ subtractor circuit, BCD adder, carry look- a-head adder, binary multiplier, magnitude comparator, decoders and encoders, multiplexers, demultiplexers.

Learning Outcomes:

- Apply Boolean algebra for describing combinational digital circuits. (L2)
- Compare K- Map and Q-M methods of minimizing logic functions. (L5)

Unit III

Sequential Circuits: Latches, flip-flops, truth tables and excitation tables, timing and triggering consideration, conversion of flip- flops, design of counters, ripple counters, synchronous counters, Modulus-n Counter, Ring counter, Johnson counter, Up-Down counter, registers, shift registers, universal shift register.

Learning Outcomes:

- Describe behavior of Flip-Flops and Latches.(L2)
- Design synchronous sequential circuits using flip flops and construct digital systems using components such as registers and counters (L4)

Unit IV

Finite State Machine: Types of FSM, capabilities and limitations of FSM, state assignment, realization of FSM using flip-flops, Mealy to Moore conversion and vice-versa, reduction of state tables using partition technique, Design of sequence detector.

Memory and Programmable Logic: RAM, Types of Memories, Memory decoding, ROM, Types of ROM, Programmable Logic Devices (PLDs): Basic concepts, PROM as PLD, Programmable Array Logic (PAL) and Programmable Logic Array (PLA).

Learning Outcomes:

- Utilize concepts of state and state transition for analysis and design of sequential circuits(L3)
- Compare Moore and Mealy machine models.(L5)
- Define RAM, ROM, PROM, EPROM and PLDs. (L1)
- Describe functional differences between different types of RAM & ROM. (L2)

Unit V

CMOS Logic:

Introduction to logic families, CMOS logic, CMOS logic families; Bipolar Logic and Interfacing: Bipolar logic, Transistor logic, TTL families, CMOS/TTL interfacing, low voltage CMOS logic and interfacing, Emitter coupled logic, Comparison of logic families, Familiarity with standard 74-series and CMOS 40- series-ICs – Specifications.

Learning Outcomes:

- Analyze various logic families like CMOS, TTL, ECL
- familiar with interfacing between CMOS and TTL

Text Books:

1. M. Morris Mano, “Digital Design”, 3rd Edition, PHI.
2. Charles H.Roth,Jr., “Fundamentals of Logic Design” 5th edition , CENGAGE Learning 2012.

References:

1. ZviKohavi and Niraj K.Jha, “Switching and Finite Automata Theory, 3rd Edition, Cambridge University Press, 2010.
2. D.P. Leach, A.P. Malvino, “Digital Principles and Applications”, TMH, 7th Edition.

Course Outcomes:

After completion of the course, student will be able to

- Understand the properties of Boolean algebra, other logic operations, and minimization of Boolean functions using Karnaugh map.
- Make use of the concepts to solve the problems related to the logic circuits.
- Analyze the combinational and sequential logic circuits.
- Compare various Programmable logic devices.
- Compare the concepts of RAM and ROM.
- Understand the operation CMOS, TTL logic families, ECL logic families and interfacing between them.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech -III SEM

L	T	P	C
3	0	0	3

(EC20APC302) ELECTRONIC CIRCUIT ANALYSIS & DESIGN (ECE)

Course Objectives:

- To design and analyze multi-stage amplifiers using BJT at low and high frequencies.
- To analyze the effect of negative feedback on amplifier characteristics.
- To understand the basic principles of oscillators and analyze RC & LC oscillator circuits.
- To understand different types of large signal amplifiers and tuned amplifiers.

Unit I

Multistage Amplifiers and Frequency response: Classification of amplifiers, Methods of coupling, Cascading transistor amplifiers: CE-CC connection, Miller's theorem, CE short circuit current gain obtained with hybrid-pi model, parameter f_T, Cascode transistor configuration, High input resistance transistor circuits, Boot-strapped Darlington circuit andEmitter coupled difference amplifier.

Learning outcomes:

- Understand basic concepts, need of multistage amplifiers, and various inter-stage coupling in multi-stage amplifiers. (L2)
- Analyze low frequency and high frequency models of BJT. (L4)

Unit II

Feedback Amplifiers: Classification of feedback amplifiers, Feedback concept, General characteristics of negative feedback amplifiers, Generalized analysis of feedback amplifiers using block diagram approach, Performance comparison of feedback amplifiers, Method of Analysis of Feedback Amplifiers.

Learning outcomes:

- Understand concept of different feedback topologies. (L2)
- Determine the effect of feedback on amplifier characteristics.(L2)
- Analyze characteristics of various types of feedback configurations. (L4)

Unit III

Oscillators: Oscillator principle, condition for oscillations, types of oscillators, RC phase shift and Wein bridge oscillators using BJT with the relevant analysis, Generalized analysis of LC Oscillators, Hartley and Colpitt's oscillators using BJT with relevant analysis, Crystal oscillators, Frequency and amplitude stability of oscillators.

Learning outcomes:

- Understand the working principle of oscillator and stability constraints. (L2)
- Analyze different types of RC and LC oscillators, with detailed mathematical analysis and illustrations. (L4)

Unit IV

Power Amplifiers: Classes of power amplifiers, Class A large signal Amplifiers, Transformer Coupled Audio power amplifier, Efficiency of Class A Amplifier, Class B Amplifiers-Push-pull amplifiers and Complementary Symmetry push pull amplifier, Efficiency of Class B Amplifier, Operation of Class AB, Class C and Class D power amplifiers, Thermal stability and Heat sink.

Learning outcomes:

- Understand the operation and characteristics of power amplifiers under different classes of operation. (L2)
- Analyze the efficiency of power amplifiers under different classes of operation. (L4)
- Understand the concept of heat sink.(L2)

Unit V

Tuned Amplifiers: Introduction, Q-Factor, Capacitance Coupled Single tuned amplifiers, Double Tuned Amplifiers, Effect of Cascading tuned amplifiers on Band width, Staggered tuned amplifiers, comparison of single tuned, double tuned and stagger tuned amplifiers.

Learning outcomes:

- Evaluate the resonant frequency of tuned amplifiers. (L5)
- Understand the operation and characteristics of different tuned amplifiers. (L4)

Text Books:

1. J. Millman, C.C.Halkias and S. Jit, "Millman's Electronic Devices and Circuits",
   Tata McGraw Hill, 4th edition, 2019.

2. S. Salivahanan and N. Suresh Kumar, “Electronic Devices and Circuits”, McGraw Hill India Pvt. Ltd., 4th Edition, 2020.

References:

1. Robert L. Boylestad and Louis Nashelsky, “Electronic Devices and Circuits Theory”, Pearson/Prentice Hall, 9th Edition, 2006.
2. Sedra A.S. and K.C. Smith, “Micro Electronic Circuits”, Oxford University Press, 5th Edition.
3. Donald A. Neaman, “Electronic Circuit Analysis and Design”, McGraw Hill Education, 3rd edition.

Course Outcomes:

After the completion of the course, students will able to

CO1: Understand the working principle of multistage amplifiers, Feedback amplifiers, power amplifiers and tuned amplifiers. (L2)

CO2: Analyze multistage amplifiers, feedback amplifiers, power amplifiers, and tuned amplifiers. (L4)

CO3: Design multistage amplifiers, feedback amplifiers, oscillators, power amplifiers and tuned amplifiers for the given specification.(L6)

CO4: Evaluate the efficiency of large signal (power) amplifiers. (L5)

CO5: Compare the frequency response of Single-stage, Double-stage amplifiers with Single tuned, double tuned and Stagger tuned amplifiers. (L2)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech -III SEM

L	T	P	C
3	0	0	3

(EC20APC303) SIGNALS & SYSTEMS
(ECE)

Course Objectives:

- To introduce students to the basic idea of signal and system analysis and its characterization in time and frequency domains.
- To present Fourier tools through the analogy between vectors and signals.
- To teach concept of sampling and reconstruction of signals.
- To analyze characteristics of linear systems in time and frequency domains.
- To understand Laplace and z-transforms as mathematical tool to analyze continuous and discrete-time signals and systems.

Unit 1

Signals & Systems: Basic definitions and classification of Signals and Systems (Continuous time and discrete time), operations on signals, Concepts of Convolution and Correlation of signals, Analogy between vectors and signals-Orthogonality, mean square error

Fourier Series: Trigonometric & Exponential, Properties of Fourier series, concept of discrete spectrum, Illustrative Problems.

Learning outcomes:

- Understand different types of signals and systems. (L2)
- State principles of vector spaces and concept of Orthogonality. (L1)
- Analyze the periodic signals by applying Fourier series. (L4)

Unit II

Continuous Time Fourier Transform: Definition, Computation and properties of Fourier transform for different types of signals and systems, Inverse Fourier transform.

Sampling Theory: Statement and proof of sampling theorem of low pass signals, Illustrative Problems.

Learning outcomes:

- Identify system properties based on impulse response and Fourier analysis. (L1)
- Analyze the spectral characteristics of signals using Fourier transform. (L3)
- Illustrate signal sampling and its reconstruction. (L4)

Unit III

Laplace Transform: Definition, ROC, Properties, Inverse Laplace transforms, the S-plane and BIBO stability, Transfer functions, System Response to standard signals, Solution of differential equations with initial conditions.

Learning outcomes:

- Understand the limitations of Fourier transform and need for Laplace transform and develop. (L1)
- Evaluate response of linear systems to known inputs by using Laplace transforms. (L2)

Unit IV

Signal Transmission through Linear Systems: Linear system, impulse response, Response of a linear system for different input signals, linear time-invariant (LTI) system, linear time variant (LTV) system, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, System bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Paley-Wiener criterion for physical realization, Relationship between bandwidth and rise time, Energy and Power spectral densities, Illustrative Problems.

Learning outcomes:

- Understand the impulse response, transfer characteristics of LTI system and various filters. (L1)
- Analyze filter characteristics and physical realization of LTI system. (L4)
- Apply the relation between bandwidth and rise time & energy and power spectral densities in various applications. (L3)

Unit V

Discrete Time Fourier Transform: Definition, Computation and properties of Discrete Time Fourier transform for different types of signals and systems, Illustrative Problems.

Z–Transform: Definition, ROC, Properties, Poles and Zeros in Z-plane, The inverse Z-Transform, System analysis, Transfer function, BIBO stability, System Response to standard signals, Solution of difference equations with initial conditions, Illustrative Problems.

Learning outcomes:

- Apply Discrete Time Fourier transform techniques to analyze discrete-time signals and systems. (L2)
- Analyze the spectral characteristics of signals using Fourier transform. (L4)
- Evaluate the Fourier transform of Discrete-time signals. (L5)
- Apply transform techniques to analyze discrete-time signals and systems using Z transforms. (L2)

Text Books:

1. A.V. Oppenheim, A.S. Willsky and S.H. Nawab, “Signals and Systems”, 2nd Edition, PHI, 2009.
2. Kumar, A. Anand. Signals and systems. PHI Learning Pvt. Ltd., 2012.

References:

1. BP Lathi, “Principles of Linear Systems and Signals”, 2nd Edition, Oxford University Press, 015.
2. Simon Haykin and Van Veen, “Signals & Systems”, 2nd Edition, Wiley, 2005.
3. Hwei Hsu, “Schaum’s Outline of Signals and Systems”, 4th Edition, TMH, 2019

Course Outcomes:

After completion of the course, student will be able to

CO1: Understand the mathematical description and representation of continuous- time and discrete-time signals and systems. Also understand the concepts of various transform techniques. (L2)

CO2: Apply sampling theorem to convert continuous-time signals to discrete-time signals and reconstruct back, different transform techniques to solve signals and system related problems. (L3)

CO3: Analyze the frequency spectra of various continuous-time signals using different transform methods. (L4)

CO4: Analyze the systems based on their properties and determine the response of them. (L4)

CO5: Analyze the frequency spectra of various discrete-time signals using different transform methods. (L4)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech -III SEM

L	T	P	C
3	0	0	3

(BA20AHS301) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS (ECE)

Course Objectives:

- To inculcate the basic knowledge of managerial economics and demand analysis.
- To make the students learn input-output relationship for optimizing production and cost analysis.
- To Know the Various types of market structure and pricing methods and strategy.
- To provide fundamental skills on accounting and to explain the process of preparing financial statements.
- To give an overview on investment appraisal methods to promote the students to learn how to plan long-term investment decisions.

UNIT I

INTRODUCTION TO MANAGERIAL ECONOMICS

Managerial Economics – Definition- Nature- Scope - Contemporary importance of Managerial Economics - Relationship of Managerial Economics with Financial Accounting and Management. Demand Analysis: Concept of Demand-Demand Function - Law of Demand - Elasticity of Demand- Significance - Types of Elasticity - Measurement of elasticity of demand - Demand Forecasting- factors governing demand forecasting- methods of demand forecasting.

Learning Outcomes:

- Students can understand the basic terms and concepts related to economics and managerial economics.
- It describes decision making process of a firm.
- Students are able to understand the relationship between price and demand.
- Students can understand the techniques involved in forecasting the Demand.

UNIT II

THEORY OF PRODUCTION AND COST ANALYSIS

Production Function- Least cost combination- Short-run and Long- run production function- Isoquants and Isocosts, MRTS - Cobb-Douglas production function - Laws of returns - Internal and External economies of scale - Cost Analysis: Cost concepts and cost behavior- Break-Even Analysis (BEA) - Determination of Break Even Point (Simple Problems)-Managerial significance and limitations of Break- Even Point.

Learning Outcomes:

- Students can understand the various levels of production function.
- It demonstrates the methods of costing a product.
- Students are able to understand the Breakeven point of an organization.
- It explains the merits and demerits of increase in the scale of production.

UNIT III

INTRODUCTION TO MARKETS AND NEW ECONOMIC ENVIRONMENT

Market structures: Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition- Monopoly-Monopolistic Competition-Oligopoly-Price-Output Determination - Pricing Methods and Strategies-Forms of Business Organizations- Sole Proprietorship- Partnership – Joint Stock Companies - Public Sector Enterprises – New Economic Environment- Economic Liberalization – Privatization - Globalization. GST and Demonetization.

Learning Outcomes:

- Students can understand about different types of Market structures.
- They are able to find what are the determines of different markets.
- Able to get information about various Pricing strategies.
- Students can understand about various business structures in India.

UNIT IV

INTRODUCTION TO FINANCIAL ACCOUNTING AND ANALYSIS

Financial Accounting – Concept - Emerging need and Importance - Double-Entry Book Keeping- Journal- Ledger – Trial Balance - Financial Statements - Trading Account – Profit & Loss Account – Balance Sheet (with simple adjustments). Financial Analysis – Ratios – Liquidity, Leverage, Profitability, and Activity Ratios (simple problems).

Learning Outcomes:

- It explains basic concepts of Accounting.

- Students can understand preparation of Final Accounts.
- It describes the cycle of Accounting.
- Students can understand the importance of Ratios in measuring the financial position of a company.

UNIT V

CAPITAL AND CAPITAL BUDGETING

Concept of Capital - Over and Undercapitalization – Remedial Measures - Sources of Shot term and Long term Capital - Estimating Working Capital Requirements – Capital Budgeting – Features of Capital Budgeting Proposals – Methods and Evaluation of Capital Budgeting Projects – Pay Back Method – Accounting Rate of Return (ARR) – Net Present Value (NPV) – Internal Rate Return (IRR) Method (simple problems)

Learning Outcomes:

- Students are able to understand the procurement of funds and its effective utilisation.
- It describes the Time value of money.
- Students are able to understand the difference between working capital and capital budgeting.
- Students can understand the various types of finance.

TEXT BOOKS:

- Managerial Economics 3/e, Ahuja H.L, S.Chand, 2013.
- Financial Management, I.M.Pandey, Vikas Publications, 2013.

REFERENCES:

1. Managerial Economics and Financial Analysis, 1/e, Aryasri, TMH, 2013.
2. Managerial Economics and Financial Analysis, S.A. Siddiqui and A.S. Siddiqui, New Age International, 2013.
3. Accounting and Financial Management, T.S.Reddy & Y. Hariprasad Reddy, Margham

COURSE OUTCOMES:

CO1: Should be able to understand managerial economics and demand analysis.

CO2: Should be able to analyze decisions relating to production and cost analysis.

CO3: Should be able to evaluate market structures and forms of business.

CO4: Should be able to assess financial statements and ratios.

CO5: Should be able to apply capital budgeting methods.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech -III SEM

L	T	P	C
0	0	3	1.5

(EC20APC304) BASIC SIMULATION LAB (ECE)

Course Objectives:

- To simulate various Signals and Systems through MATLAB
- To apply the concepts of signals to determine their energy, power, PSD etc.
- To teach analyzing signals and sequences using Fourier, Laplace and Z-transforms.
- To enable to write programs for signal processing applications.

List of Experiments:

1. Write a program to generate various Signals and Sequences: Periodic and Aperiodic, Unit Impulse, Unit Step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sinc function.
2. Perform operations on Signals and Sequences: Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.
3. Write a program to find the trigonometric & exponential Fourier series coefficients of a rectangular periodic signal. Reconstruct the signal by combining the Fourier series coefficients with appropriate weightages- Plot the discrete spectrum of the signal.
4. Write a program to find Fourier transform of a given signal. Plot its amplitude and phase spectrum.
5. Write a program to convolve two discrete time sequences. Plot all the sequences.
6. Write a program to find autocorrelation and cross correlation of given sequences.
7. Write a program to verify Linearity and Time Invariance properties of a given Continuous/Discrete System.

8. Write a program to generate discrete time sequence by sampling a continuous time signal. Show that with sampling rates less than Nyquist rate, aliasing occurs while reconstructing the signal.
9. Write a program to find magnitude and phase response of first order low pass and high pass filter. Plot the responses in logarithmic scale.
10. Write a program to find response of a low pass filter and high pass filter, when a speech signal is passed through these filters.
11. Write a program to generate Complex Gaussian noise and find its mean, variance, Probability Density Function (PDF) and Power Spectral Density (PSD).
12. Generate a Random data (with bipolar) for a given data rate (say 10kbps). Plot the same for a time period of 0.2 sec.
13. To plot pole-zero diagram in S-plane/Z-plane of given signal/sequence and verify its stability.

NOTE: All Experiments are to be simulated using MATLAB or equivalent software.

Course Outcomes:

After completion of the course, student will be able to

CO1: Learn how to use the MATLAB software and know syntax of MATLAB programming (L1)

CO2: Understand how to simulate different types of signals and system response.(L2)

CO3: Analyze signals using Fourier, Laplace and Z-transforms. (L4)

CO4: Compute Fourier transform of a given signal and plot its magnitude and phase spectrum.(L2)

CO5: Verify Sampling theorem, Determine Convolution and Correlation between signals and sequences. (L5)

Equipment Required:

1. MATLAB.
2. Personal computer with necessary peripherals.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech -III SEM

L	T	P	C
0	0	3	1.5

(EC20APC305) DIGITAL LOGIC DESIGN LAB (ECE)

Course Objectives:

- To understand various pin configurations of the Digital ICs used in the laboratory
- To conduct the experiments and verify the truth tables of various logic circuits.
- To analyze the logic circuits
- To design sequential and combinational logic circuits and verify their properties.

List of Experiments:

Part A: Combinational Logic Circuits (any 6 experiments can be performed)

1. Verification of truth tables of the following Logic gates

   Two input (i) OR (ii) AND (iii) NOR (iv) NAND (v) Exclusive-OR (vi) NOT
2. Implementation of the given Boolean function using logic gates in both SOP and POS forms.
3. Design half adder and full adder circuit and verify its functional table.
4. Design half subtractor and full subtractor circuit and verify its functional table.
5. Implementation and verification of Binary to Gray and Gray to Binary code converters.
6. Implementation and verification of BCD to Excess-3 and Excess-3 to BCD code converters.
7. Implementation and verification of BCD to 7 segment decoder.
8. Implementation of 4x1 Multiplexer using logic gates.

Part B: Sequential Logic Circuits (any 6 experiments can be performed)

1. Verification of functional tables of (i) RS Flip–Flop (ii) JK Flip–Flop (iii) D Flip-Flop.
2. Design a four-bit comparator and verify output.
3. Design and implementation of 8-bit odd/even parity checker.

4. Verify the operation of 4-bit Universal Shift Register for different Modes of operation.
5. Design and implementation of a decade counter.
6. Design and implementation of a binary counter.
7. Design a four-bit ring counter using D Flip–Flops/JK Flip Flop and verify output
8. Design a four bit Johnson's counter using D Flip-Flops/JK Flip Flops and verify output

Equipment Required:

1. Digital Trainer kits.

References:

1. M. Morris Mano, "Digital Design", 3rd Edition, PHI
2. Online learning resources/virtual labs: https://www.vlab.co.in/

Course Outcomes

On completion of this course, the students will be able to

CO1: Understand the pin configuration of various digital ICs used in the lab.

CO2: Conduct the experiment and verify the properties of various logic circuits.

CO3: Design sequential circuits.

CO4: Design combinational circuits.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech -III SEM

L	T	P	C
0	0	3	1.5

(EC20APC306) ELECTRONIC CIRCUIT ANALYSIS & DESIGN LAB (ECE)

Course Objectives:

- To design and analyze the multistage amplifiers and verify the frequency response.
- To verify the effect of negative feedback on amplifier parameters.
- To understand the application of positive feedback circuits& generation of signals.
- To understand the concept of design and analysis of Power amplifiers and tuned amplifiers

LIST OF EXPERIMENTS:

1. Two stage RC coupled amplifier
2. Darlington pair amplifier
3. Cascade amplifier
4. Voltage series feedback amplifier
5. Current shunt feedback amplifier
6. RC Phase Shift / Wien Bridge oscillator
7. Hartley / Colpitt's oscillator
8. Class A power amplifier
9. Class B power amplifier
10. Single tuned amplifier

NOTE: Design & Simulate any 8 experiments with MULTISIM software and verify the results in hardware lab with discrete components using BJT/JFET/MOSFTET.

Course Outcomes:

After completion of the course, student will be able to

CO1: Understand the characteristics and frequency response of various amplifiers and determine its gain and bandwidth. (L2)

CO2: Simulate and analyze the performance of negative feedback amplifier circuits, oscillators and Power amplifiers and single tuned amplifiers. (L4)

CO3: Design a RC and LC oscillator circuits for a given frequency. (L2)

CO4: Calculate the efficiency of the power amplifier circuits. (L2)

CO5: Distinguish the operating modes of various Power amplifier circuits.(L6)

Software:

1. MULTISIM/ PSPICE/Equivalent Licensed simulation software tool
2. Computer Systems with required specifications

Hardware:

1. Regulated Power supplies ,
2. Analog/Digital Storage Oscilloscopes
3. Analog/Digital Function Generators
4. Digital Multimeters, Decade Résistance Boxes/Rheostats, Decade Capacitance Boxes,
5. Ammeters & Voltmeters (Analog or Digital)
6. Active & Passive Electronic Components
7. Bread Boards, Connecting Wires & CRO Probes etc.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech -III SEM

L	T	P	C
1	0	2	2

(IT20ASC301) Application Development using Python

Course Objectives:

The aim of Python Programming Lab is

- To acquire programming skills in core Python.
- To acquire Object Oriented Skills in Python
- To develop the skill of designing Graphics in Python
- To implement various graph using mathematical libraries.

Tasks:

1. Write a program to demonstrate different number datatypes in python
2. Write a program to perform arithmetic operations on numbers
3. Write a program to add two numbers.
4. Write a program to find largest number among three.
5. Write a program to find the given number is even or odd.
6. Write a python program to print a number is positive/negative using if-else.
7. Write a program to find sum of individual digits.
8. Write a program to check the given string is palindrome or not.
9. Write a program to find GCD of two numbers.
10. Use a for loop to print a triangle like the one below. Allow the user to specify how high the triangle should be

```
*
**
***
****
```

11. Write a program takes in the the number of terms and finds the sum of series:

$1 + x^2/2 + x^3/3 + \ldots x^n/n.$

12. Write a program to create, concatenate and print a string and accessing sub-string from a given string.
13. Write a program to construct the following pattern using nested for loop

```
*
```

```
**
***
****
*****
*****
****
***
**
*
```

14. Write a program to print prim numbers less than 20.
15. Write a program to find factorial of a number using recursion.
16. Write a program to define a module to find fibonaaci numbers and import the module to another program.
17. Create a list and perform the following methods

1) insert( ) 2) remove( ) 3) append( ) 4) len( )

5) pop( ) 6)clear( ) meters, or kilometres

18. Write a program to find the cumulative sum of a list where the ith element is the sum of the first i+1 elements from the original list.
19. Create a dictionary and apply the following methods

1) Print the dictionary items 2) access items 3) useget()

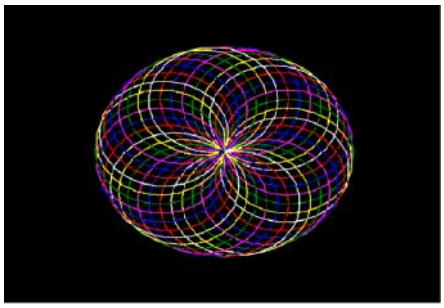
4)change values 5) use len()

20. Write a program to count the frequency of words appearing in a string using a dictionary
21. Create a tuple and perform the following methods

1) Add items 2) len() 3) check for item in tuple 4)Access iems

22. Write a program to count the number of vowels present in a string using sets
23. Write a program which accepts the radius of circle from user and compute area (use math module).
24. Write a program to count the number of words in a text file.
25. Write a program to read a file and capitalize the first letter of every word in the file.
26. Write a program to find the area of a rectangle using classes.

27. Write a program using NumPy, implement different matrix operations in python.
28. First we import the turtle module. Then create a window, next we create turtle object and using turtle method we can draw in the drawing board.
29. Write program to draw the following image



30. Write a program using MatPlotlib library, plot the graph with all different plot types. (Pie Chart, Area Plot, Scatter Plot, Histogram and Bar Graph)

Course Outcomes:

By the end of this lab, the student is able to

CO1: Write, Test and Debug Python Programs. (L1)

CO2: Use Conditionals and Loops for Python Programs. (L3)

CO3: Construct custom modules and functions to handle different operations.(L3)

CO4: Implement Object oriented concepts through real time scenarios and handle errors. (L3)

CO5: Design different shapes and objects using turtle graphics. (L4)

Reference Books:

1. Allen B. Downey, “Think Python: How to Think like a Computer Scientist”, 2nd edition,O’Reilly,2016.Or http://www.ict.ru.ac.za/Resources/cspw/thinkcspy3/thinkcspy3.pdf
2. Paul Barry, “Head First Python a Brain Friendly Guide” 2nd Edition, O’Reilly, 2016
3. Dainel Y.Chen “Pandas for Everyone Python Data Analysis” Pearson Education, 2019

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech -III SEM

L	T	P	C
2	0	0	0

(CH20AMC301) BIOLOGY FOR ENGINEERS
(ECE)

Course Objectives:

- To provide basic understanding about life and life Process. Animal an plant systems.
- To understand what bimolecules, are, their structures are functions. Application of certain bimolecules in Industry. Brief introduction about human physiology and bioengineering.
- To understand hereditary units, i.e. DNA (genes) and RNA and their synthesis in living organism.
- How biology Principles can be applied in our daily life using different technologies.
- Brief introduction to the production of transgenic microbes, Plants and animals.

Unit I: Introduction to Basic Biology

Cell as Basic unit of life, cell theory, Cell shapes, Cell structure, Cell cycle. Chromosomes, Prokaryotic and eukaryotic Cell. Plant Cell, Animal Cell, Plant tissues and Animal tissues, Brief introduction to five kingdoms of classification.

Learning Outcomes:

After completing this unit, the student will be able to

- Summarize the basis of life. (L1)
- Understand the difference between lower organisms (prokaryotes) from higher organisms (eukaryotes). (L2)
- Understand how organisms are classified. (L3)

Unit II: Introduction to Biomolecules:

Carbohydrates, lipids, proteins, Vitamins and minerals, Nucleic acids (DNA and RNA) and their types. Enzymes, Enzyme application in Industry. Large scale production of enzymes by Fermentation.

Learning Outcomes:

After completing this unit, the student will be able to

- Understand what are biomolecules, their role in living cells, structure, function and how they are produced. (L2)
- Analyze the relationship between the structure and function of nucleic acids. (L4)
- Summarize the applications of enzymes in industry. (L2)
- Understand what is fermentation and its applications of fermentation in industry. (L2)

Unit III: Human Physiology

Nutrition: Nutrients or food substances. Digestive system, Respiratory system, (aerobic and anaerobic Respiration). Respiratory organs, respiratory cycle. Excretory system.

Learning Outcomes:

After completing this unit, the student will be able to

- Understand nutrients are present in our body (L2)
- Understand the mechanism and process of important human functions (L2)

Unit IV:

Introduction to Molecular Biology and recombinant DNA Technology: Prokaryotic gene and Eukaryotic gene structure. DNA replication, Transcription and Translation. rDNA technology. Introduction to gene cloning.

Learning Outcomes:

After completing this unit, the student will be able to

- Understand and Explain about gene structure and replication in prokaryotes and Eukaryotes (L2)
- Understand genetic material is replicated, RNA and proteins are synthesized. (L2)
- Understand about recombinant DNA technology and its application in different

  fields.(L2)
- Understand the gene cloning. (L2)

Unit V:

Application of Biology:Brief introduction to industrial Production of Enzymes,

Pharmaceutical and therapeutic Proteins, Vaccines and antibodies. Basics of biosensors, biochips, Bio fuels, and Bio Engineering. Basics of Production of Transgenic plants and animals.

Learning Outcomes:

After completing this unit, the student will be able to Understand.

- Understand biology is applied for production of useful products for mankind.(L2)
- Understand the biosensors, biochips etc. (L2)
- Understand transgenic plants and animals and their production (L2)

Course Outcomes:

After studying the course, the student will be able to:

CO1: Analyze about cells and their structure and function. Different types of cells and basics for classification of living Organisms.

CO2: Analyze about biomolecules, their structure and function and their role in the living organisms. How biomolecules are useful in Industry.

CO3: Analyze about human physiology.

CO4: Analyze about genetic material, DNA, genes and RNA how they replicate, pass and preserve vital information in living Organisms.

CO5: Apply biological Principles in different technologies for the production of medicines and Pharmaceutical molecules through transgenic microbes, plants and animals.

Text books:

1. P.K.Gupta, Cell and Molecular Biology, 5th Edition, Rastogi Publications -
2. U. Satyanarayana. Biotechnology, Books & Allied Ltd 2017

Reference Books:

1. N. A. Campbell, J. B. Reece, L. Urry, M. L. Cain and S. A. Wasserman, “Biology: A Global Approach”, Pearson Education Ltd, 2018.
2. T Johnson, Biology for Engineers, CRC press, 2011
3. J.M. Walker and E.B. Gingold, Molecular Biology and Biotechnology 2nd ed.. Panima Publications. PP 434.
4. David Hames, Instant Notes in Biochemistry –2016
5. Phil Tunner, A. Mctennan, A. Bates & M. White, Instant Notes – Molecular Biology –2014

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech -III SEM

L	T	P	C
2	0	0	0

(MA20AMC301) LOGICAL SKILLS FOR PROFESSIONALS-II
(Mandatory Course)

Course Objectives:

- To learn the basic methods to find HCF, LCM Factors, Simplification, Pipes, Alligation or Mixture, Table, Bar Graphs and Pie Chart concepts.
- To understand the logic behind the Syllogism, Calender, Clocks and Number Series Analogy concepts.

UNIT I

HCF, LCM Factors:

Find the HCF and LCM of the given numbers by using Factorization method.

Find the HCF and LCM of the given numbers by using Division method.

Simplification:

Using BODAMS rule to find out the value of a given expression.

Using Vernacular rule to find out the value of a given expression.

UNIT II

Pipes

Find the how much time taken to fill the tank by opening one pipe, two pipe and one after another.

Alligation or Mixture

Using Ratio and proportion to solve the mixture problems.

To find quickly calculate the price of a mixture, given that it is a mix of two elements having different prices.

UNIT III

Data Interpretation :

Table, Bar Graphs

Find the Average sales of all branches for the respective years.

Find the ratio of the total sales of respective branches.

Pie Charts

Study the Pie chart and the table answer the questions based on them.

Find the central angle of the components.

UNIT IV: Syllogism

Type-I: Different types of Venn diagrams with their implications.

Type-II: Analyse the figure carefully and then answer certain questions regarding the given data.

UNIT V:

Calendars

Find the day of the week on a given date, Find the ordinary year and Leap year

Clocks

Find the angle between the hour hand and minute hand of a clock, when the hands are at right angles.

Number Series Analogy

Choosing a similarly related pair as the given number pair on the basis of the relation between the numbers in each pair.

Choosing a number similar to a group of numbers on the basis of certain common properties that they possess.

Text Books:

1. Quantitative Aptitude, 2012, Dr. R.S. Aggarwal, S. Chand and Company Ltd, New Delhi.
2. A Modern Approach to Verbal and Non-Verbal Reasoning, 2012, Dr. R.S. Aggarwal, S. Chand and Company Ltd, New Delhi.

Reference Books:

1. Quantitative Aptitude for Competitive Examinations, 14/e, 2010, Abhijit Guha, Tata McGraw Hill Publishers, New Delhi.
2. Course in Mental Ability & Quantitative Aptitude, 3/e, 2012, Edgar Thorpe, Tata McGraw Hill Publishers, New Delhi.
3. Fast Track Objective Arithmetic, 2012, Rajesh Verma, Arihant Publications, Meerut.
4. Reasoning and Aptitude, 2013, Nem Singh, Made Easy Publications, New Delhi.

Course Outcomes:

CO1: Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of HCF, LCM Factors and Simplification.

CO2: Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of Pipes, Alligation or Mixture.

CO3: Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of Table, Bar Graphs and Pie Chart.

CO4: Analyze the techniques in Syllogism.

CO5: Analyze the techniques in Calender, Clocks and Number Series Analogyconcepts

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech- III Sem. **L T P C**

2 0 0 0

(EG20AMC301)ENHANCING ENGLISH LANGUAGE SKILLS

COURSE OBJECTIVES

To enhance communication skills through listening, speaking, reading, and writing.
To improve language proficiency of the students for career development.
To train students to use language appropriately for interview skills, group discussion and public speaking.
To develop confidence in the students to use English in everyday situations.
To provide training and opportunities to participate in formal and informal communication.

UNIT- I

1. Greetings-Introducing oneself and others
2. Just A Minute (JAM) & Role play
3. Prepositions, Word formation

Learning Outcomes

At the end of the module, the learners will be able to
Respond general questions on familiar topics by introducing one self and others
Comprehend short talks on general topics.
Use grammatical structures effectively and meaningfully.

UNIT- II

1. Oral Presentations – Technical presentations
2. Letter Writing- Formal and Informal, Email Writing
3. Articles, Punctuation.

Learning Outcomes

At the end of the module, the learners will be able to Make formal oral presentations using effective strategies
Write formal letters and e-mail writing appropriately in formal contexts without any mistakes
Use articles and use punctuation contextually.

UNIT – III

1. Communication – Verbal and Non- verbal communication
2. Telephone Etiquettes
3. Tenses,Subject-verb agreement, Prefixes & suffixes

Learning Outcomes

At the end of the module, the learners will be able to

Understand non-verbal features of communication and holdFormal& informal conversations
Use correct tense forms and structures in speech and writing
Use grammatical structures aptly.

UNIT – IV

1. Resume Writing and Technical Report writing
2. Book/Film review
3. Synonyms and Antonyms, Vocabulary building

Learning Outcomes

At the end of the module, the learners will be able to

Write Resume appropriately and ready for an interview.
Review a book/film
Edit short texts by correcting errors

UNIT – V

1. Group Discussions
2. Debate
3. Interview Skills

Learning Outcomes

At the end of the module, the learners will be able to

Participate in formal & informal discussions and speak clearly on a specific topic
Understand how to face interviews effectively.
Comprehend, discuss and respond to academic texts orally and in writing

COURSE OUTCOMES

Use English language, both written and spoken, competently and correctly.
Improve comprehension and fluency of speech.

Hone the communication skills to meet the challenges of their careers successfully.
Gain confidence in using English in verbal situations.
Strengthen communication skills in different contexts like formal and informal.

REFERENCE BOOKS:

1. Krishna Mohan & NP Singh, Speaking English Effectively, 2nd Edition,2011.
2. MAshrafRizvi,EffectiveTechnicalCommunication,TataMcGra w- Hill, New Delhi,2017.
3. Francis Soundararaj,Basics of Communication in English: Soft Skills for Listening, Speaking, Reading and Writing, New Delhi: Macmillan-2012.
4. ChaseR. Tarver&Kristin L. Johannsen, Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018.
5. Meenakshi Raman, Technical Communication, Oxford University Press,2008
6. Raymond Murphy, English Grammar in Use, Cambridge University Press,4th Edition,2012.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech -IV SEM

L	T	P	C
3	0	0	3

(CS20AES401)DATASTRUCTURES USING C
(ECE, EEE, ME, CE)

Course Objectives:

- To familiarize with basic techniques of algorithm analysis.
- To familiarize Stacks, Queues using Arrays and Linked List.
- To Understand Searching and Sorting techniques.
- To learn the concepts of different types of trees and its operations.
- To familiarize with graph algorithms.

Unit I

Data Structures: Introduction to Data Structures, Time and Space Complexity, Asymptotic Notations. Stack, Stack operations, Implementation using arrays, Applications of stack, Queue, Queue operations, Implementation using arrays, various Queue Structures, Applications of queue.

Learning Outcomes:

At the end of this unit, the student will be able to

- Analyze the given algorithm to find the time and space complexities.(L4)
- Develop the applications of stack and queue using arrays.(L3)

Unit II

Linked lists: Single linked list, double linked list, Circular linked list, operations on linked lists, Applications of Linked List. Implementation of Stack using Pointers, Implementation of Queue using Pointers.

Learning Outcomes:

At the end of this unit, the student will be able to

- Implement Stack and Queues using Pointers.(L3)
- Construct the linked lists for various applications.(L4)

Unit III

Searching Techniques: Linear Search and Binary Search.

Sorting Techniques: Selection Sort, Insertion sort, Merge Sort, Quick Sort, Heap sort.

Learning Outcomes:

At the end of this unit, the student will be able to

- Select sorting technique for a given sorting.(L3)
- Construct Heap and its implementation.(L4)

Unit IV

Trees: Vocabulary and Definitions, Binary Tree, Implementation, Binary Tree Traversal, Binary Search Tree, Implementation, Heap Trees.

Learning Outcomes:

At the end of this unit, the student will be able to

- Explain the concept of a tree.(L2)
- Compare different tree structures.(L4)
- Apply Trees for indexing.(L3)

Unit V

Graph Theory: Graphs Terminology, Graph Traversals, Shortest Paths, Minimum Spanning Trees- Prims' Algorithm, Kruskal's Algorithm.

Learning Outcomes:

At the end of this unit, the student will be able to

- Recognize the importance of Graphs in solving real world problems.(L2)
- Apply various graph traversal methods to applications.(L3)
- Design a minimum cost solution for a problem using spanning trees.(L4)

Text Books:

1. Data Structures and Algorithm Analysis in C, Mark Allen Weiss,Second Edition, 2002,Pearson.
2. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein, Third Edition, 2010,PHI.
3. Data Structures and Algorithms Made Easy by Narasimha Karumanchi, 2020, Career Monk Publications.

Reference Books:

1. Fundamental of Data Structures in C, Horowitz, Sahani, Anderson-Freed, Second Edition, 2008, Universities Press.
2. Classic Data Structures, Debasis Samantha, Second Edition, 2009,PHI

Course Outcomes:

CO1: Analyze the problems using asymptotic notations.(L4)

CO2: Apply Stack, Queues and linked list to solve different applications.(L3)

CO3: Demonstrate suitable sorting techniques for the real world problem.(L4)

CO4: Implementtreestructuresindifferentpatternsofrepresentationofdata.(L3)

CO5: Analyze the given problem using graph traversal techniques.(L4)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech -IV SEM

L	T	P	C
3	0	0	3

(MA20ABS402) PROBABILITY THEORY AND STOCHASTIC PROCESSES (ECE)

Course Objectives:

- To gain the knowledge of the basic probability concepts and acquire skills in handling situations involving more than one random variable and functions of random variables.
- To understand the principles of random signals and random processes.
- To known the Spectral and temporal characteristics of Random Process.
- To be acquainted with systems involving random signals.
- To gain knowledge of standard distributions that can describe real life phenomena.

Unit I

Probability Introduced Through Sets and Relative Frequency: Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Mathematical Model of Experiments, Probability as a Relative Frequency, Joint Probability, Conditional Probability, Total Probability, Bayes' Theorem, Independent Events.

Learning Outcomes:

- Understand the fundamental concepts of probability (L1).

Unit II

Random Variable: Definition of a Random Variable, Conditions for a Function to be a Random Variable, Classifications of Random Variable, Distribution and Density functions and its properties, Distribution & Density functions: Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh, Conditional Distribution & Density functions.

Operations on Single Random Variable: Introduction, Expectation of a random variable and its Properties, Moments-moments about the origin, Central moments, Variance and Skewness, Moment generating function, characteristic function, Inequalities- Chebyshev's inequality, Markov's inequality.

Learning Outcomes:

- Understand the fundamental concepts of random variables, and conditional probability. (L1)

- Evaluate the different probability distribution and density functions. (L2)
- Apply the knowledge to the sum of random variables, central limit theorem in communication system (L2).
- Evaluate the single and multiple random variable concepts to expectation, variance and moments (L4).

Unit III

Multiple Random Variables: Vector Random Variables, Joint Distribution Function and its properties, Joint Density Function and its Properties, Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning, Interval conditioning, Central Limit Theorem, (Without Proof)-Unequal & Equal Distributions.

Operations on Multiple Random Variables: Expected Value of a Function of Random Variables, Joint Moments about the Origin, Joint Central Moments, Joint Moment Generating Function, Joint Characteristic Functions, Jointly Gaussian Random Variables: Two Random Variables case, N Random Variable case.

Learning Outcomes:

- Understand the fundamental concepts of multiple random variables, and conditional probability. (L1)
- Evaluate the Joint probability distribution and Joint density functions. (L2)
- Evaluate the multiple random variable concepts to expectation, variance and moments (L4).

Unit IV

Random Processes-Temporal Characteristics: The Random Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, joint Distribution and Joint Density Function, Independent Random Process, Stationary Random Processes, Wide-Sense Stationary, Strict-Sense Stationary.

Time Averages of a Random Process, Ergodic Theorem and Ergodic Processes, Autocorrelation Function and Its Properties, Cross-Correlation Function and its Properties, Covariance Functions, Gaussian Random Processes, Poisson Random Process.

Learning Outcomes:

- Understand and analyze continuous and discrete-time random processes (L1).
- Analyze the concepts and its properties of auto correlation, cross correlation functions (L3).

Unit V

Random Processes-Spectral Characteristics: The Power Density Spectrum and its Properties, Relationship between Power Spectrum and Autocorrelation Function, The Cross-Power Density Spectrum and its Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function.

Learning Outcomes:

- Analyze the concepts and its properties power spectral density (L3).

Course Outcomes:

After completion of the course, student will be able to

CO1: Analyze and understand the concepts of Probability.

CO2: Analyze the concept of Single Random Variable and evaluate the operations that may be performed on a single Random variable.

CO3: Analyze the concepts of Multiple Random Variable and evaluate the operations that may be performed on a multiple Random variable.

CO4: Analyze the concepts of Random Process and evaluate the Temporal characteristics of Random Processes.

CO5: Analyze the concepts of Random Process and evaluate the Spectral characteristics of Random Processes.

TEXT BOOKS:

1. Peyton Z. Peebles, "Probability, Random Variables & Random Signal Principles", 4th Edition, TMH,2002.
2. Probability Theory and Stochastic Processes-Mallikarjuna Reddy,cengage Learning.

REFERENCES:

1. Simon Haykin, "Communication Systems", 3rd Edition, Wiley,2010.

Athanasios Papoulis and S. Unnikrishna Pillai, "Probability, Random Variables and Stochastic Processes", 4th Edition, PHI,2002

2. Henry Stark and John W.Woods, "Probability and Random Processes with Application to Signal Processing," 3rd Edition, Pearson Education,2002.
3. George R. Cooper, Clave D. MC Gillem, "Probability Methods of Signal and System Analysis," 3rd Edition, Oxford,1999.
4. Dr. A. Singaravelu, Probability and Statistics, Meenakshi Agency, 2017

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech -IV SEM

L	T	P	C
3	0	0	3

(EC20APC401) ANALOG COMMUNICATIONS
(ECE)

Course Objectives

- To introduce various modulation and demodulation techniques of Analog communication system.
- To analyze different parameters of Analog communication techniques.
- Know Noise Figure in AM & FM receiver systems.
- Understand Function of various stages of AM, FM transmitters and Know Characteristics of AM &FM receivers.
- Understand the concepts of information theory.

Unit I

Introduction: Elements of communication systems, Information, Messages and Signals, Modulation, Modulation Methods, Modulation Benefits and Applications.

Amplitude Modulation & Demodulation: Baseband and carrier communication, Amplitude Modulation (AM), Rectifier detector, Envelope detector, Double sideband suppressed carrier (DSB-SC) modulation & its demodulation, Switching modulators, Ring modulator, Balanced modulator, Frequency mixer, sideband and carrier power of AM, Generation of AM signals, Single sideband (SSB) transmission, Time domain representation of SSB signals & their demodulation schemes (with carrier, and suppressed carrier), Generation of SSB signals, Vestigial sideband (VSB) modulator & demodulator, Frequency division multiplexing (FDM).

Learning Outcomes:

- Understand the concepts of Amplitude Modulation and demodulation techniques. (L1)
- Apply the concepts to solve problems in Amplitude modulation Schemes. (L2)
- Analyse frequency spectra of modulated signals used in various amplitude modulation (L3)
- Compare the Performance of different amplitude modulation techniques. (L4)

Unit II

Angle Modulation & Demodulation: Concept of instantaneous frequency, Generalized concept of angle modulation, Bandwidth of angle modulated waves – Narrow band frequency modulation (NBFM) and Wide band FM (WBFM), Phase modulation, Verification of Frequency modulation bandwidth relationship, Features of angle modulation, Generation of FM waves-Indirect method, Direct generation; Demodulation of FM, Band pass limiter, Practical frequency demodulators, Small error analysis, Pre-emphasis, & De-emphasis filters, FM Capture Effect.

Learning Outcomes:

- Understand the concepts of Angle modulation and demodulation techniques. (L1)
- Understand importance Pre-emphasis & de-emphasis circuit in FM modulation. (L1)
- Apply the concepts to solve problems in Angle modulation Schemes. (L2)
- Analyse frequency spectra of modulated signals used in various angle modulation (L3)

Unit III

Noise in Communication Systems: Thermal noise, Time domain representation of narrowband noise, filtered white noise, Signal to noise ratio & probability of error, Noise equivalent bandwidth, Effective noise temperature, and Noise figure, Baseband systems with channel noise, Performance analysis (i.e. finding SNR expression) of AM, DSB-SC, SSB-SC, FM, PM in the presence of noise.

Learning Outcomes:

- Understand different types of noise and sources that effect the performance of the communication system. [L1]
- Analyse performance of Analog communication system in the presence of noise. [L3]
- Compare the performance of communication system by evaluating figure of merit for different schemes of modulation. [L4]

Unit IV

Analog Pulse Modulation Schemes: Pulse amplitude modulation – Natural sampling, flat top sampling and Pulse amplitude modulation (PAM) & demodulation, Pulse-Time Modulation – Pulse Duration and Pulse Position modulations, and demodulation schemes, Illustrative Problems.

Radio Receiver: Working principle of Super heterodyne AM and FM Receivers along

with suitable block diagrams, Sensitivity, Selectivity and fidelity.

Learning Outcomes:

- Understand the concepts of Analog Pulse Modulation and Demodulation techniques. [L1]
- Understand the concepts of AM and FM receivers. [L1]
- Apply the concepts to solve problems in Analog pulse modulation schemes. [L2]
- Analyse the performance of AM and FM receivers.[L3]
- Compare the Performance of different Analog Pulse Modulation techniques.[L4]

Unit V

Information Theory: Introduction, Information and Entropy, and its properties, source coding Theorem, Huffman coding, Discrete Memoryless channels, Mutual Information, and its properties, Channel capacity, Channel coding Theorem, differential entropy and mutual information, Information capacity theorem, implication of information capacity theorem, Rate Distortion, Illustrative problems.

Learning Outcomes:

- Understand the concepts of information theory and different coding techniques.[L1]
- Analyse Binary symmetric channel. [L3]
- Design the channel performance using information theory. [L4]
- Derive equation for Entropy, Mutual information and channel capacity for all types of channels. [L2]

Course Outcomes

After completion of the course, student will be able to

CO1: Understand the concepts of various Amplitude, Angle and Pulse Modulation schemes.

CO2: Apply the concepts to solve problems in Analog and pulse modulation schemes. (L2)

CO3: Analysis of Analog communication system in the presence of noise. (L3)

CO4: Compare and contrast design issues, advantages, disadvantages and limitations of various modulation schemes in Analog communication systems.(L4)

CO5: Solve basic communication problems & calculate information rate and channel capacity of a discrete communication channel (L5)

TEXT BOOKS:

1. John Wiley & Sons Simon Haykin, “Communication Systems,”,3rd Edition, 2010.

2. Dr.Sanjay Sharma, Communication systems, S.K.Katari & Sons 6th Edition, 2013.

REFERENCES:

1. Bruce Carlson, & Paul B. Crilly, “Communication Systems – An Introduction to Signals & Noise in Electrical Communication”, McGraw-Hill International Edition, 5th Edition, 2010
2. J. G. Proakis, M Salehi, Gerhard Bauch, “Modern Communication SystemsUsingMATLAB,” CENGAGE, 3rd Edition, 2013.
3. P.Lathi, “Modern Digital and Analog Communication Systems,” 3rd Edition, Oxford Univ. press, 2006

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech -IV SEM

L	T	P	C
3	0	0	3

(EC20APC402)ELECTROMAGNETIC WAVES AND TRANSMISSION LINES (ECE)

Course Objectives:

The main objectives of this course are to understand

- To introduce fundamentals of static and time varying electromagnetic fields.
- To teach problem solving in Electromagnetic fields using vector calculus.
- To demonstrate the concepts of Static and time varying Maxwell equations.
- To demonstrate Wave equations in different media for normal and oblique incidence.
- To introduce various concepts of transmission lines and their practical applications.

Unit I

Electrostatics: Review of Co-ordinate Systems & Vector Calculus , Coulomb's Law, Electric Field Intensity – Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations Between E and V, Maxwell's Two Equations for Electrostatic Fields, Electric Dipole, Energy Density, Convection and Conduction Currents, Dielectric Constant, Linear, Isotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations, Capacitance – Parallel Plate, Coaxial, Spherical Capacitors.

Learning Outcomes:

- Understand basic laws of static electric field. (L1)
- Derive the Maxwell's equations for electrostatic fields. (L3)
- Solve problems applying laws of electrostatics. (L3)

Unit II

Magneto Statics: Biot-Savart Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell'sTwo Equations for Magneto static Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law, Inductances and Magnetic Energy.

Learning Outcomes:

- Understand basic laws of static magnetic field. (L1)
- Derive the Maxwell's equations for magnetic fields. (L3)
- Solve problems applying laws of magneto statics. (L3)

Unit III

Maxwell's Equations (Time Varying Fields): Faraday's Law and Transformer E.M.F, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's equations for time varying fields, Maxwell's Equations in Different Final Forms and Word Statements, Boundary Conditions of Electromagnetic fields: Dielectric-Dielectric and Dielectric-Conductor Interfaces.

Learning Outcomes:

- Derive the Maxwell's equations for electromagnetic fields. (L3)
- Apply the boundary conditions of electromagnetic fields at the interface of different media. (L2).

Unit IV

EM Wave Characteristics: Waves – Definition, Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane, All Relation between E & H Sinusoidal variations, Wave Propagation in Lossless and Conducting Media, Conductors & Dielectrics – Characterization, Wave Propagation in Good Conductors and Good Dielectrics.

Reflection and Refraction of Plane Waves – Normal and Oblique Incidences, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance, Poynting Vector, and Poynting Theorem.

Learning Outcomes:

- Understand concept of wave propagation through the Maxwell's equations. (L1)
- Derive wave equations for different media (L3)
- Understand principles of reflections and refraction for different incidences. (L1)
- State concept of power flow using Poynting vector. (L2)

Unit V

Transmission Lines: Types, Transmission line parameters, Transmission line equivalent circuit, Transmission line equations, input impedance, standing wave ratio, Phase and Group Velocities, Infinite Line, Lossless lines, distortion less lines, Transmission of finite length - half wave, quarter wave transmission line, Smith chart, graphical analysis of transmission lines using Smith chart, Illustrative Problems.

Learning Outcomes:

- Understand the principles of transmission lines and concept of smith chart.(L1)
- Derive the input impedance of transmission line.(L3)
- Finding the line parameters through problem solving.(L4)
- Study the applications of different lengths of transmission lines.(L2)

Course Outcomes:

At the end of this course the student can able to

CO1: Understanding the basic laws and applications of electromagnetic fields (L2)

CO2: Evaluate the problems related to electromagnetic fields (L3)

CO3: Analyze Maxwell equations for static and time varying fields (L3)

CO4: Analyze electric and magnetic fields at the interface of different media (L3)

CO5: Evaluate electric and magnetic fields and calculates different angles (L5)

CO6: Evaluate transmission lines with equivalent circuit and their characteristics with various lengths (L2)

TEXT BOOKS:

1. Matthew N.O. Sadiku, "Elements of Electromagnetics", 4th edition. Oxford Univ. Press,2008.
2. E.C. Jordan and K.G. Balmain, "Electromagnetic Waves and Radiating Systems", 2nd
3. Edition, PHI, 2000

REFERENCES:

1. John D. Krauss, "Electromagnetics", 4th Edition,McGraw- Hill publication1999.
2. William H. Hayt Jr. and John A. Buck, "Engineering Electromagnetics", 7th edition.,TMH, 2006.
3. Electromagnetics, Schaum's outline series, 2nd Edition, Tata McGraw-Hill publications,2006.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech -IV SEM

L	T	P	C
3	0	0	3

(EC20APC403) LINEAR & DIGITAL INTEGRATED CIRCUITS AND APPLICATIONS (ECE)

Course Objectives:

- To introduce the basic building blocks of linear integrated circuits.
- To teach the linear and non-linear applications of operational amplifiers.
- To introduce the theory and applications of PLL.
- To introduce the concepts of waveform generation and introduce some special function ICs.
- Exposure to digital IC's
- To create combinational circuits &sequential circuits using HDLs.

Unit I

OPERATIONAL AMPLIFIER: Introduction, Classification of IC's, basic information and features of Op-Amp IC741, the ideal Operational amplifier, Op-Amp internal circuit, characteristics - DC and AC.

LINEAR APPLICATIONS OF OP-AMP: Inverting and non-inverting amplifiers, adder, subtractor, Instrumentation amplifier, AC amplifier, V to I and I to V converters, Integrator and differentiator.

Learning Outcomes:

- Understand the basic building blocks of Op-Amps & specialized ICs. (L2)
- Understand the DC and AC performance characteristics of Op-Amps. (L2)
- Apply knowledge on linear applications of Op-Amps. (L3)

Unit II

NON-LINEAR APPLICATIONS OF OP-AMP: Sample and Hold circuit, Log and Antilog amplifier, multiplier and divider, Comparators, Schmitt trigger, Multivibrators, Triangular and Square waveform generators, Oscillators

TIMER AND PHASE LOCKED LOOPS: Introduction to IC 555 timer, monostable and astable operations and applications, Schmitt trigger, PLL - introduction, basic principle, phase detector/comparator, voltage controlled oscillator (IC 566), applications of PLL.

Learning Outcomes:

- Understand the specialized ICs such as VCO and PLL. (L2)
- Apply knowledge on non-linear applications of Op-Amps. (L3)
- Analyze and create various circuits using Op-Amps and 555 timer. (L5)

UNIT III

VOLTAGE REGULATOR: Introduction, Series Op-Amp regulator, IC Voltage Regulators, IC 723 general purpose regulators, Switching Regulator.

D to A & A to D CONVERTERS: Introduction, basic DAC techniques - weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, A to D converters - parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC, DAC and ADC Specifications.

Learning Outcomes:

- Apply the specialized ICs of Voltage Regulator. (L3)
- Analyze the operation & characteristics of data converters. (L4)

Unit IV

HARDWARE DESCRIPTION LANGUAGE: Introduction to Verilog - structural Specification of logic circuits, behavioural specification of logic circuits, hierarchical Verilog Code, Verilog for combinational circuits - conditional operator, if-else statement, case statement, for loop; using storage elements with CAD tools-using Verilog constructs for storage elements, flip-flop with clear capability, using Verilog constructs for registers and counters.

Learning Outcomes:

- Understand the concepts of Verilog Language. (L1)
- Understand and analyze the syntax of HDL. (L3)

Unit V

COMBINATIONAL LOGIC CIRCUITS: Logic gates using 74XX ICs, Adders, Subtractors, Four-bit parallel adder, Comparator, Encoder, Priority Encoder, Decoder, BCD-to-7- segment decoder, Multiplexer, Demultiplexer. Verilog/VHDL models for the above standard building block ICs.

SEQUNTIAL CIRCUITS USING ICs: Latches, Flip Flops, Review of design of State machines; Standard building block ICs for Shift registers, parallel / serial conversion, shift register counters, Ring counters; Johnson counters, LFSR counter; Verilog/VHDL models for the above standard building block ICs.

Learning Outcomes:

- Design of Combinational logic circuits using Verilog. (L4)
- Design of Sequential logic circuits using Verilog. (L4)

Course Outcomes:

CO1: List out the characteristics of Linear and Digital ICs.

CO2: Discuss the various applications of linear & Digital ICs.

CO3: Solve the application based problems related to linear and digital ICs.

CO4: Analyze various applications based circuits of linear and digital ICs.

CO5: Design the circuits using either linear ICs or Digital ICs from the given specifications.

CO6: Develop digital circuits using HDL.

TEXT BOOKS:

1. D. Roy Choudhury, Shail B. Jain, “Linear Integrated Circuit”, 4thedition (2012), New Age International Pvt.Ltd., New Delhi, India.
2. Ramakant A. Gayakwad, “OP-AMP and Linear Integrated Circuits”, 4thedition (2012), Prentice Hall / Pearson Education, New Delhi.
3. John F.Wakerly,“ Digital Design Principles and Practices” 4thedition, Pearson Education., 2009.

REFERENCE BOOKS:

1. Sergio Franco (1997), Design with operational amplifiers and analog integrated circuits, McGraw Hill, New Delhi.
2. Gray, Meyer (1995), Analysis and Design of Analog Integrated Circuits, Wiley International, New Delhi.
3. M.Morris Mano and Michael D. Cilleti., “Digital Logic Design” 4th edition Pearson Education., 2013
4. J. Bhasker, “A VHDL PRIMER” 3rd edition Eastern Economy Edition, PHI Learning, 2010.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech -IV SEM

L	T	P	C
0	0	3	1.5

(EC20APC404) ANALOG COMMUNICATIONS LABORATORY (ECE)

Course Objectives:

- To familiarize the students with basic analog communication systems. Integrate theory with experiments so that the students appreciate the knowledge gained from the theory course.
- Understand all types of analog modulation / demodulation principles.
- Substantiate pulse modulation techniques.
- To design and implement different modulation and demodulation techniques.

LIST OF EXPERIMENTS (All experiments are to be conducted)

1. Amplitude Modulation and Demodulation
2. Frequency Modulation and Demodulation
3. (a).Characteristics of Mixer

(b).Pre-emphasis & De-emphasis.

4. Pulse Amplitude Modulation & Demodulation.
5. Pulse Width Modulation &Demodulation.
6. Pulse Position Modulation & Demodulation
7. Measurement of Half power Beam width and gain of half wave dipole antenna.
8. Simulate AM and FM signals and find power spectrum of each signal. Plot the graphs.
9. Simulate PAM and PWM signals and find power spectrum of each signal. Plot the graphs.
10. Generate a complex Gaussian noise (with zero mean unit variance). And pass through an LTI system. Find the power spectrum density of the noise signal available at the output of LTI system.
11. Make use of AM signal from experiment no. 9 add Gaussian noise (with zero mean and unity variance) to the signal. Extract the information bearing signal using suitable system.
12. Simulate Huffman coding.

Course Outcomes:

After the completion of the course students able to

CO1: Understand different analog modulation techniques &Radio receiver characteristics.(L1)

CO2: Analyze different analog modulation techniques. (L3)

CO3: Design and implement different modulation and demodulation techniques.(L4)

CO4: Observe the performance of system by plotting graphs & Measure radio receiver characteristics. (L2)

CO5: Simulate all digital modulation and demodulation techniques. (L5)

Equipment & Software Required:

1. Computer Systems with latest specifications
2. Connected in LAN (Optional)
3. Operating system (Windows XP)
4. Simulations software (MATLAB)

Equipment:

1. Regulated Power Supply (0-30) V.
2. CROs (0-20) MHz.
3. Function Generators (0-3) MHz.
4. RF Signal Generators (0-1000) MHz.
5. Multimeters.
6. Required Electronic components (active and passive) for the design of experiments from 1 -7.
7. RF power meter frequency range 0 – 1000MHz
8. Spectrum Analyzer.

Note: Conduct experiments (8-12) using MATLAB software.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech -IV SEM

L	T	P	C
0	0	3	1.5

(CS20AES402) DATA STRUCTURES USING C LAB
(ECE, EEE, ME, CE)

Course Objectives:

- To strengthen the ability to identify and apply the suitable data structure for the given real-world problem.

Tasks:

1. Demonstrate recursive algorithms with examples.
2. Develop a program to perform operations of a Stack and Queue using arrays.
3. Implement and perform different operations on Single, Double and Circular Linked Lists.
4. Develop a program to perform operations of Stack and Queue using Linked Lists.
5. Develop a program to implement Stack applications.
6. Implement Circular Queues.
7. Implement various Searching techniques.
8. Develop programs for different Sorting techniques.
9. Develop a program to represent a Tree Data Structure.
10. Develop a program to demonstrate operations on Binary Search Tree.
11. Demonstrate Graph Traversal Techniques.

Text Books:

1. Data Structures and Algorithm Analysis in C, Mark Allen Weiss, Second Edition, 2002,Pearson.
2. IntroductiontoAlgorithms, ThomasH.Cormen, CharlesE.Leiserson, RonaldL. Rivest, Clifford Stein, Third Edition, 2010, PHI.
3. Data Structures and Algorithms Made Easy by Narasimha Karumanchi, 2020, Career Monk Publications.

Course Outcomes:

CO1: Demonstrate the concept of Recursion for solving a problem.(L4)

CO2: Choose and implement linear data structure to solve problems.(L3)

CO3: Develop programs for searching and sorting algorithms.(L3)

CO4: Select and implement suitable non linear data structure for solving a problem. (L3)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech -IV SEM

L	T	P	C
0	0	3	1.5

(EC20APC405) LINEAR & DIGITAL INTEGRATED CIRCUITS AND APPLICATIONS LAB (ECE)

Course Objectives:

- The objective of the course is to learn design, testing and characterizing of circuit behavior with digital and analog ICs.

List of Experiments:

Part A: Hardware

Linear IC Experiments: (Students has to perform atleast 6 experiments.)

1. OP AMP Applications – Adder, Subtractor, Comparators.
2. Integrator and Differentiator Circuits using IC 741.
3. IC 741 Waveform Generators – Sine, Square wave and Triangular waves.
4. IC 555 Timer – Monostable and Astable Multivibrator Circuits.
5. Data converters
   i. DAC circuits – R-2R and ladder type.
   ii. Successive approximation type ADC.
6. Schmitt Trigger Circuits – using IC 741
7. IC 565 – PLL Applications.
8. Voltage Regulator using IC 723, Three Terminal Voltage Regulators – 7805, 7809, 7912.

PART B: Software

Digital IC Applications: (Students has to perform atleast 6 experiments.)

1. 3-8 line decoder.
2. 4-bit comparator.
3. 8x1 Multiplexer and 2 to 4 Demultiplexer.
4. BCD to 7-segment decoder.
5. D Flip Flop, JK Flip Flops.
6. Decade counter.
7. Up/Down Counter.
8. Universal shift registers.

Equipment required for Laboratory:

Software:

1. Xilinx ISE
2. Computer Systems with required specifications

Hardware:

1. Regulated Power supplies
2. Analog/Digital Storage Oscilloscopes
3. Analog/Digital Function Generators
4. Digital Multimeters
5. Decade Resistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital)
8. Voltmeters (Analog or Digital)
9. Active & Passive Electronic Components
10. Bread Boards
11. Connecting Wires
12. CRO Probes

Course Outcomes:

CO1: Understand the pin configuration of each linear/ digital IC and its functional diagram.

CO2: Conduct the experiment and obtain the expected results.

CO3: Analyze the given circuit/designed circuit and verify the practical observations with the analyzed results.

CO4: Design the circuits for the given specifications using linear and digital ICs.

CO5: Acquaintance with lab equipment about the operation and its use.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech -IV SEM

L	T	P	C
1	0	2	2

(EG20ASC301) SOFT SKILLS
(ECE)

Course Objectives:

- To encourage all round development of the students by focusing on soft skills
- To make the students aware of critical thinking and problem-solving skills
- To develop leadership skills and organizational skills through group activities
- To function effectively with heterogeneous teams

UNIT I

Communication Skills:

Introduction, meaning, significance of soft skills – definition, significance, types of communication skills - Intra-personal & Inter-personal skills - Verbal and Non-verbal Communication

Activities:

Intrapersonal Skills- Narration about self- strengths and weaknesses- clarity of thought – self- expression – articulating with felicity

(The facilitator can guide the participants before the activity citing examples from the lives of the great, anecdotes and literary sources)

Interpersonal Skills- Group Discussion – Debate – Team Tasks - Book and film Reviews by groups - Group leader presenting views (non- controversial and secular) on contemporary issues or on a given topic.

Verbal Communication- Oral Presentations- Extempore- brief addresses and speeches- convincing- negotiating- agreeing and disagreeing with professional grace.

Non-verbal communication – Public speaking – Mock interviews – presentations with an objective to identify non- verbal clues and remedy the lapses on observation

Learning Outcomes

At the end of the module, the learners will be able to

- Acquire attributes regarding communication skills
- Enhance their intrapersonal and interpersonal skills
- Improve LSRW Skills

UNIT II

Critical Thinking

Active Listening – Observation – Curiosity – Introspection – Analytical Thinking – Open-mindedness – Creative Thinking

Activities:

Gathering information and statistics on a topic - sequencing – assorting – reasoning – critiquing issues –facing the problem – finding the root cause - seeking viable solution – judging with rationale – evaluating the views of others - Case Study, Story Analysis

Learning Outcomes

At the end of the module, the learners will be able to

- Enhance their LSRW skills
- Be able to get innovative and creative skills
- Acquire logical and analytical thinking capability
- Develop their cognitive level

UNIT III

Problem Solving & Decision Making

Meaning & features of Problem Solving – Managing Conflict – Conflict resolution – Methods of decision making – Effective decision making in teams – Methods & Styles

Activities:

Facing problem which involves conflict of interests, choice and views – formulating the problem – exploring solutions by proper reasoning – Discussion on important professional, career and organizational decisions and initiate debate on the appropriateness of the decision.

Case Study & Group Discussion

Learning Outcomes

At the end of the module, the learners will be able to

- Solve the problems logically
- Make decisions effectively
- Face the problems positively with confidence

UNIT IV

Emotional Intelligence & Stress Management

Managing Emotions – Thinking before Reacting – Empathy for Others – Self-awareness – SWOC analysis – Stress factors – Controlling Stress – Tips

Activities:

Providing situations for the participants to express emotions such as happiness, enthusiasm, gratitude, sympathy, and confidence, compassion in the form of written or oral presentations.

Providing opportunities for the participants to narrate certain crisis and stress –ridden situations caused by failure, anger, jealousy, resentment and frustration in the form of

written and oral presentation, Organizing Debates

Learning Outcomes

At the end of the module, the learners will be able to

Control their emotions and stress levels

Be emotionally balanced

Respond instead of reacting in their professional and academic life

UNIT – V

Leadership Skills

Team-Building – Decision-Making – Accountability – Planning – Public Speaking – Motivation – Risk-Taking - Time Management

Activities:

Forming group with a consensus among the participants- choosing a leader- encouraging the group members to express views on leadership- democratic attitude- sense of sacrifice – sense of adjustment – vision – accommodating nature- eliciting views on successes and failures of leadership using the past knowledge and experience of the participants, Public Speaking, Activities on Time Management, Motivation, Decision Making, Group discussion etc.

Learning Outcomes

At the end of the module, the learners will be able to

- Learn the aspects of team building
- Understand the characteristics of effective leadership skills
- Improve spontaneous communication

Course Outcomes:

By the end of the program students should be able to

CO1: Memorize various elements of effective communicative skills

CO2: Interpret people at the emotional level through emotional intelligence

CO3: Apply critical thinking skills in problem solving

CO4: Analyze the needs of an organization for team building

CO5: Judge the situation and take necessary decisions as a leader

CO6: Develop social and work-life skills as well as personal and emotional well being

Textbooks:

1. Barun Mitra, Personality Development and Soft Skills, English,Oxford University Press,2012
2. Dr Shikha Kapoor,Personality Development and Soft Skills: Preparing for Tomorrow,International Publishing House; 0 edition (February 28, 2018)

Reference Books:

1. Prashant Sharma ,Soft skills: Personality Development for Life Success, BPB publications, 2018.
2. DR.K.Alex ,Soft Skills, S.Chand Publications.
3. Gajendra Singh Chauhan &Sangeetha Sharma, Soft Skills: An Integrated Approach to Maximise Personality, Published by Wiley
4. Avni. Sharma ,Communication Skills and Soft Skills Hardcover, ,Publisher: Yking books
5. Renu Shorey,SOFT SKILLS for a BIG IMPACT, Publisher: Notion Press
6. Dr. Rajiv Kumar Jain & Dr. UshaLife Skills(a guide to steer life),Publisher: Vayu Education of India
7. Raymond.L.Gorden,Basic Interviewing Skills, Waveland publications

Online Learning Resources:

1. https://youtu.be/DUlsNJtg2L8?list=PLLy_2iUCG87CQhELCytvXh0E_y-bOO1_q
2. https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHlsQFwJZel_j2PUy0pwjVUgj7KlJ
3. https://youtu.be/-Y-R9hDl7lU
4. https://youtu.be/gkLsn4ddmTs
5. https://youtu.be/2bf9K2rRWwo
6. https://youtu.be/FchfE3c2jzc

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech -IV SEM

L	T	P	C
2	0	0	0

(BA20AMC201/ BA20AHS201) UNIVERSAL HUMAN VALUES

Course Objectives:

The objective of the course is four fold:

- Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
- Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence.
- Strengthening of self-reflection.
- Development of commitment and courage to act.

Unit I:

Course Introduction-Need, Basic Guidelines, Content and Process for Value Education

- Purpose and motivation for the course, recapitulation from Universal Human Values-I.
- Self-Exploration–what is it? Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration.
- Continuous Happiness and Prosperity- A look at basic Human Aspirations.
- Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority.
- Understanding Happiness and Prosperity correctly-A critical appraisal of the current scenario.
- Methods to fulfil the above human aspirations: understanding and living in harmony at various levels.
- Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co- existence) rather than as arbitrariness in choice based on liking-disliking.

Unit -II: Understanding Harmony in the Human Being - Harmony in Myself!

- Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
- Understanding the needs of Self ('I') and 'Body' - happiness and physical facility.
- Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer).
- Understanding the characteristics and activities of 'I' and harmony in 'I'.

- Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail.
- programs to ensure Sanyam and Health.
- Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease.

Unit III:

Understanding Harmony in the Family and Society- Harmony in Human - Human Relationship

- Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship.
- Understanding the meaning of Trust; Difference between intention and competence.
- Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship.
- Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals. Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.
- Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios, elicit examples from students' lives.

Unit IV:

Understanding Harmony in the Nature and Existence -Whole existence as Co-existence

- Understanding the harmony in the Nature.
- Interconnectedness and mutual fulfilment among the four orders of nature recyclability and self-regulation in nature.
- Understanding Existence as Co-existence of mutually interacting units in all pervasive Space.
- Holistic perception of harmony at all levels of existence. Include practice sessions to discuss human being as cause of imbalance in nature (film"Home" can be used), pollution, depletion of resources and role of technology etc.

Unit V:

Implications of the above Holistic Understanding of Harmony on Professional Ethics

Natural acceptance of human values.

- Definitiveness of Ethical Human Conduct.
- Basis for Humanistic Education, Humanistic Constitution and Humanistic universal order
- Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems.
- Case studies of typical holistic technologies, management models and production systems
- Strategy for transition from the present state to Universal Human Order:
    - At the level of individual: as socially and ecologically responsible engineers, technologists and managers.
    - At the level of society: as mutually enriching institutions and organizations
- Sum up: Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions

  E.g., To discuss the conduct as an engineer or scientist etc.

Text Books:

1. R R Gaur, R Asthana, G P Bagaria, "A Foundation Course in Human Values and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1.
2. R R Gaur, R Asthana, G P Bagaria, "Teachers' Manual for A Foundation Course in Human Values and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi,2019. ISBN 978-93-87034-53-2.

Reference Books:

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amar kantak, 1999.
2. A. N. Tripathi, "Human Values", New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. Mohandas Karamchand Gandhi "The Story of My Experiments with Truth"
5. E. FSchumacher. "Small is Beautiful".
6. Slow is Beautiful –Cecile Andrews.
7. J C Kumarappa "Economy of Permanence".
8. Pandit Sunderlal "Bharat Mein Angreji Raj".
9. Dharampal, "Rediscovering India".
10. Mohandas K. Gandhi, "Hind Swaraj or Indian Home Rule".
11. India Wins Freedom - Maulana Abdul Kalam Azad.
12. Vivekananda - Romain Rolland (English).
13. Gandhi - Romain Rolland (English).

Course Outcomes:

By the end of the course,

CO1: Understanding the value of education to become more aware of themselves, and their surroundings (family, society, nature). (L2)

CO2: Utilize the concepts of human being-harmony in myself become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. (L3)

CO3: Understanding the concepts of society-harmony in human for better critical ability. (L2)

CO4: Understanding the human values, human relationship and human society to become sensitive to their commitment. (L2)

CO5: Apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction. (L3)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

Karakambadi Road, TIRUPATI – 517507

B.Tech- IV SEM

L	T	P	C
2	0	0	0

(MA20AMC401)ENGINEERING MATHEMATICS

(Common to All Branches of LE Students)

Course Objectives:

- This course will illuminate the students in the concepts of calculus and linear algebra.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various realworld problems and their applications.

UNIT -1

Matrices

Solving system of homogeneous and non homogeneous linear equations. Eigen values and Eigenvectors and their properties, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem,

Learning Outcomes:

At the end of this unit, the student will be able to

- Solving systems of linear equations, using technology to facilitate row reduction determine the rank, eigen values and eigenvectors (L3).
- Identify special properties of a matrix, such as positive definite, etc., and use this information to facilitate the calculation of matrix characteristics (L3).

UNIT -2

Mean Value Theorems

Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's andMaclaurin theorems with remainders (without proof) related problems.

Learning Outcomes:

At the end of this unit, the student will be able to

- Translate the given function as series of Taylor's and Maclaurin's with remainders (L3)

Analyze the behaviour of functions by using mean value theorems (L3)

UNIT 3

Linear differential equations of higher order

Definitions, complete solution, operator D, rules for finding complimentary function, inverse operator, rules for finding particular integral, method of variation of parameters, Applications to L-C-R Circuit problems.

Learning Outcomes:

At the end of this unit, the student will be able to

- Identify the essential characteristics of linear differential equations with constant coefficients (L3)
- Solve the linear differential equations with constant coefficients by appropriate method (L3)

UNIT 4

Multivariable Calculus

Partial derivatives, total derivatives, chain rule, change of variables, Jacobian, maxima and minima of functions of two variables, method of Lagrange multipliers.

Learning Outcomes:

At the end of this unit, the student will be able to

- Find partial derivatives numerically and symbolically and use them to analyze and interpret the way a function varies. (L3)
- Acquire the Knowledge maxima and minima of functions of several variable (L1)
- Utilize Jacobian of a coordinate transformation to deal with the problems in change of variables (L3)

UNIT -5

Vector Calculus

Vector differentiation

Scalar and vector point functions, vector operator del, del applies to scalar point functions-Gradient, del applied to vector point functions-Divergence, Curl and their related properties.

Vector integration

Line integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and applications of these theorems.

Learning Outcomes:

At the end of this unit, the student will be able to •

- Find the work done in moving a particle along the path over a force field (L4)

- Evaluate the rates of fluid flow along and across curves (L4) •
- Apply Green's, Stokes and Divergence theorem in evaluation of double and triple integrals (L3)

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.

2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.

Reference Books:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.

2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.

3. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 2011.

4. B. V. Ramana, Higher Engineering Mathematics, McGraw Hill Education

5. H. k Das, Er. RajnishVerma, Higher Engineering Mathematics, S. Chand.

6. N. Bali, M. Goyal, C. Watkins, Advanced Engineering Mathematics, Infinity Science Press.

Course Outcomes:

At the end of the course, the student will be able to

- Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)
- Utilize mean value theorems to real life problems (L3)
- Solve the differential equations related to various engineering fields (L6) •
- Apply multiple integrals to find the area and volumes for different functions. (L3)
- Estimate the work done against a field, circulation and flux using vector calculus (L6)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

	L	T	P	C
B. Tech- V Sem	3	0	0	3

(EC20APC501) ANTENNAS AND WAVE PROPAGATION

Course Objectives:

1. To introduce radiation mechanism and basic characteristics of antennas.
2. To discuss various antennas which are operated in VHF & UHF frequency range
3. To introduce design concepts of various types of antennas including micro-strip antenna & Lens antenna.
4. To explain the concept of antenna arrays and measurement of antenna parameters.
5. To demonstrate various modes of EM wave propagation.

UNIT-I

Antenna Basics, Monopole & Dipole antennas: Definition of antenna , Radiation mechanism- single wire, two wire, dipole, Basic antenna parameters- patterns, Main lobe and Side lobes, Beam widths, Beam area, Radiation Intensity, Beam Efficiency, Directivity, Gain & Resolution, Antenna Apertures, Effective height & length, Antenna impedance, Front–to-back ratio, Antenna theorems, Radiation from Monopole, Small Electric Dipole, Half wave Dipole Antennas – Current Distributions, Field Components, Radiated power, Radiation Resistance, Illustrative problems.

Learning Outcomes:

- Understand radiation mechanism and basic antenna characteristics. (L1)
- Compute radiation intensity, gain and directivity of antennas. (L2)

UNIT-II

VHF, UHF and Microwave Antennas - I:Loop Antennas - Introduction, Radiation Resistances and Directives of small and large loops, Arrays with Parasitic Elements - Yagi - Uda Arrays, Folded Dipoles & their characteristics. Helical Antennas- Helical Geometry, Helix modes, Practical Design considerations for Monofilar Helical Antenna in Axial and Normal Modes. Horn Antennas- Types, Fermat's Principle, Optimum Horns, Design considerations of Pyramidal Horns, Illustrative Problems.

Learning Outcomes:

- Derive expressions for radiation resistance, directivity of Loop antennas(L3)
- Obtain radiation pattern of various array antennas. (L2)

UNIT-III

VHF, UHF and Microwave Antennas - II: Micro strip Antennas- Introduction, features, advantages and limitations, Rectangular patch antennas- Geometry and parameters, characteristics of Micro strip antennas, reflector antennas - Introduction, Flat sheet and corner reflectors, parabola reflectors- geometry, pattern characteristics, Feed Methods, Reflector Types - Related Features, Lens Antennas - Geometry of Non-metallic Dielectric Lenses, Zoning, Tolerances, Applications, Illustrative Problems.

Learning Outcomes:

- Understand basic principles of Micro strip Antennas (L2)
- Describe feeding methods for micro-strip antennas. (L2)

UNIT-IV

Antenna Arrays: Arrays of 2 Isotropic sources- Different cases, Principle of Pattern Multiplication, Uniform Linear Arrays – Broadside Arrays, End-fire Arrays, General considerations and Binomial Arrays, Illustrative problems.

Antenna Measurements: Introduction, Near and Far Fields, Pattern Measurement, Directivity Measurement, Gain Measurements (by comparison, Absolute and 3-Antenna Methods).

Learning Outcomes:

- Compare radiation pattern and other antenna parameters of broad side and end fire array antennas. (L5)
- Describe the different types of Antenna Measurement (2)

UNIT-V

Wave Propagation-I: Introduction, Definitions, Categorizations and General Classifications, Different Modes of Wave Propagation ,Ray/Mode Concepts ,Ground-Wave Propagation- Introduction, Plane Earth Reflections, Space and Surface Waves, Wave Tilt, Curved Earth Reflections, Space-Wave Propagation- Introduction, Field Strength Variation with Distance and Height, Effect of Earth's Curvature, Absorption, Super refraction, M-Curves and Duct Propagation, Scattering Phenomena, Troposphere Propagation.

Wave Propagation - II: Sky-Wave Propagation -Introduction, Structure of Ionosphere, Refraction and Reflection of Sky-Waves by Ionosphere, Ray-Path, Critical-Frequency, MUF, LUF, OF, Virtual Height and Skip Distance, Relation between MUF and skip Distance, Multi-hop Propagation, illustrative problems.

Learning Outcomes:

- Understand effects of earth's magnetic field on wave propagation (L2)
- Apply the concepts to solve problems related to wave propagation (L3)

TEXT BOOKS:

1. John D. Kraus, Ronald J. Marhefka, Ahmad S. Khan, "Antennas and Wave Propagation",4th Edition, TMH, 2010.
2. Jordan E.C. and Balmain. K.G., "Electromagnetic Waves and Radiating Systems", Prentice-Hall Publications.

REFERENCES:

1. Constantine A. Balanis, "Antenna Theory-Analysis and Design", Wiley Publication,2016.
2. K.D. Prasad, "Antenna & Wave Propagation", Satya Prakash Publications, 2009.
3. Matthew N.O. Sadiku, "Principle of Electromagnetics", 4th edition, Oxford (International), 2012.

Course Outcomes:

CO1: Discuss various antenna parameters, principles of operation of basic antennas & Analyze field components of various dipole antennas.

CO2: Demonstrate the basic principles of antennas which are operated in VHF- UHF frequency range.

CO3: Demonstrate the basic principles of antennas which are operated in Microwave frequency & discuss various feeding mechanism.

CO4: Analyze radiation pattern of various antenna arrays & Evaluate the antenna parameters.

CO5: Discuss various EM wave propagation methods & Analyze mathematical aspects of wave propagation.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- V Sem

L	T	P	C
3	0	0	3

(EC20APC502) DIGITAL COMMUNICATIONS

Course Objectives:

1. To understand the key modules of digital communication systems with emphasis on digital modulation techniques.
2. To get introduced to the concept and basics of information theory and the basics of source and channel coding/decoding.
3. To prepare mathematical background for communication signal analysis.
4. To study signal flow in a digital communication system.
5. To analyze error performance of a digital communication system in presence of noise and other interferences.

UNIT- I:

Pulse Digital Modulation: Introduction, sampling process, quantization, quantization noise, encoding, Pulse-Code Modulation (PCM), Line codes, Differential encoding, Regeneration, Decoding & Filtering, Noise considerations in PCM systems, Time-Division Multiplexing (TDM), Synchronization, Delta modulation (DM)- Granular noise Slope over distortion, Differential PCM (DPCM), Processing gain, Comparison of the above systems.

Learning Outcomes:

- Understand source coding techniques & pulse modulation techniques. (L1)
- Describe and determine the performance of line codes. (L2)

UNIT- II:

Baseband Pulse Transmission: Introduction, Matched filter, Properties of Matched filter, Matched filter for rectangular pulse, Error rate due to noise, Inter-symbol Interference (ISI), Nyquist's criterion for distortion less baseband binary transmission, ideal Nyquist channel, raised cosine filter & its spectrum, Correlative coding – Duo binary & Modified duo binary signalling schemes, Partial response signalling, Baseband M-ary PAM transmission, Eye diagrams.

Learning Outcomes:

- Analyze the performance of baseband pulse transmission system. (L3)
- Describe the generation & detection of pass band modulated signals. (L2)

UNIT- III

Signal Space Analysis: Introduction, Geometric representation of signals, Gram-Schmidt orthogonalization procedure, Coherent detection of signals in noise - maximum likelihood decoder, Probability of error, Correlation receiver.

Learning Outcomes:

• Understand the concepts of signal space analysis. (L1)
• Examine the characteristics of maximum likelihood decoder. (L2)

UNIT- IV:

Passband Data Transmission: Introduction, Passband transmission model, Coherent modulation schemes- Generation and detection of binary phase shift keying (BPSK), Quadrature shift keying (QPSK), and Binary Frequency shift keying (BFSK). Analysis of probability of error for BPSK, QPSK, BFSK, M-ary PSK, Non-coherent orthogonal modulation schemes - Generation and detection of non-coherent BFSK, DPSK ,Comparison of power bandwidth requirements for all the above schemes, Illustrative Problems.

Learning Outcomes:

- Analyse the different digital modulation techniques, generation and detection, power spectra and their probability of error performance. (L3)
- Compare the power bandwidth, bit error probability for various modulation scheme. (L5)

UNIT- V

Channel Coding: Linear Block Codes, Syndrome decoding, minimum distance considerations, Cyclic codes- generator polynomial, parity check polynomial, encoder for cyclic code, calculation of syndrome, Convolutional Codes – generator polynomials, problems.

Learning Outcomes:

- Understand various error control encoding and decoding techniques. (L1)
- Apply information theory and linear algebra in source coding and channel coding. (L2)

Text Books:

1. Simon Haykin, “Communication Systems,” Wiley India Edition, 4th Edition, 2011.
2. B. P. Lathi, “Modern Digital and Analog Communication Systems,” 3rd Edition, Oxford Univ. press, 2006.

References:

1. A. Bruce Carlson, & Paul B. Crilly, “Communication Systems – An Introduction to Signals & Noise in Electrical Communication”, McGraw-Hill International Edition, 5th Edition, 2010.
2. Sham Shanmugam, “Digital and Analog Communication Systems”, Wiley-India edition, 2006.
3. Dr. Sanjay Sharma, Communication systems, S.K.Katari & Sons 6th Edition, 2013.

Course Outcomes:

CO1: Understand the elements of digital communication system, baseband pulse transmission, pass band digital modulation,

CO2: Understand the concepts of geometric representation of signals, basics of information theory and error correcting codes.

CO3: Apply the knowledge of signals and system & statistical theory to evaluate the performance of digital communication systems.

CO4: Analyze the different coding, modulation techniques, Probability of error performance of digital system.

CO5: Compare the performance of different modulation schemes& error correcting codes.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- V Sem

L	T	P	C
3	0	0	3

(EC20APC503) MICROPROCESSORS AND MICROCONTROLLERS

Course Objectives:

1. To study the architecture, pin diagram, memory organization, interrupt structure of 8086 Microprocessor.
2. To study Instruction Formats and Assembler Directives, macros and procedure, string instructions of 8086 microprocessor based ALP.
3. To study to interface 8086 with 8255, 8253, 8251, 8237, 8259 and RAM, ROM Memories.
4. To study the architecture, pin diagram, memory organization, interrupt structure, Instruction formats and addressing modes of 8051 Microcontroller.
5. To study to hardware features of timers, interrupts and serial port and also interface 8051 with Push button switches , LED, seven segment display, stepper motor & LCD.

Unit I

8086 Microprocessor- Features, Architecture, Register Organization, Flag Register, Pin Diagram, Maximum and minimum mode configuration, Memory organization, Memory Segmentation and memory banks accessing, Accessing memory locations. Interrupt structure of 8086 and Interrupt Vector Table.

Unit II

8086 Microprocessor - Instruction Formats, Addressing Modes, Instruction Set of 8086, Assembler Directives, Procedures and macros. Simple ALPs.

Unit III

8086 Microprocessor Interfacing: Semiconductor memories interfacing (RAM, ROM), Intel 8255 programmable peripheral interface, Intel timer IC 8253, Intel 8251 USART architecture and interfacing, Intel 8237 DMA controller, 8259 programmable interrupt controllers.

Unit IV

Intel 8051 Microcontroller - Architecture, Memory organization, internal RAM structure, Special Function Registers (SFRs). Addressing modes and instruction set of 8051. 8051 Assembly language programming.

Unit V

Hardware features of 8051- timers, interrupts and serial ports. 8051 Interfacing - Push button switches and LEDs, interfacing seven segment display. Interfacing stepper motor and LCD with 8051.

Text Books:

1. Microprocessors and Interfacing N. Senthil kumar, M. Saravanan S.Jeevananthan, S.K. Shah, Oxford University Press.
2. K M Bhurchandi, A K Ray, Advanced Microprocessors and Peripherals, 3rd edition, McGraw Hill Education, 2017.

References:

1. Microprocessors and Interfacing – Programming and Hardware by Douglas V Hall, SSSP Rao, Tata McGraw Hill Education Private Limited, 3rd Edition,1994.
2. Kenneth J. Ayala, The 8051 Microcontroller, 3rd edition, Cengage Learning, 2004.
3. Raj Kamal, Microcontrollers: Architecture, Programming, Interfacing and System Design, 2nd edition, Pearson, 2012.

Course Outcomes:

CO1: Demonstrate ability to understand the architecture of 8086 microprocessor.

CO2: Demonstrate ability to develop 8086 assemble language programming using assembly language programming in MASM/TASM.

CO3: Demonstrate ability to describe interfacing of peripheral devices with 8086

CO4: Demonstrate ability to understand the architecture and addressing modes of 8051 microcontroller.

CO5: Demonstrate ability to understand the hardware features of 8051 and interfacing with pushbutton switches, LED, LCD, Stepper motor, Seven Segment Display., etc.

SRIVENKATESWARACOLLEGEOFENGINEERING

(Autonomous)

B.Tech- V Sem

L	T	P	C
3	0	0	3

(CE20AOE502)Principles of Waste Management

Course Objectives:

- Understanding of problems posed by various types of solid waste
- Categorize various solid and hazardous waste
- Obtain knowledge about various techniques adopted in field to treat solid and hazardous waste
- Become aware of various methods of disposal of solid and hazardous waste
- Understand engineering, financial and technical options for waste management.

UNIT –I

Introduction to Solid Waste

Waste-Types and classification, Waste sources and generation rates, Traditional methods of waste collection and disposal, Factors influencing waste generation and health hazards, Waste composition, Waste collection and Characterization of wastes.

Learning Outcomes:

After completion of this unit, students should

- Learn sampling and characterization of solid waste
- Analysis of hazardous waste constituents including QA/QC issues
- Understand traditional methods of waste collection and disposal

UNIT – II

Waste Processing

Waste processing: Size and volume reduction, Waste minimization, waste hierarchy and waste audit, Recycling of solid wastes,

Hazardous Waste

Definition, sources, classification, collection and segregation, Hazardous waste characterization, treatment and disposal, Radioactive waste

Learning Outcomes:

After completion of this unit, students should

- Learn waste processing techniques
- Determine the ways to reduce waste production
- Learn recycling of solid waste in their homes.
- Understand characteristics of hazardous waste and its treatment, final disposal

UNIT – III

Biomedical waste

e-waste and Plastic waste, Biomedical waste and Biomedical waste management rules, 2016

Composting

Definition- Vermi composting and Biogas production from solid waste

Learning Outcomes:

After completion of this unit, students should

- Learn composting and its types
- Determine the ways to produce more biogas from solid waste
- Understand the ways to dispose e-waste and plastic waste

UNIT –IV

Thermal treatment and Solid waste disposal

Thermal treatment of solid waste – Incineration, Thermal treatment of solid waste – Pyrolysis and gasification, Solid waste disposal – Sanitary landfilling, Landfill leachate and gas management, Landfill bioreactors, Fly ash- Generation and management

Learning Outcomes:

After completion of this unit, students should

- Design a sanitary landfill for a community
- Determine the ways to protect ground water from leachate contamination
- Learn about thermal treatment of solid waste.

UNIT – V

Solid waste management rules and Swachh Bharat Abhiyan

Fly ash management Solid waste management rules, 2016, Hazardous and other waste amendment rules, 2016, Plastic waste management rules, 2016, e-waste management rules, 2016, Swachh Bharat Abhiyan and Recent advances in solid waste management

Learning Outcomes:

After completion of this unit, students should

- Know the rules and regulatory bodies details.
- Use latest standards and techniques to manage the solid waste and hazardous waste
- Adopt the recent advancements in solid waste management

CourseOutcomes (CO):

After studying this course, students will be able to:

- Understand various types of solid waste, sources and their collection methods.
- Identify various waste processing techniques and characteristics of hazardous waste
- Understand the process of management of biomedical waste and composting
- Apply various solid waste disposal techniques according to situation
- Obtain awareness on various solid waste management rules and Swachh Bharat Abhiyan

Textbooks:

1. ArcadioSincero and GregoriaSincero“Environmental Engineering”, Second Edition, Prentice -Hall India
2. George Tchobanoglous“Intigrated Solid Waste Management : Engineering Principles and Management”, McGraw-Hill Publication 1993
3. M LaGrega and others “Hazardous Waste Management”, McGraw-Hill Publication2010
4. Tchobanoglous G, Theisen H and Vigil SA ‘Integrated Solid Waste Management, Engineering Principles and Management Issues’ McGraw-Hill, 1993.
5. Vesilind PA, Worrell W and Reinhart D, ‘Solid Waste Engineering’ Brooks/Cole Thomson Learning Inc., 2002.

Reference Books:

1. Peavy, H.S, Rowe, D.R., and G. Tchobanoglous, ‘Environmental Engineering’, McGraw Hill Inc., New York, 1985.
2. Qian X, Koerner RM and Gray DH, ‘Geotechnical Aspects of Landfill Design and Construction’ Prentice Hall, 2002

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech- V Sem

L	T	P	C
3	0	0	3

(ME20AOE501) INDUSTRIAL AUTOMATION

Pre-Requisite: Operation Research, Production & Operation Management

Course Objectives:

Course Objectives:

- To understand the basic concepts of Automation
- To understand the concepts of automation cycle and hardware components
- To gain knowledge about pneumatic and hydraulic devices
- To understand the concepts of sensors and actuators
- To know the use of Robotics used in industries automation

UNIT -I: Introduction to Automation Definition and fundamentals of automation, reasons for Automating, basic elements of an automated system: Power, Program and control system, safety, maintenance & repair diagnosis, error detection and recovery, Automation principles and strategies: USA principle, strategies of automation and production system, automation migration strategy

Learning Outcomes:

At the end of the unit, students will be able to:

- To understand the fundamental concepts of automation and its basic elements
- To understand system safety requirements
- To understand about maintenance and repair strategies
- To know about production system automation

UNIT- II: Mechanization and Automation

Basic principles of Mechanization and automation, product cycle, hard Vs flexible automation, Capital- intensive Vs low cost automation. Types of systems-mechanical, electrical, hydraulic, pneumatic and hybrid systems, Automation using CAMS, Geneva mechanisms, gears etc.

Assembly line Automation: automated assembly systems, transfer systems, vibratory bowl feeders, non-vibratory feeders, part orienting, feed track, part placing & part escapement systems. Introduction to Material storage/ handling and transport systems, and its automation using AS/RS, AGVS and conveyors etc.

Learning Outcomes:

At the end of the unit, students will be able to:

- To know about how to analyse the various automation methods
- To know about assembling and placing of various parts

• To distinguish between mechanization and automation of systems

• To know about material storage, handling and automation using various approaches

UNIT -III:

Pneumatics and hydraulics

Hydraulic and pneumatic devices-Different types of valves, Actuators and auxiliary elements in Pneumatics & hydraulics , their applications and use of their ISO symbols. Synthesis and design of circuits (up to 3 cylinders)–pneumatic, electro pneumatics and hydraulics. Design of Electro-Pneumatic Circuits using single solenoid and double solenoid valves; with and without grouping.

Learning Outcomes:

At the end of the unit, students will be able to:

• To know design of various pneumatic and hydraulic components

• To understand about synthesis and design of Pneumatic circuits

• To understand about electro pneumatic circuits

• To design using various solenoid valves with and without grouping

UNIT -IV: Sensors & Actuators Sensors Selection of sensors (Displacement, temperature, acceleration, force /pressure) based on static and dynamic characteristics. Interfacing: Concept of interfacing, bit accuracy and sampling speed, amplifying electronics, and microcontroller. Actuators: Principle and selection of electro mechanical actuators (1) DC motors (2) Stepper Motors (3) Solenoid Actuators (4) Servo Motors (5) BLDC

Learning Outcomes:

At the end of the unit, students will be able to:

• To know about selection of sensors and actuators based on dynamic characteristics

• To understand about necessity of interfacing sensors with Microcontroller

• To understand principle and selection of actuators

• To apply various electro mechanical actuators to certain machines

UNIT- V:

Robots and their applications

Introduction to robots, Types, Classifications, Selection of robots, Robot Degrees of freedom, Robot configuration, Accuracy and repeatability, Specification of a robot, Robot feedback controls: Point to point control and Continuous path control, Control system for robot joint, Adaptive control, Drives and transmission systems, End effectors, Industrial robot applications of robots

Learning Outcomes:

At the end of the unit, students will be able to:

• To know about Robots, classification, selection and specifications

• To understand the use of robotics in industrial applications

• To know about various feedback controls of Robot

• To understand how adaptive control strategies can be used in Robots

TEXT BOOKS:

1. Stamatios Manesis and George Nikolakopoulos, “Introduction to Industrial Automation”, CRC Press, 2018. 2. Frank Lamb, “Industrial Automation”, Hands on, Mc Graw Hill Education, 2013.

REFERENCES:

1. Richerd L. Shell and Ernest L. Hall, “Hand Book of Industrial Automation”, CRC Press, 2000.

- Through reading the text, references and discussion of cases students should be able to understand the fundamentals underlying the management of an Organization.
- Understand where the plant is to be located based on facilities available and what are the important factors affecting the facilities location of a plant, and plant layout.
- Determine work measurement techniques for time study.
- Recognize the importance of Inventory control to ensure their availability with minimum capital lock up.
- Understand the concepts of TQM, ISO, BIS etc.

Course Outcomes:

1. Understand the basic concepts of Industrial automation
2. Design and analysis of automation methods, placing and assembling of various parts
3. Design of various processing and control circuits using pneumatic and hydraulic elements
4. Selection of sensors based on the industrial application
5. Role of robotics in industrial applications

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech- V Sem

L	T	P	C
3	0	0	3

(EE20AOE502) PROGRAMMABLE LOGIC CONTROLLERS

Course Objectives:

The student will be able to:

- Understand the basic functions and types of PLCs, Easy Veep software, its applications
- Understand Classification of PLCs and applications
- Design PLC Programming for various applications
- Analyze PLC Troubleshooting aspects

UNIT I INTRODUCTION TO PLCs

Introduction:Basic functions of PLCs, Mechanical relays versus PLC, Different types of PLC's – Allen-Bradley – Micrologix: ML1000, ML1100, SLC500, Compact Logix, Mitsubishi FX series, HMI's, Processor and I/O cards

UNIT II PLC COMPUTATIONAL TOOL

Introduction to Easy Veep software, Link between mechanical, electrical and programming documentation, Logic diagrams, Flip-Flop Logic, M8000, M8001 internal bits interpretation, Binary code, data table, manipulation and search engine in Mitsubishi environment Communication between PC and PLC, Communication between PC and HMI, PLC and HMI Serial Local network, Introduction to SLC500

UNIT III PLC DEVELOPMENT

PLC software and applications, Boolean algebra – understanding binary code, ADD and SUB functions, UP and Down Counters, Introduction to k1Y0, MOV function, CPR and ZCP functions, SHWT and SHRD instructions, Introduction to Absolutely Drum Instruction.

UNIT IV PLC PROGRAMMING

Programming instructions: Instructions and binary interpretation, Bit Instruction, Timers and counters, Comparison instructions, Programming Instructions - Math instructions, Move and Logical Instructions, Discussions of programming, communications for PLC-Robotic arm, Exercise of setup and monitoring.

UNIT V APPLICATIONS

Analog and Digital parameters by using SLC5/03-VFD-Panel Mate series 1700, Practical Troubleshooting, troubleshooting technique, Control system stability and tuning basics. Applications: Process to rewind, test, and integrate with extrusion process for wiring and fibre optic industries, Food industry – yeast, flour distribution and control. Process Medical equipment Industry – Gas analyzer, Leak tester (using CO2), plastic wrapping machines etc.

Course Outcomes:

At the end of the course, the student will be able to:

CO1:Understand different types of PLCs, Its classification and the usage of Easy Veep software
CO2: Analyze the Computation tool.
CO3: Illustrate the Boolean logic & basic PLC
CO4:Design PLC Programming for various applications
CO5:Apply PLC programming concepts in different fields of Science and Technology

Reference Books:

1. Programmable Logic Controllers by R. Bliesener, F Ebel, Festo. Didactic publishers, 2002.

2. Programmable Logic Controllers by W. Bolton, 4th Edition, Newnes, 2006.

3. Introduction to PLCs by Jay F. Hooper, 2nd Edition, Carolina Academic Press, 2006.

Online Learning Resources:

1. https://nptel.ac.in/courses/108105088

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech V Sem

L	T	P	C
3	0	0	3

(AM20A0E501) Introduction to Operating Systems

Course Objectives:

- Understand basic concepts and functions of operating systems.
- Understand the processes, threads and scheduling algorithms.
- Provide good insight on various memory management techniques.
- Expose the students with different techniques of handling deadlocks.
- Explore the concept of file-system and its implementation issues.
- Implement various schemes for achieving system protection and security.
- Familiarize with the basics of Windows and Linux operating systems.

UNIT I

Operating Systems Overview: Operating system functions, Operating system structure, operating systems Operations, protection and security, Kernel data Structures, Computing Environments, Open-Source Operating Systems.

Operating System Structure: Operating System Services, User and Operating-System Interface, system calls, Types of System Calls, system programs, operating system structure, operating system debugging, System Boot.

Processes: Process concept, process Scheduling, Operations on processes, Inter process Communication, Examples of IPC systems.

Learning Outcomes:

At the end of this unit, the student will be able to

- Identify major components of operating systems and understand the types of computing environments.(L1)
- Explore several open source operating systems.(L2)
- Recognize operating system services to users, processes and other systems.(L2)
- Understand the importance, features of a process and methods of communication between processes.(L2)

UNIT II

Multithreaded Programming: Overview, Multi-core Programming, Multithreading Models, Thread Libraries, Implicit threading, Threading Issues, Examples.

CPU Scheduling: Basic concepts, Scheduling-Criteria, Scheduling Algorithms, Thread Scheduling, Multiple-Processor Scheduling, Real-Time CPU Scheduling, Algorithm Evaluation.

Inter-process Communication: Race conditions, Critical Regions, Mutual exclusion with busy waiting, Sleep and wakeup, Semaphores, Mutexes, Monitors, Message passing, Barriers, Classical IPC Problems - Dining philosopher's problem, Readers and writers problem.

Learning Outcomes:

At the end of this unit, the student will be able to

- Improving CPU utilization through multi programming and multithreaded programming. (L3)
- Examine several classical synchronization problems.(L2)
- Understand various process scheduling algorithms.(L2)
- Understand the importance, features of a process and methods of communication between processes.(L2)

UNIT III

Memory Management: Swapping, contiguous memory allocation, segmentation, paging, structure of the page table.

Virtual memory: demand paging, page-replacement, Allocation of frames, Thrashing, Memory-Mapped Files, Allocating Kernel Memory, Examples

Learning Outcomes:

At the end of this unit, the student will be able to

- Examine the various techniques of allocating memory to processes. (L2)
- Summarize how segmentation and paging works in contemporary computer systems. (L2)
- Understanding the benefits of virtual memory systems. (L2)

UNIT IV

Deadlocks: System Model, deadlock characterization, Ostrich algorithm, Methods of handling Deadlocks, Deadlock prevention, Detection and Avoidance, Recovery from deadlock.

File Systems: Files, Directories, File system implementation, management and optimization, Directory Implementation, Allocation Methods, Free-Space management.

Secondary-Storage Structure: Overview of disk structure, and attachment, Disk scheduling,

RAID structure, Stable storage implementation.

Learning Outcomes:

At the end of this unit, the student will be able to

- Investigate methods for preventing/avoiding deadlocks.(L3)
- Examine file systems and its interface in various operating systems.(L2)
- Analyze different disk scheduling algorithms.(L4)
- Understand the Stable-storage implementation and Free-Space management.(L2)

UNIT V

Protection: Goals of Protection, Principles of Protection, Domain of protection, Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights, Capability- Based systems, Language – Based Protection

Security: The Security problem, Program threats, System and Network threats, Cryptography as a security tool, User authentication, Implementing security defenses, Firewalling to protect systems and networks, Computer–security classifications.

Case Studies: Linux, Microsoft Windows.

Learning Outcomes:

At the end of this unit, the student will be able to

- Identify various schemes available for achieving system protection.(L2)
- Acquiring knowledge about various countermeasures to security attacks.(L2)
- Outline protection and security in Linux and Microsoft Windows. (L2)

Course Outcomes:

- Understand theOS design structures, its services and basics of a Process. (L2)

- Analyze various scheduling algorithms and examine concurrency mechanisms in Operating Systems. (L4)
- Apply memory management techniques in the design of operating systems. (L3)
- Compare and contrast various structures and organization of the file system and secondary storage structure. (L4)
- Apply different concepts of Protection and Security services in OS. (L3)

Text Books:

1. Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Ninth Edition,2012, Wiley.
2. Modern Operating Systems, Andrew S Tanenbaum, Third Edition, Pearson Education, 2008

Reference Books:

1. Operating systems by A K Sharma, Universities Press.
2. Operating Systems: Internals and Design Principles, Stallings, Sixth Edition, 2009, Pearson Education.
3. Operating Systems, S. Haldar, A.A. Aravind, Pearson Education.
4. Operating Systems, A.S. Godbole, Second Edition, TMH.

Online Learning Resources:

- https://nptel.ac.in/courses/106/106/106106144/

http://peterindia.net/OperatingSystems.html

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- V Sem

L	T	P	C
3	0	0	3

(CS20AOE502) COMPUTER ARCHITECTURE & ORGANIZATION

(ECE)

Course Objectives:

- The purpose of the course is to introduce principles of computer organization and the basic architectural concepts.

UNIT I

Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture. Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit. Basic Computer Organization and Design: Instruction codes, Computer Registers Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt.

UNIT II

Micro programmed Control: Control memory, Address sequencing, micro program example, design of control unit.

Central Processing Unit: General Register Organization, Instruction Formats, Addressing modes, Data Transfer and Manipulation, Program Control.

UNIT III

Data Representation: Data types, Complements, Fixed Point Representation, Floating Point Representation.

Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic unit, Decimal Arithmetic operations.

UNIT IV

Input-Output Organization: Input-Output Interface, Asynchronous data transfer, Modes of Transfer,

Priority Interrupt Direct memory Access.

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory,
Cache Memory.

UNIT V

Reduced Instruction Set Computer: CISC Characteristics, RISC Characteristics. Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processor. Multi Processors: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor arbitration, Interprocessor communication and synchronization, Cache Coherence.

Course Outcomes:

CO1: Understand the basics of instructions sets and their impact on processor design.
CO2: Demonstrate an understanding of the design of the functional units of a digital computer system.
CO3: Evaluate cost performance and design trade-offs in designing and Constructing a computer processor including memory.
CO4:Design a pipeline for consistent execution of instructions with minimum hazards.
CO5: Recognize and manipulate representations of numbers stored in digital computers.

Textbook:

1. Computer System Architecture – M. Moris Mano, Third Edition, Pearson/PHI.

References:

1. Computer Organization – Car Hamacher, ZvonksVranesic, SafeaZaky, V th Edition, McGraw Hill.
2. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.
3. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition, PHI/Pearson.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech – V Sem

L	T	P	C
3	0	0	3

(CH20AOE501) CHEMISTRY OF POLYMERS AND ITS APPLICATIONS

Course Objectives:

- To understand the basic principles of polymers
- To synthesize the different polymeric materials and their characterization by various instrumental methods.
- To impart knowledge to the students about fundamental concepts of Hydro gels of polymer networks, surface phenomenon by micelles
- To enumerate the applications of polymers in engineering

Unit – I : Polymers-Basics and Characterization

Basic concepts: monomers, repeat units, degree of polymerization, linear, branched and network polymers, classification of polymers, Polymerization: condensation, addition, radical chain, ionic and coordination and copolymerization. Average molecular weight concepts: number, weight and viscosity average molecular weights, polydispersity and molecular weight distribution Measurement of molecular weight: end group, viscosity, light scattering, osmotic and ultracentrifugation methods, analysis and testing of polymers.

Learning Outcomes:

At the end of this unit, the students will be able to

- Classify the polymers (L3)
- Explain polymerization mechanism (L2)
- Differentiate addition, condensation polymerizations (L2)
- Describe measurement of molecular weight of polymer (L2)

Unit – II : Synthetic Polymers

Addition and condensation polymerization processes – Bulk, Solution, Suspension and Emulsion polymerization. Preparation and significance, classification of polymers based on physical properties, Thermoplastics, Thermosetting plastics, Fibers and elastomers, General Applications.

Preparation of Polymers based on different types of monomers, Olefin polymers, Diene polymers, nylons, Urea - formaldehyde, phenol - formaldehyde and melamine Epoxy and Ion exchange resins. Characterization of polymers by IR, NMR, XRD.

Learning Outcomes:

At the end of this unit, the students will be able to

- Differentiate Bulk, solution, Suspension and emulsion polymerization (L2)
- Describe fibers and elastomers (L2)
- Identify the thermosetting and thermo polymers (L3)
- Characterize the properties of polymers by IR, NMR, XRD etc.,

Unit – III : Natural Polymers & Modified cellulosics

Natural Polymers: Chemical & Physical structure, properties, source, important chemical modifications, applications of polymers such as cellulose, lignin, starch, rosin, shellac, latexes, vegetable oils and gums, proteins.

Modified cellulosics: Cellulose esters and ethers such as Ethyl cellulose, CMC, HPMC, cellulose acetals, Liquid crystalline polymers; specialty plastics- PES, PAES, PEEK, PEAK.

Learning Outcomes:
At the end of this unit, the students will be able to

- Describe the properties and applications of polymers (L2)
- Interpret the properties of cellulose, lignin, starch, rosin, latex etc., (L2)
- Discuss the special plastics of PES, PAES, PEEK etc., (L3)
- Explain modified cellulosics (L2)

Unit-IV: Hydrogels of Polymer networks and Drug delivery

Definitions of Hydrogel, polymer networks, Types of polymer networks, Methods involved in hydrogel preparation, Classification, Properties of hydrogels, Applications of hydrogels in drug delivery.

Introduction to drug systems including, drug development, regulation, absorption and disposition, routes of administration and dosage forms. Advanced drug delivery systems and controlled release.

Learning Outcomes:

At the end of this unit, the students will be able to

- Identify types of polymer networks (L3)
- Describe methods involve in hydrogel preparation (L2)
- Explain applications of hydrogels in drug delivery (L2)
- Demonstrate the advanced drug delivery systems and controlled release (L2)

Unit – V : Surface phenomena

Surface tension, adsorption on solids, electrical phenomena at interfaces including electrokinetics, micelles, reverse micelles, solubilization. Application of photoelectron spectroscopy, ESCA and Auger spectroscopy to the study of surfaces.

Learning Outcomes:

At the end of this unit, the students will be able to

- Demonstrate electrical phenomena at interfaces including electrokinetics, miselles, reverse micelles etc., (L2)
- Explain photoelectron spectroscopy (L2)
- Discuss ESCA and Auger spectroscopy to the study of surfaces (L3)
- Differentiate micelles and reverse micelles (L2)

Course Outcomes

At the end of the course, the student will be able to:

- Understand the state of art synthesis of Polymeric materials
- Understand the hydro gels preparation, properties and applications in drug delivery system.
- Characterize polymers materials using IR, NMR, XRD.
- Analyze surface phenomenon fo micelles and characterise using photoelectron spectroscopy, ESCA and Auger spectroscopy.

References :

1. A Text book of Polymer science, Billmayer
2. Organic polymer Chemistry, K.J.Saunders, Chapman and Hall
3. Advanced Organic Chemistry, B.Miller, Prentice Hall
4. Polymer Chemistry – G.S.Mishra
5. Polymer Chemistry – Gowarikar
6. Physical Chemistry –Galston
7. Drug Delivery- Ashim K. Misra

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech- V Sem

L	T	P	C
3	0	0	3

(EE20APE502) CONTROL SYSTEM ENGINEERING

Course Objectives:

To make the students learn about:

- The effect of feedback, the use of block diagram algebra and Mason's gain formula to find the overall transfer function
- Transient and steady state response and time domain specifications
- The concept of stability by Routh's stability criterion and Root loci
- Frequency domain specifications, Bode diagrams and Nyquist plots
- State space modeling of Control system and the concept of controllability and observability.

UNIT – I

CONTROL SYSTEMS CONCEPTS

Open loop and closed loop control systems and their differences- Classification of control systems, Feedback characteristics, Mathematical models – Differential equations of translational and rotational mechanical systems and electrical systems, Analogous Systems, Block diagram reduction methods – Signal flow graphs - Reduction using Mason's gain formula.

Principle of operation of DC and AC Servo motor, Transfer function of DC servo motor - AC servo motor, Synchros.

Learning Outcomes:

At the end of the unit, the student will be able to

- Write the differential equations for mechanical and electrical systems(L3)
- Obtain the transfer function from block diagrams, servo motors and signal flow graphs (L4)

UNIT-II

TIME RESPONSE ANALYSIS

Step Response - Impulse Response - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants, Basics of P, PI, PID Controllers.

Learning Outcomes:

At the end of the unit, the student will be able to

- Analyze the time domain specifications(L4)
- Calculate the steady state errors(L4)

- Understand about Proportional, Integral and Derivative controllers along with combinations(L2)

UNIT– III

STABILITY ANALYSIS IN TIME DOMAIN

The concept of stability – Routh's stability criterion – Stability and conditional stability – limitations of Routh's stability. The Root locus concept - construction of root loci-effects of adding poles and zeros to G(s)H(s) on the root loci.

Learning Outcomes:

At the end of the unit, the student will be able to

- Analyze the concept of stability in time domain(L4)
- Apply the concept of Routh's stability and Root locus in time domain (L5)

UNIT– IV

FREQUENCY RESPONSE ANALYSIS

Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Stability Analysis from Bode Plots. Polar Plots-Nyquist Plots- Phase margin and Gain margin-Stability Analysis. Basics of Compensation techniques – Lag, Lead, Lag-Lead Compensator in frequency Domain.

Learning Outcomes:

At the end of the unit, the student will be able to

- Evaluate the frequency domain specifications from Bode, Polar and Nyquist plots (L5)
- Design Compensators for various systems (L5)
- Deducing transfer functions from Bode Plots(L4)
- Understand difference between Phase and Gain margins (L2)

UNIT– V

STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS

Concepts of state, state variables and state model, state models - differential equations & Transfer function models - Block diagrams, Transfer function from state model, Solving the Time invariant state Equations- State Transition Matrix and it's Properties, The concepts of controllability and observability.

Learning Outcomes:

At the end of the unit, the student will be able to

- Understand the concept of state space, controllability and observability (L2)
- Obtain the transfer function from sate space and vice versa (L4)
- Understand the state transition method of solving time invariant state equations (L2)

Text Books:

1. Katsuhiko Ogata, “Modern Control Engineering”, 5th edition, Prentice Hall of India Pvt. Ltd., 2010.
2. J. Nagrath and M. Gopal, “Control Systems Engineering” 5th edition, New Age International (P) Limited Publishers, 2007.

Reference Books:

1. M. Gopal, “Control Systems Principles & Design” 4th Edition, McGraw Hill Education, 2012.
2. B. C. Kuo and FaridGolnaraghi, “Automatic Control Systems” 8th edition, John wiley and sons, 2003.
3. Joseph J Distefano III, “Feedback and Control Systems”, Allen R Stubberud& Ivan J Williams, 2nd Edition, Schaum’s outlines, McGraw Hill Education, 2013.
4. Graham C. Goodwin, “Control System Design” Stefan F. Graebe and Mario E. Salgado, Pearson, 2000.
5. Gene F. Franklin, “Feedback Control of Dynamic Systems”, J.D. Powell and Abbas Emami- Naeini, 6th Edition, Pearson, 2010.

Course Outcomes:

After completing the course, the student should be able to:

CO-1:Understand the concepts of control systems classification, feedback effect, mathematical modelling, and and state space analysis. Apply the concepts of Block diagram reduction, Signal flow graph

CO-2:Analyse time response analysis, error constants, and stability characteristics of a given mathematical model using different methods.

CO-3:Apply the concepts of RH and Root locus for stability calculations

CO-4:Analyze system behavior of the system in frequency domain. frequency response characteristics, Design and develop different compensators. Bode, Nyquist, Polar plots for stability calculations

CO-5:Analyze system behavior based on the state space analysis of that system. controllability and observability

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- V Sem

L	T	P	C
3	0	0	3

(EC20APE501) MECHATRONICS

Course Objectives:

1. Learn about the operating principle of various sensors and its importance in real time measurement applications.
2. Acquire the knowledge to model Electrical system and Mechanical system building blocks.
3. Calculate the transfer function of both First–order and Second-order systems.
4. Learn about the interfacing procedure of Peripherals with Programmable Logic Controllers.
5. Study some of the recent Real-time Mechatronics system Design and Modelling solutions.

Unit I

Sensors and Transducers:

What is Mechatronics, Performance terminology, Microprocessor-based controllers, The Mechatronics approach, Performance terminology, Displacement, Position and Proximity, Velocity and Motion, Force, Fluid pressure, Liquid flow and level, Temperature and Light sensors, Selection of sensors and Inputting data by switches.

Unit II

Electrical Actuation Systems and System Models:

Electrical Systems, Mechanical switches, Solid-state switches, Solenoids, DC Motors, AC Motors and Stepper Motors, Mathematical models, Mechanical system building blocks, Electrical system building blocks, Fluid system building blocks and Thermal system building blocks.

Unit III

Dynamic Response and Transfer functions:

Modelling dynamic systems, First–order and Second-order systems, Performance measures for second-order systems, The transfer function, First–order and Second-order

systems, Systems in series, Systems with feedback loops and Effect of Pole location on transient response.

Unit IV

Programmable Logic Controllers:

Introduction, Basic structure, Input/output processing, Programming, Mnemonics, Timers, Internal relays and Counters, Shift registers, Master and Jump controls, Data Handling, Analogue input/output and Selection of PLC.

Unit V

Mechatronic Systems:

Traditional and Mechatronics designs, Possible Mechatronics design solutions and Case studies of Mechatronic Systems.

Text Books:

3. W.Bolton, "Mechatronics-Electronic Control systems in Mechanical and Electrical Engineering", Third Edition, Pearson Education Limited, 2018.
4. Nitaigour Premchand Mahalik, "Mechatronics Principles, Concepts and Applications", McGraw Hill Education, New Delhi, 2017.

References:

3. Davis G. Alciatore and Michael B. Histand, "Introduction to Mechatronics and Measurement systems", Second edition, McGraw Hill Education, New Delhi, 2019.
4. Devdas Shetty and Richard A. Kolk, "Mechatronics System Design", Second edition, Cengage learning India Pvt. Ltd., 2012.

Course Outcomes:

CO1: Decide the appropriate sensor for a given application of interest.
CO2: Develop a simulation model for simple physical systems and explain mechatronics design process.
CO3: Summarize the effects of Pole location on system transient response.
CO4: Interface Peripheral devices with Programmable Logic Controllers.
CO5: Analyze possible solutions in the design of Mechatronic systems.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- V Sem

L	T	P	C
3	0	0	3

(EC20APE502) NANOELECTRONICS

Course Objectives:

1. To understand the evolution and basics of Nanoelectronics.
2. To understand various fabrication methods in nanotechnology (top down & bottom up).
3. To analyze and discuss various characterization methods in nanotechnology (optical, electrical, AFM, SEM, TEM, and nanoindentation).
4. To understand nano electronic systems and building blocks such as: low-dimensional semiconductors, hetero structures, carbon nano tubes, quantum dots, nano wires etc.
5. To familiarize students with the present research front in Nanoelectronics and to be able to critically assess future trends.

Unit I

Fundamentals of Nanoelectronics:

Moore's Law, Wave functions, wave packets, Schrodinger's wave equation, potential barriers and tunneling, Fermi-Dirac statistics, Density of states, Limitations of conventional FET in nanoscales, Quantum Well, Quantum wire, Quantum dot, current flow in two terminal Quantum dots, ballistic transport, Single Electron Transistor

Unit II

Introduction to methods of fabrication of Nano-Layers: Physical vapour deposition- evaporation & Sputtering, Chemical vapour deposition, Molecular Beam Epitaxy, Ion Implantation, Formation of Silicon Dioxide- dry and wet oxidation methods. Fabrication of nanoparticles: grinding with iron balls, laser ablation, reduction methods, sol gel, self-assembly, precipitation of quantum dots.

Unit III

Introduction to characterization of nanostructures: Principle of operation of Scanning Tunneling Microscope, Atomic Force Microscope, Scanning Electron microscope - specimen interaction, X-Ray Diffraction analysis

Unit IV

Basic quantum structures: Quantum wells, quantum wires and quantum dots, Single electron devices charge quantization, energy quantization, Coulomb blockade, Coulomb staircase, Bloch oscillations.

Unit V

Nano electronic Devices: Carbon nanotubes based devices CNFET, characteristics; Spin-based devices spin FET, characteristics, Applications of MOSFET, CNFET and Spin FET devices.

Text Books:

1. George W Hanson, “Fundamentals of Nanoelectronics”, Prentice Hall, 2008.
2. Karl Goser, “Nanoelectronics and Nano systems: From Transistors to Molecular and Quantum Devices”, Springer, First edition, 2005.

References:

1. Rainer Waser (Ed), “Nanoelectronics and Information Technology”, Second Edition, Wiley VCH, 2003.
2. Mary Eshaghian- Wilner, “Bio inspired and Nano Scale Integrated Computing”, Wiley, 2009.

Course Outcomes:

CO1: Get an insight of quantum mechanical effects associated with low dimensional semiconductors.
CO2: Explain the different processes involved in the fabrication of nanoparticles and nanolayers.
CO3: Explain the different techniques for characterizing nanolayers and nanoparticles
CO4: Integrate and model the device with basic quantum structures.
CO5: Correlating device structures with type of materials, which are commonly used for fabrication, defend the tunneling devices with several parameters of hetero structures; compare characteristics study for the MOS/FET devices.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- V Sem

L	T	P	C
3	0	0	1.5

(EC20APC504)DIGITAL COMMUNICATIONS LAB

Course Objectives:

1. To Develops skills for performance analysis of practical digital communication systems.
2. To understand the fundamental concepts on TDM, Pulse modulations& digital modulation techniques.
3. To evaluate the performance of PCM, DPCM and DM in a digital communication system.
4. To learns how to use MATLAB software and hardware effectively and creatively to synthesis digital communication systems.

LIST OF EXPERIMENTS

Minimum of Twelve experiments to be conducted

Part –A Hardware Experiment (All experiments)

1. Time Division Multiplexing
2. Pulse Code Modulation
3. Differential Pulse code Modulation
4. Delta Modulation
5. Frequency Shift Keying
6. Differential Phase Shift Keying
7. Verification of Sampling Theorem

Part –B Software Experiment (Any Seven experiments)

1. Sampling Theorem-Verification
2. Time Division Multiplexing
3. Delta Modulation
4. Pulse Code Modulation
5. Differential Pulse code Modulation
6. Amplitude Shift Keying
7. Frequency Shift Keying
8. Phase Shift Keying
9. Differential Phase shift Keying

10. QPSK Modulation and Demodulation

Course Outcomes:

CO1: Understand real time behavior of different digital modulation schemes and technically visualize spectra of different digital modulation schemes.

CO2: Design and implement different modulation and demodulation techniques.

CO3: Analyze digital modulation & demodulation techniques.

CO4: Simulate all digital modulation and demodulation techniques in MATLAB.

Equipment:

1. Regulated Power Supply (0-30) V .
2. CROs (0-20)MHz.
3. Function Generators (0-3)MHz
4. RF Signal Generators (0-1000)MHz
5. Multimeters.
6. Required Electronic components (active and passive) for the conduction of experiments from 1-7
7. Radio Receiver Demo kits or Trainers.
8. RF power meter frequency range (0 – 1000)MHz
9. Spectrum Analyzer

Software Required:

1. Computer Systems with latest specifications
2. Connected in LAN (Optional)
3. Operating system (Windows XP)
4. Simulations software (MATLAB).

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- V Sem

L	T	P	C
3	0	0	1.5

(EC20APC505)MICROPROCESSORS AND MICROCONTROLLERS LAB

Course Objectives:

1. To study programming based on 8086 microprocessor and 8051 microcontrollers.
2. To study 8086 microprocessor based ALP using arithmetic, logical and shift operations.
3. To study modular and Dos/Bios programming using 8086 microprocessor.
4. To study to interface 8086 with I/O and other devices.
5. To study and interface 8051 micro controller with I/O and other devices.

Part- A

8086 Microprocessor Programs using MASM/TASM/8086 kit.

(Any Six Experiments)

1. Introduction to MASM/TASM Programming
2. Arithmetic operations.
3. Multiplication and Division.
4. Logical operations.
5. String operations and Instruction prefix: Move Block, Reverse string, Sorting, String comparison.
6. Code conversion.
7. Multi byte arithmetic operations.
8. DOS/BIOS Programming, reading keyboard -Display characters

Part-B

8086 Interfacing:

(Any Two Experiments)

9. 8259 – Interrupt Controller and its interfacing programs
10. 8255 – PPI and its interfacing programs (A /D, D/A,)
11. 8255 – PPI and its interfacing programs (stepper motor,)
12. 7-Segment Display.

Part-C:

Microcontroller 8051 Trainer kit:

(Any Four Experiments)

1. Addition and Subtraction– Signed and unsigned Arithmetic operation.
2. Multiplication and Division – Signed and unsigned Arithmetic operation.
3. Logic operations – Shift and rotate.
4. Sorting- Ascending and descending order.
5. Timer/Counter in 8051
6. Interrupt handling in 8051

Course Outcomes:

CO1: Demonstrate ability to handle arithmetic and Logical operations using assembly language programming in MASM/TASM.

CO2: Demonstrate ability to handle string instructions using assembly language programming in MASM/TASM.

CO3: Demonstrate ability to handle sorting operations and using assembly language programming in MASM/TASM.

CO4: Demonstrate ability to handle Arithmetic and Logical operations using 8051 trainer kits.

CO5: Demonstrate ability to handle sorting operations using 8051 trainer kits.

CO6: To interface the Microprocessor/Microcontroller with various peripherals for various applications.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- V Sem

L	T	P	C
1	0	2	2

(EC20ASC501) PCB DESIGN AND PROTOTYPE DEVELOPMENT

Course Objectives:

- To know the various component and symbols in basic electronic circuit
- To understand the PCB in detail
- To analyze the PCB design using KICAD tools

UNIT I

Fundamental of basic electronics:

Fundamental of basic electronics: Component identification, Component symbols & their footprints, basic electronic circuits, understand schematic, Introduction PCB, Difference between PWB and PCB, Types of PCBs: Single Layer, Multi-Layer, Surface Mount, PCB Materials, Electronic Component packaging.

Learning Outcomes:

- Identification basic electronic circuit symbols and their footprints
- Understand the different types of PCB

UNIT II

Making Printed Circuit Boards: Layout Design, Copper Clad Preparation, Etching the PCB, drilling and soldering the PCB, Introduction to Electronic Design Automation (EDA): History of EDA, Different EDA Tools, Creating new PCB, Browsing footprints libraries, sets up the PCB layers, Design rule checking, Track width selection, Component selection, Routing and completion of the design. Design Issues: Transmission line, Cross talk and Thermal management.

Learning Outcomes:

- Understand the EDA Tools
- Analyze Design Issues: Transmission line, Cross talk and Thermal management.

UNIT III

Introduction to Development Tools: Introduction to PCB Design using KiCad tools.

PCB Design Process: PCB Design Flow, Placement and routing, Steps involved in layout design, General design factors for digital and analogue circuits, Layout and Artwork making for Single-side, double-side and Multilayer Boards, Design for manufacturability, Design-specification standards.

Learning Outcomes:

- Implement digital and analog circuits using PCB design
- Understand the Artwork making of Single-side, double-side and Multilayer Boards

Practice Exercises: Any Ten experiments are to be done (13th Experiment is Mandatory)

1. Practice following PCB Design steps

- Schematic Design: Familiarization of the Schematic Editor, Schematic creation, Annotation, and Netlist generation.
- Layout Design: Familiarization of Footprint Editor, Mapping of components, Creation of PCB layout Schematic.
- Create new schematic components.
- Create new component footprints.

2. Regulator circuit using 7805.

3. Inverting amplifier using op-amp.

4. Full-wave rectifier .

5. Astable multivibrator using IC555.

6. RC phase shift oscillator using BJT.

7. Full adder circuit.

8. RS flip flop with logic circuit.

9. Four-bit comparator.

10. LED Flashing / Blinking Circuit using 555 Timer IC.

11. Automatic street light controller using LDR & Transistor.

12. Two way traffic light controller using 555 timers.

13. Fabricate a Single sided PCB, Mount the components and assemble them in a cabinet for anyone of the circuits mentioned in the above listed.

References:

1. Jon Varteresian, Fabricating Printed Circuit Boards, Newnes, 2002

2. R. Tummala, Fundamentals of Microsystems Packaging, McGraw-Hill 2001

3. C. Robertson. PCB Designer´s Reference. Prentice Hall, 2003
4. Open-source EDA Tool KiCad Tutorial: http://kicad-pcb.org/help/tutorials
http://www.wikihow.com/Create-Printed-Circuit-Boards
http://www.siongboon.com/projects/2005-09-07_home_pcb_fabrication/
http://reprap.org/wiki/MakePCBInstructions#Making_PCBs_yourself
5. Open-source EDA Tool Eagle Tutorial: https://en.freedownloadmanager.org/users choice/Eagle_Pcb_Design_For_32bit_Windows_7.html
6. Open-source EDA Tool proteus Tutorial: https://softfamous.com/proteus

Course Outcomes:

CO1: Learn how to design schematic and layout using PCB.
CO2: Design and implement experiments using PCB.
CO3: Test and analyze the working of PCB.
CO4: Identify different components required in PCB Design.
CO5: Aware of PCB Making Process.
CO6: Able to design different circuits using design tools.

Software Required:

1. Computer Systems with latest specifications
2. Connected in LAN
3. Operating system (Windows10)
4. Simulations software (Eagle, kicad).

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech – V Sem

L	T	P	C
2	0	0	0

(BA20AMC501) CONSTITUTION OF INDIA

Course Objectives:

- To enable the student to understand the importance of constitution
- To understand the structure of executive, legislature and judiciary
- To understand philosophy of fundamental rights and duties
- To understand the autonomous nature of constitutional bodies like Supreme Court and high court controller and auditor general of India and Election Commission of India.
- Tounderstandthecentral-staterelationinfinancialandadministrativecontrol

UNIT-I

Introduction to Indian Constitution – Constitution -Meaning of the term - Indian Constitution-Sources and constitutional history - Features– Citizenship – Preamble - Fundamental Rights and Duties-Directive Principles of State Policy.

Learning Outcomes:-

After completion of this unit student will

- Understand the concept of Indian constitution
- Apply the knowledge on directive principle of state policy
- Analyze the History and features of Indian constitution
- Learn about Preamble, Fundamental Rights and Duties

UNIT-II

Union Government and its Administration Structure of the Indian Union-Federalism -Centre-State relationship–President's Role, power and position-PM and Council of ministers - Cabinet and Central Secretariat–LokSabha–RajyaSabha - The Supreme Court and High Court-Powers

Learning Outcomes:-

After completion of this unit student will

- Understand the structure of Indian government
- Differentiate between the state and central government
- Explain the role of President and Prime Minister
- Know the Structure of Supreme Court and High court

UNIT-III

State Government and its Administration - Governor - Role and Position -CM and Council of ministers –State Secretariat-Organization Structure and Functions

Learning Outcomes:-

After completion of this unit student will

- Understand the structure of state government
- Analyze the role of Governor and Chief Minister
- Explain the role of State Secretariat
- Differentiate between structure and functions of state secretariat

UNIT-IV

Local Administration-District's Administration Head-Role and Importance-Municipalities - Mayor and role of Elected Representatives -CEO of Municipal Corporation Pachayati Raj - Functions– PRI –Zilla Parishath - Elected officials and their roles – CEO, Zilla Parishath –Block level Organizational Hierarchy-(Different departments)-Village level –Role of Elected and Appointed officials-Importance of grass root democracy

Learning Outcomes:-

After completion of this unit student will

- UnderstandthelocalAdministration
- Compareandcontrastdistrictadministration'sroleandimportance
- AnalyzetheroleofMayor andelectedrepresentativesofMunicipalities
- LearnabouttheroleofZillaParishathblocklevelorganization

UNIT-V

Election Commission-Election Commission-Roleof Chief Election Commissioner and Election Commissionerate -State Election Commission -Functions of Commissions for thewelfare ofSC/ST/OBC andWomen

Learning Outcomes:-

After completion of this unit student will

- KnowtheroleofElectionCommission
- Contrast and compare the role of Chief Election commissioner and Commissionerate
- Analyzetheroleofstateelectioncommission
- EvaluatevariouscommissionsvizSC/ST/OBCandwomen

Course Outcomes:-

- At the end of the course, students will be able to

- Understand historical background of the constitution making and its importance for
- Building a democratic India.
- Understand the functioning of three wings of the government ie., executive, legislative and judiciary.
- Understand the value of the fundamental rights and duties for becoming good citizen of India.
- Analyze the decentralization of power between central, state and local self-government
- Apply the knowledge in strengthening of the constitutional institutions like CAG,
- Election Commission and UPSC for sustaining democracy.

Textbooks:

- J.A. Siwach,"DynamicsofIndianGovernment&Politics".
- H.M.Sreevai,"ConstitutionalLawofIndia",4theditionin3volumes(UniversalLawPublication)
- J.C.Johari, "IndianGovernment andPolitics", HansIndia
- M.V.Pylee, "IndianConstitution", DurgaDasBasu, HumanRightsinConstitutionalLaw,Prentice–Hallof India Pvt. Ltd. NewDelhi

References:

- J.A. Siwach,"DynamicsofIndianGovernment&Politics".
- H.M.Sreevai,"ConstitutionalLawofIndia",4theditionin3volumes(UniversalLawPublication)
- J.C.Johari, "IndianGovernment andPolitics",HansIndia
- M.V.Pylee, "IndianConstitution", DurgaDasBasu, HumanRightsinConstitutionalLaw,Prentice–Hallof India Pvt. Ltd. NewDelhi

E-RESOURCES:

- nptel.ac.in/courses/109104074/8
- nptel.ac.in/courses/109104045/
- nptel.ac.in/courses/101104065/
- www.hss.iitb.ac.in/en/lecture-details

  www.iitb.ac.in/en/event/2nd-lecture-institute-lecture-series-indian-constitution

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech-V Sem

L	T	P	C
2	0	0	0

(IT20AMC501) PROBLEM SOLVING AND PROGRAMMING

(Lateral Entry Students Only)

Course Objectives:

- To learn how to solve a given problem.
- To illustrate the basic concepts of C programming language.
- To discuss the concepts of Functions, Arrays, Pointers and Structures.
- To familiar with Dynamic memory allocation concepts.
- To apply concepts of structures and files to solve real word problems.

UNIT-1:

Introduction to Problem Solving: Problem Solving Aspect, Problem Identification, Problem Understanding, Algorithm Development, Solution Planning, Flowcharts, flowgorithm.

Overview of C: History Of C, C Language Elements, Basic Structure of C Program, C Tokens-Variables and Data Types, Operators, Expressions and Type Conversions.

Learning Outcomes:

The students will be able to

- Develop solution through problem understanding and decomposition (L6).
- Develop basic flowcharts for performing input and output and computations(L3).
- Solve Numerical Problems using Flowgorithm (L3).
- Use C basic concepts to write simple C programs (L3).

UNIT-2:

Control Statements: Selection Statements- if and switch statements.

Iterative Statements: for, while and do-while statements.

Jump Statements: break and continue statements.

Learning Outcomes:

The students will be able to

- Implement C program using Conditional statements (L2).
- Implement C program using Iterative statements (L2).

UNIT-3:

Arrays: Declaration, accessing array elements, Storing values, Operations on arrays, Multi-dimensional arrays.

Functions: Introduction, Using Functions, Function declaration, Function definition and Function call, Parameter passing, Passing arrays to functions, Recursion, Storage classes.

Learning Outcomes: The students will be able to

- Writing Structured programs using Functions (L5).
- Apply arrays concepts on real time applications (L6).

UNIT-4:

Pointers: Declaration and Initialization of pointer variables, Pointer arithmetic, Pointers and arrays, Pointer to pointer, Array of pointers, Pointers and functions, Dynamic Memory Allocation.

Strings: Introduction to Strings, String handling functions, Preprocessor Directives.

Learning Outcomes: The students will be able to

- Use pointers to write c Programs (L3).
- Understand the concepts of preprocessors (L2).
- Apply Dynamic Memory Allocation concepts on real time applications (L6).

UNIT-5:

Structures: Introduction, Nested Structures, Array of Structures, Structures and Functions, Unions.

Files in C: Using Files in C, Read data from Files, Writing data to Files, Randomaccess to files, Command-line Arguments

Learning Outcomes:

The students will be able to

- Use the concepts of Structures and Unions to write C programs (L3).
- Apply various operations on Files (L6).

Text Books:

1. Reema Thareja, Programming in C, Oxford University Press, AICTE Edition,2018.
2. R.G. Dromey, “How to Solve it by Computer”. 2014, Pearson.

Reference Books:

1. Jeri R. Hanly, Ellot B. Koffman, Problem Solving and Program Design in C, 5/e,Pearson
2. B. A. Forouzan and R. F. Gilberg, Computer Science: A Structured Programming Approach Using C, 3/e, Cengage Learning, 2007.
3. Brian W Kernighan and Dennis M Ritchie, The C Programming Language,Second Edition, Prentice Hall Publication.
4. Paul Deitel, Harvey Deitel -C How to Program with an introduction to C++,Eighth Edition

Course Outcomes:

At the end of the course, the students will be able to:

- Solve computational problems (L3).
- Select the features of C language appropriate for solving a problem (L4)
- Design computer programs for real world problems (L6)
- Organize the data which is more appropriated for solving a problem (L6).

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VI Sem

L	T	P	C
3	0	0	3

(EC20APC601)DIGITAL SIGNAL PROCESSING

Course Objectives:

1. To summarize and analyze the concepts of signals, systems in time and frequency domain.
2. To learn properties of DFT and its application to linear filtering.
3. To understand the designs of IIR and FIR filters.
4. To outline need of Multi-rate DSP.
5. To introduce the concepts of DSP architecture and its applications.

UNIT- I

Frequency analysis of Signals and Systems:

Review of Discrete time signals and systems, Discrete Fourier transform, Relationship of the DFT to other transforms, Properties of DFT, Linear filtering based on the DFT- Filtering of long data sequences - overlap save and overlap add method.

Fast Fourier Transform (FFT): Efficient computation of DFT - Radix-2 - Decimation-in-time (DIT), Decimation-in-frequency (DIF) algorithms, Inverse FFT.

UNIT- II

Infinite Impulse Response Filters:

Design of IIR filters from Analog filters –Approximation of derivatives, Impulse invariance method, and bilinear transformation. Frequency transformation in the analog domain, Illustrative Problems.

Realization of IIR Filter: Structures for IIR system- Direct-Form-I, Direct-Form-II, Transposed form, Cascade-Form, and Parallel-Form Structures.

UNIT- III

Finite Impulse Response Filters:

Design of linear phase FIR filters using Fourier series method - FIR filter design using windows (Rectangular, Hamming and Hanning window), Frequency sampling method, Illustrative Problems.

Realization of FIR Filter: Structures for FIR system–Direct-Form, Cascade-Form and Linear Phase Structure.

Unit -IV

Multi-rate Digital Signal Processing:

Introduction, Decimation, and interpolation, sampling rate conversion by a rational factor, Implementation of sampling rate conversion, Multi-stage implementation of

sampling rate conversion, sampling rate conversion of band-pass signals, Applications of multi-rate signal processing.

UNIT- V

Architectures for Programmable DSP Devices:

Basic Architectural features, DSP computation Building Blocks, Bus Architectures and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed Issues.

Text Books:

1. John G. Proakis & Dimitris G.Manolakis, Digital Signal Processing – Principles, Algorithms & Applications, 4th Edition, Pearson Education / Prentice Hall, 2007.
2. A.V. Oppenheim, R.W. Schafer and J.R. Buck, Discrete-Time Signal Processing, 8th Indian Reprint, Pearson, 2004.

References:

1. Emmanuel C. Ifeachor & Barrie. W. Jervis, Digital Signal Processing, 2nd Edition, Pearson Education / Prentice Hall, 2002.
2. P.Ramesh Babu, Digital Signal Processing, SCITECH, 7th Edition, 2019.
3. Sanjit K. Mitra, Digital Signal Processing – A Computer Based Approach, Tata Mc Graw Hill, 2007.

Course Outcomes:

CO1: Analyze DFT computation using fast algorithms.

CO2: Design & Implementation of IIR filters using different techniques.

CO3: Design of FIR filters based on windowing methods.

CO4: Analyse multi-rate signal processing techniques.

CO5: Understanding the architecture details and instruction sets of fixed and Floating point DSP's.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VI Sem

L	T	P	C
3	0	0	3

(EC20APC602) MICROWAVE ENGINEERING AND OPTICAL COMMUNICATIONS

Course Objectives:

1. To develop the knowledge on transmission lines for microwaves, cavity resonators and waveguide components and applications.
2. To understand the scattering matrix parameters and its use.
3. To differentiate Linear beam tubes and crossed field tubes in terms of operation and performance.
4. To remember various types of fibers, modes, configurations and signal degradations.
5. To analyze signal degradation in optical fibers and compare the performance of various optical sources and detectors.

Unit I

Introduction: Introduction to Microwaves, Microwave spectrum and bands, applications of Microwaves.

Rectangular Waveguides- Solution of Wave Equation in Rectangular Coordinates, TE/TM mode analysis, Expressions for fields, Characteristic equation and cutoff frequencies, filter characteristics, dominant and degenerate modes.

Circular Waveguides- Introduction, Expression for cut off frequencies

Learning Outcomes:

- Know the importance of waveguides (L1).
- Derive field expressions for different modes of propagation in the waveguides(L3).

Unit II

WAVEGUIDE COMPONENTS AND APPLICATIONS: Introduction to scattering parameters and their properties, Terminations, Attenuators, Phase shifters, Hybrid Tees (H-plane, E-plane, Magic Tees), Hybrid ring, Directional Couplers – Bethe hole and Two hole Couplers, Microwave propagation in Ferrites, Microwave devices employing Faraday rotation – Isolator, Circulator, Deriving Scattering matrix for Microwave passive devices.

Learning Outcomes:

- Understand principle of operation of all passive microwave devices (L1).
- Know the importance of Scattering parameters and their properties (L1)

Unit III

MICROWAVE TUBES

Linear Beam Tubes – Two cavity Klystron amplifier -velocity modulation, bunching process, output power, Reflex Klystron oscillator, power output and efficiency, Travelling Wave Tube (TWT) – Bunching process and amplification process.

Crossed Field Tubes – Magnetron oscillator, pi-mode operation, power output and efficiency, Hartree Condition, Mode jumping in Magnetron, Principle of operation of Cross Field Amplifier (CFA).

Learning Outcomes:

- Understand principle of operation of Microwave Tubes and semiconductor devices (L1).
- Derive the expressions power output and efficiency of all microwave devices (L3).

Unit IV

OPTICAL COMMUNICATIONS:

Overview of Optical Fiber Communications, optical fibers – Structures, Optical fiber modes and configurations, Signal degradation in optical fibers – Signal attenuation, absorption, scattering losses, Bending Losses, Core and Cladding losses, Signal distortion in optical waveguides, Information capacity determination, Group delay, waveguide dispersion, Inter model dispersion.

Learning Outcomes:

- Remember the optical fiber types, modes, configurations, and signal degradation types (L1).
- Analyze the signal degradation in optical fibers (L4).

Unit V

OPTICAL SOURCES AND DETECTORS: Introduction, LEDs – structure – Light source, Quantum efficiency, Modulation of an LED, LASER diodes, Source to Fiber power launching, LASER diode to fiber coupling, LED coupling to single mode fibers, Fiber, Splicing, Optical Fiber connectors, Photo diodes – Principle of Photo diodes, Avalanche Photodiodes, Photo detector noise, detector response time, Comparison of Photo diodes.

Learning Outcomes:

- Understand the working principle of optical sources, detectors and power coupling (L2)
- Compare the performance of various optical source and detectors (L4)

Text Books:

1. Samuel Y. Liao, "Microwave Devices and Circuits", PHI publications, Third Edition, 1997. (For Units 1,2 and 3)
2. Gerd Keiser, "Optical Fiber Communications", McGraw Hill, Third Edition, 2000. (For Units 4, and 5)

References:

1. Om. P. Gandhi, "Microwave: Engineering and Applications", Kai Fa Book Company, 1981.
2. R. E. Collin, "Foundations for Microwave Engineering", Wiley Student Edition, Second Edition, 2009.
3. F E Terman, "Electronic and Radio Engineering", McGraw Hill, 4th Edition,1984.

Course Outcomes:

CO1:Analyze micro-wave circuits incorporating hollow, dielectric and planar waveguides, transmission lines, filters and other passive components, active devices.

CO2: Understand microwave transmission lines and how to Use microwave components such as isolators, Couplers, Circulators, Tees, Gyrators etc.

CO3: Differentiate Linear bean tubes and crossed field tubes in terms of operation and performance.

CO4: Understand various types of fibers, modes, configurations and signal degradations.

CO5: Analyze signal degradation in optical fibers and compare the performance of various optical sources and detectors.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VI Sem

L	T	P	C
3	0	0	3

(EC20APC603) VLSI DESIGN

Course Objectives:

6. Learn about the various processing steps involved in the fabrication of a nMOS, pMOS and CMOS transistors.
7. Learn about the various Design rules and Layout of MOS transistors.
8. Enable the students to learn about the Scaling Models and Scaling factors of MOS transistors.
9. Study the various examples of structured design.
10. Learn about the Testing concepts in VLSI Chip design.

Unit I

Review of Microelectronics and Introduction to MOS technology:

The IC era, Basic MOS transistors- Enhancement mode and Depletion mode transistor action, nMOS fabrication, CMOS fabrication-P-Well, N-Well and Twin-tub process, Thermal Aspects of processing and Bi-CMOS. Drain-to-Source current versus Voltage V_{DS} relationships, MOS transconductance, output conductance and Figure of Merit.

Unit II

MOS and Bi-CMOS circuits and Design process:

The Pass transistor, nMOS inverter, Pull-up to Pull-down ratio of different cases, CMOS inverter and Latch-up in CMOS circuits. MOS layers, Stick diagrams-nMOS and CMOS design styles, Design rules and Layout- Lambda-based design rules, Contact cuts, Double Metal MOS process rules and CMOS Lambda-based design rules, 2µm Double Metal, Double Poly. CMOS/BiCMOS rules and Layout diagrams.

Unit III

Circuit Concepts and Scaling of MOS circuits:

Sheet resistance concept, Area Capacitance of layers and calculations, The Delay unit, Inverter delay, Driving large capacitance loads, Propagation delays and Wiring capacitances, Scaling Models and Scaling factors, Scaling factors for various device parameters and its summary.

Unit IV

Subsystem Design and Layout:

Architectural issues, Switch logic, Gate restoring logic-The inverter, Two-input nMOS, CMOS and BiCMOS NAND and NOR gates, Other forms of CMOS logic, Examples of Structured design- Parity generator, Multiplexers, Four-Line Gray code to Binary code converter, Clocked Sequential circuits-Two-phase clocking and Charge storage, System considerations- Bipolar drivers for Bus lines, Basic arrangements for Bus lines and Precharged bus concept.

Unit V

Test and Testability:

System partitioning, Layout and Testability, Reset/Initialization, Design for Testability, Testing Combinational Logic and Sequential Logic, Practical Design for Test guidelines, Scan Design Techniques and Built-In-Self-Test (BIST).

Text Books:

1 K.Eshraghian, D.A. Pucknell and S.Eshraghian, “Essentials of VLSI Circuits and Systems”, Third Edition, PHI Learning Pvt. Ltd., 2019.

2 W.Wolf “Modern VLSI Design IP based design” Fourth edition, PHI Learning Pvt. Ltd., 2020.

References:

1 Mead, C.A and Conway, L.A., “Introduction to VLSI Systems”, Addison –Wesley, USA, 1980.

2. Neil H. E. Weste & D.M.Harris, “CMOS VLSI Design-A Circuits and Systems Perspective”, Fourth edition, Pearson Edition, 2020.

Course Outcomes:

CO1: Outline the processing steps in the fabrication of a nMOS, pMOS and CMOS structure.

CO2: Illustrate the Layout procedure of simple MOS circuit using Lambda based design rules.

CO3: Summarize the scaling effects of various key parameters of MOSFET devices.

CO4: Design various MOS based logic circuits.

CO5: Develop algorithms for automatic test generation for combinational and sequential circuits.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VI Sem

L	T	P	C
3	0	0	3

(EC20APE601) ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Course Objectives:

1. To understand various measurement metrics for performance analysis and basic principles of various measurements like voltage, current, Resistance.
2. To familiarize the characteristics, operations, calibrations and applications of the different oscilloscopes.
3. To explain principles of operation and working of different electronic instruments like signal generators, wave analyzers etc.
4. Understand the basic principle of various DC/AC bridges for the measurement of unknown passive elements like R, L and C.
5. To provide exposure to working principles of different sensors and transducers.

UNIT-I

Performance characteristics of Instruments: Static characteristics, Accuracy, Precision, Resolution, Sensitivity, static and dynamic calibration, Errors in Measurement, and their statistical analysis, dynamic characteristics-speed of Response, fidelity, Lag and dynamic error. DC ammeters, DC voltmeters-multirange, range extension/solid state and differential voltmeters, AC voltmeters –multirange, range extension. Thermocouple type RF ammeter, ohm meters, series type, shunt type, multimeter for voltage, current and resistance measurements.

Learning Outcomes:

At the end of this unit, the student will be able to

- Define different terms used for characterizing the performance of an instrument/measurement system (L1).
- Understand the principle of operation of various meters (L1).

UNIT-II

Oscilloscopes: Standard specifications of CRO,CRT features, vertical and horizontal amplifiers, horizontal and vertical deflection systems, sweep trigger pulse, delay line, sync selector circuits, probes for CRO – active, passive, and attenuator type, dual trace/beam CRO, Principles of sampling oscilloscope, storage oscilloscope, and digital storage oscilloscope, Digital frequency counters, time & Period measurements.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand the basic blocks of analog and digital CROs (L1)
- Measure amplitude and frequency utilizing oscilloscopes (L2)

UNIT-III

Signal generators & Analyzers: Specifications & principles of working (Block diagram approach) Signal generators-fixed and variable, AF oscillators, function generators, pulse, random noise, sweep, and Wave analyzers, Harmonic distortion analyzers, Spectrum analyzers.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand the basic principle of various signal generators and analyzers (L1).
- Describe characteristics of signal generators and analyzers (L2).

UNIT-IV

Review of DC Bridges: Wheatstone bridge, Kelvin Bridge, errors and precautions in using bridges.

AC bridges: Measurement of inductance-Maxwell's bridge, Anderson Bridge. Measurement of capacitance- Schering Bridge. Measurement of frequency- Wein Bridge, Q-meter.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand principles of measurements associated with different DC/AC bridges(L2)
- Ability to derive balance condition of various bridges to find unknown values (L2)

UNIT-V

Sensors and Transducers - Active and passive transducers: Measurement of displacement (Resistance, capacitance, inductance; LVDT) Force (strain gauges) Pressure (piezoelectric transducers) Temperature (resistance thermometers, thermocouples, and thermistors), Velocity, Acceleration.

Learning Outcomes:

At the end of this unit, the student will be able to

- Explain basic principle of the different types of sensors and Transducers (L2)
- Select the appropriate sensor/transducer for the measurement of physical parameters (L5)

TEXT BOOKS:

1. A.D. Helfrick and W.D. Cooper, “Modern Electronic Instrumentation and Measurement Techniques”, PHI, 5th Edition,2002.
2. H.S.Kalsi, “Electronic instrumentation”, second edition, Tata McGraw Hill, 2004.

REFERENCES:

1. Robert A. Witte, “Electronic Test Instruments, Analog and Digital Measurements”, Pearson Education, 2nd Ed., 2004.
2. David A. Bell, “Electronic Instrumentation & Measurements”, PHI, 2nd Edition, 2003.
3. K. Lal Kishore, “Electronic Measurements & Instrumentations”, Pearson Education,2009.

Course Outcomes:

CO 1: Describe the basic principles involved in the meters for measuring voltage, current, resistance and frequency (L2).

CO 2: Analyze CRO for measuring signal characteristics (L4)

CO3: Analyze different waveforms using advanced instruments such as signal generators, logic analyzer & Spectrum analyzer (L4)

CO4: Apply the principles of various DC/AC bridges to solve various measurement parameters (L3)

CO5: Analyze various parameters using sensors and transducers (L4)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VI Sem

L	T	P	C
3	0	0	3

(EC20APE602) INFORMATION THEORY AND CODING

Course Objectives:

1. To teach basic parameters of Information, concepts of source coding techniques, and error control coding techniques.
2. To transmit knowledge on Information theory and error control coding techniques for solving problems.
3. To Introduce various source coding and channel coding techniques for error detection and error correction in the information-bearing signals.
4. To dissimilate block to variable length coding and variable to block length coding techniques for merits and demerits.
5. To describe various systems for linear block codes and convolutional codes.

Unit I

Information Theory:

Introduction, Definition of Entropy, Conditional Entropy, Relative Entropy, Basic Properties of Entropy, Mutual Information, Information Inequalities, Kraft Inequality, optimal codes, bounds on optimal Code length, Shanon-Fano Coding, Huffman Coding, Related Problems.

Unit II

Asymptotic Equipartition Property: Introduction, Block to Block Coding of DMS: Consequences of Asymptotic Equipartition Property, Problem-solving.

Universal Source Coding: Lempel-Ziv Algorithm, LZ -77 Encoding, and Decoding, Lempel- Ziv Welch (LZW) Algorithm, LZW Encoding, and Decoding.

Unit III

Error Control Coding:

Introduction to Error Control Codes, Error Probability with Repetition in the Binary Symmetric Channel, Parity Check Bit Coding for Error Detection, Block Coding for Error Detection and Correction, The Hamming Distance,

Unit IV

Linear Block Codes:

Introduction to Linear Block Codes, Syndrome and Error Detection, Encoding Block Codes, Decoding of Block Codes, Single Parity Check bit Code, Repeated Codes, Hadamard Code, Hamming Code, Cyclic Codes, Generator and Parity-Check Matrices of Cyclic Codes, Encoding and Decoding of Cyclic Codes, BCH codes.

Unit V

Convolutional Coding:

Convolutional Coding, Code Generation, Decoding Convolutional Code, the Code Tree, Decoding in the presence of Noise, State and Trellis Diagrams, The Viterbi Algorithm.

Textbooks:

1. Thomas M.Cover, Joy A. Thomas, Elements of Information Theory, John Wiley & Sons,2nd Edition, 2006.
2. Shu Lin, Daniel J. Costello Jr., Error Control Coding, Pearson, Second Edition, 2013.

References:

1. Herbert Taub, Donald L Shilling, Goutam Saha, Principles of Communication Systems, 4th Edition, McGraw Hill, 2017.
2. Simon Haykin, Communication Systems, John Wiley, 4th Edition, 2010.

Course Outcomes:

CO1: Describe basic parameters of Information, the concepts of source coding techniques, and Error Control coding techniques.

CO2: Apply knowledge of Information theory and error control coding techniques to solve problems.

CO3: Analyze various source coding and channel coding techniques for error detection and error correction in the information-bearing signals.

CO4: Compare various block to variable length coding and variable to block length coding techniques for merits and demerits.

CO5: Design various systems for linear block codes and convolutional codes

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VI Sem

L	T	P	C
3	0	0	3

(EC20APE603) INTRODUCTION TO DIGITAL SIGNAL PROCESSING (EEE)

Course Objectives:

1. To summarize and analyze the concepts of signals, systems in time and frequency domain.
2. To learn properties of DFT and its application to linear filtering.
3. To understand the designs of FIR filters.
4. To understand the design of IIR filters.
5. To outline need of Multi-rate DSP.

UNIT- I

Frequency analysis of Signals and Systems:

Review of Discrete time signals and systems, Discrete Fourier transform, Relationship of the DFT to other transforms, Properties of DFT, Linear filtering based on the DFT- Filtering of long data sequences - overlap save and overlap add method.

Fast Fourier Transform (FFT): Efficient computation of DFT - Radix-2 - Decimation-in-time (DIT), Decimation-in-frequency (DIF) algorithms, Inverse FFT.

UNIT- II

Infinite Impulse Response Filters:

Design of IIR filters from Analog filters –Approximation of derivatives, Impulse invariance method, and bilinear transformation. Frequency transformation in the analog domain, Illustrative Problems.

Realization of IIR Filter: Structures for IIR system- Direct-Form-I, Direct-Form-II, Transposed form, Cascade-Form, and Parallel-Form Structures.

UNIT- III

Finite Impulse Response Filters:

Design of linear phase FIR filters using Fourier series method - FIR filter design using windows (Rectangular, Hamming and Hanning window), Frequency sampling method, Illustrative Problems.

Realization of FIR Filter: Structures for FIR system–Direct-Form, Cascade-Form and Linear Phase Structure.

Unit -IV

Multi-rate Digital Signal Processing:

Introduction, Decimation, and interpolation, sampling rate conversion by a rational factor, Implementation of sampling rate conversion, Multi-stage implementation of sampling rate conversion, sampling rate conversion of band-pass signals, Applications of multi-rate signal processing.

UNIT- V

Architectures for Programmable DSP Devices:

Basic Architectural features, DSP computation Building Blocks, Bus Architectures and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed Issues.

Text Books:

1. John G. Proakis & Dimitris G.Manolakis, Digital Signal Processing – Principles, Algorithms & Applications, 4th Edition, Pearson Education / Prentice Hall, 2007.
2. A.V. Oppenheim, R.W. Schafer and J.R. Buck, Discrete-Time Signal Processing, 8th Indian Reprint, Pearson, 2004.

References:

1. Emmanuel C. Ifeachor & Barrie. W. Jervis, Digital Signal Processing, 2nd Edition, Pearson Education / Prentice Hall, 2002.
2. P.Ramesh Babu, Digital Signal Processing, SCITECH, 7th Edition, 2019.
3. Sanjit K. Mitra, Digital Signal Processing – A Computer Based Approach, Tata Mc Graw Hill, 2007.

Course Outcomes:

CO1: Analyze DFT computation using fast algorithms.

CO2: Design & Implementation of IIR filters using different techniques.

CO3: Design of FIR filters based on windowing methods.

CO4: Analyse multi-rate signal processing techniques.

CO5: Understanding the architecture details and instruction sets of fixed and Floating point DSP's.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VI Sem

L	T	P	C
3	0	0	3

(EC20APE604)RADAR SYSTEMS

Course Objectives:

1. Make student to acquire the knowledge on types of Radars, working principles, applications.
2. Make student to acquire the knowledge on tracking a target and understand phased array antennas, navigational aids.

Unit I

Basics of Radar: Introduction, Maximum Unambiguous Range, Simple form of Radar Equation, Radar Block Diagram and Operation, Radar Frequencies and Applications, Prediction of Range Performance, Minimum Detectable Signal, Receiver Noise, Modified Radar Range Equation, Illustrative Problems.

Radar Equation: SNR, Envelope Detector, False Alarm Time and Probability, Integration of Radar Pulses, Radar Cross Section of Targets (simple targets - sphere, cone-sphere), Transmitter Power, PRF and Range Ambiguities, System Losses (qualitative treatment), Illustrative Problems.

Unit II

CW and Frequency Modulated Radar: Doppler Effect, CW Radar – Block Diagram, Isolation between Transmitter and Receiver, Non-zero IF Receiver, Receiver Bandwidth Requirements, Applications of CW radar, Illustrative Problems.

FM-CW Radar: Range and Doppler Measurement, Block Diagram and Characteristics (Approaching/ Receding Targets), FM-CW altimeter, Multiple Frequency CW Radar.

Unit III

MTI and Pulse Doppler Radar: Introduction, Principle, MTI Radar with - Power Amplifier Transmitter and Power Oscillator Transmitter, Delay Line Cancellers – Filter Characteristics, Blind Speeds, Double Cancellation, and Staggered PRFs. Range Gated Doppler Filters, MTI Radar Parameters, Limitations to MTI Performance, MTI versus Pulse Doppler radar.

Unit IV

Tracking Radar: Tracking with Radar, Sequential Lobing, Conical Scan, Mono pulse Tracking

Radar – Amplitude Comparison Mono pulse (one- and two-coordinates), Phase Comparison Mono pulse, Tracking in Range, Acquisition and Scanning Patterns, Comparison of Trackers.

Detection of Radar Signals in Noise: Introduction, Noise Figure and Noise Temperature, Matched Filter Receiver – Response Characteristics and Derivation, Correlation detection, Detection criteria, Detector Characteristics, Automatic Detection, Constant False Alarm Rate Receiver.

Unit V

Phased Array Antennas and Navigational Aids: Introduction to Phased Array Antennas - Basic Concepts, Radiation Pattern. Beam Steering and Beam Width changes. Navigational Aids: Direction Finder, VOR, ILS and Loran.

Text Books:

1. Merrill I. Skolnik, "Introduction to Radar Systems", 2nd Edition, TMH Special Indian Edition, 2007.
2. Byron Edde, "Radar Principals, Technology, Applications", Pearson Education, 1992.

Reference Books:

1. F.E. Terman, "Radio Engineering", Mc Graw Hill Book Co. (for Chapter 7 only), Fourth Edition 1955
2. Simon Kingsley & Shaun Quegan, "Understanding RADAR Systems", McGraw Hill Book Co., 1993.

Course Outcomes:

CO1. Learn the basic working principle of Radar and target detection procedure.

CO2. Know the working and applications of CW and Frequency Modulated Radar.

CO3. Gain the knowledge of MTI and Pulse Doppler Radar.

CO4. Understand different methods of tracking a target and analyze the effect of noise at the receiver.

CO5. Learn about the phased array antennas and different navigational aids.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech –VI Sem

L	T	P	C
3	0	0	3

(CE20AOE601) Disaster Management

CourseObjectives:

The objective of this course is to:

- Give the basic knowledge of Natural Hazards and disasters.
- Develop an awareness of the chronological phases of natural disaster response and rescue relief operations.
- Understand the 'relief system' and the 'disaster victim.'
- Describe the three planning strategies useful in mitigation.
- Identify the regulatory controls used in hazard management.
- Understand the tools of post-disaster management.

UNIT –I

Introduction:

Hazards, Disasters, Disaster Management, Disaster Management cycle – Five priorities for action.

Natural Hazards and Disaster Management:

Floods, droughts, Earthquakes, global warming, cyclones & Tsunamis, landslides, Post Tsunami hazards along the Indian coast, landslides.

Learning outcomes:

At the end of unit, students will be able to

- Gain the basic knowledge about hazards and disasters.
- Know about the natural hazards and its management.
- Understand about the global warming, cyclones and tsunamis

UNIT II

Man-Made Disaster and Management:

Case study methods of the following: Fire hazards, transport hazards, biological hazards, waste management, post disaster, bio terrorism -threat in mega cities.

Learning outcomes:

At the end of unit, students will be able to

- Know about the fire hazards and solid waste management.
- Gain knowledge about transport and biological hazards.

UNIT – III

Risk and Vulnerability:

Building codes and land use planning, social vulnerability, environmental vulnerability, and sustainable development, climate change risk rendition, financial management of disaster – related losses.

Learning outcomes:

At the end of unit, students will be able to

- Know about the regulations of building codes and land use planning related to risk and vulnerability.
- Understand about the financial management of disaster and related losses

UNIT – IV

Role of Technology in Disaster Managements:

Disaster management for infra structures, taxonomy of infra-structure – treatment plants and process facilities-electrical substations- roads and bridges- mitigation programme for earth quakes –multimedia technology in disaster risk management and knowledge in disaster reduction.

Learning outcomes:

At the end of unit, students will be able to

- Know about the technological aspects of disaster management.
- Understand the multimedia technology in disaster risk management.
- Get knowledge about the factors for disaster reduction.

UNIT –V

Emerging approaches in Disaster Management

- Pre- disaster stage (preparedness)
- Emergency Stage
- Post Disaster stage-Rehabilitation.

Learning outcomes:

At the end of unit, students will be able to

- Gets knowledge about three planning strategies useful in mitigation?
- Understand about preparedness and rehabilitation stage.

CourseOutcomes (CO):

On completion of the course the students will able to

- Know the different types of disasters and their effects on environment.
- Have the knowledge about Causes of disasters.
- Gain knowledge about disaster management through engineering applications.
- Explain the process of risk management
- Distinguish between the different approaches needed to manage pre- during and post disaster periods

Textbooks:

1. Rajib shah & R R Krishnamurthy “Disaster Management” – Global Challenges and Local Solutions’ Universities press. (2009),
2. Tushar Bhattacharya, “Disaster Science & Management” Tata McGraw Hill EducationPvt. Ltd., New Delhi.
3. Jagbir Singh “Disaster Management” – Future Challenges and Opportunities’ I K International Publishing House Pvt. Ltd. (2007),

Reference Books:

1. Harsh. K .Gupta “Disaster Management edited”, Universities press, 2003
2. Donald Hyndman & David Hyndman “Natural Hazards & Disasters” – Cengage Learning

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech - VI Sem

L	T	P	C
3	0	0	3

(ME20AOE601) FUNDAMENTALS OF ADDITIVE MANUFACTURING

Pre-requisite: Manufacturing Processes

Course Objectives:

- Familiarize of additive manufacturing / rapid prototyping and its applications in various fields.
- Impart reverse engineering techniques.
- Explain different processes available in additive manufacturing.
- Bring awareness on mechanical properties of materials and geometric issues related to additive manufacturing applications.

UNIT – 1:

Introduction to Additive Manufacturing (AM) Systems :

History and Development of AM, Need of AM, Difference between AM and CNC, Classification of AM Processes: Based on Layering Techniques, Raw Materials and Energy Sources, AM Process Chain, Benefits and Applications of AM, Representation of 3D model in STL format.

Learning Outcomes:

At the end of this unit, the student will be able to

- Learn the importance of AM process and development process cycle of AM.
- Distinguish the difference between CNC and AM.
- Identify the role of AM in the industrial applications.
- Understand the different formats to represent the 3D Model.

UNIT – 2:

CAD & Reverse Engineering:

Basic Concept, Digitization techniques, Model Reconstruction, Data Processing for Additive Manufacturing Technology: CAD model preparation, Part Orientation and support generation, Model Slicing, Tool path Generation, Software's for Additive Manufacturing Technology. Reverse Engineering (RE) –Meaning, RE – The Generic Process, Phase of RE Scanning, Contact Scanners, Noncontact Scanners, Point Processing.

Learning Outcomes:

At the end of this unit, the student will be able to

- Learn the different process steps of Additive Manufacturing.
- Understand the role of software tools for Additive Manufacturing Technology
- Build the CAD model and generate support forrequired 3D printing Component.

UNIT – 3:

Solid & Liquid Based AM Systems

Stereolithography (SLA) and Solid Ground Curing (SGC): Principle, Process, Materials, Advantages, Limitations and Applications.Fusion Deposition Modeling (FDM). Laminated Object Manufacturing (LOM).

Learning Outcomes:

At the end of this unit, the student will be able to

- Learn the Additive Manufacturing process of Stereolithography (SLA) and Solid Ground Curing (SGC)
- Distinguish the differences between FDM and SLA processes.
- Analyze the limitations and the opportunities of current AM processes to develop the future AM technologies.

UNIT – 4:

Powder Based AM Systems:

Principle and Process of Selective Laser Sintering (SLS), Advantages, Limitations and Applications of SLS, Principle and Process of Laser Engineered Net Shaping (LENS), Advantages, Limitations and Applications of LENS, Principle and Process of Electron Beam Melting (EBM), Advantages, Limitations and Applications of EBM.

Learning Outcomes:

At the end of this unit, the student will be able to

- Learn the Additive Manufacturing process of SLS, LENS, EBM.
- Distinguish the differences between SLS and EBM processes.
- Analyze the limitations and the opportunities of SLS, EBM, LENS AM processes to develop the future AM technologies.
- Distinguish the various AM processes and use them for specific problem-based applications.

UNIT – 5:

Other Additive Manufacturing Systems:

Three Dimensional Printing (3DP): Principle, Process, Advantages, Limitations and Applications. Ballistic Particle Manufacturing (BPM). Shape Deposition Manufacturing (SDM): Principle, Process, Advantages, Limitations, Applications.

Learning Outcomes:

- Learn the Additive Manufacturing process of BPM, SDM.
- Understand the differences between BPM and SDM processes.
- Analyze the limitations and the opportunities of BPM, SDM processes to develop the future AM technologies.

Textbooks:

1. Ian Gibson, David W. Rosen, Brent Stucker, Additive Manufacturing Technologies: Rapid Prototyping to Direct Digital Manufacturing, 1/e Springer, 2010.
2. Chua C.K., Leong K.F. and Lim C.S., Rapid Prototyping: Principles and Applications, 2/e World Scientific Publishers, 2003.

Reference Books:

1. Liou W. Liou, Frank W., Liou, Rapid Prototyping and Engineering Applications: A Tool Box for Prototype Development, CRC Press, 2007.
2. Pham D.T. and Dimov S.S., Rapid Manufacturing; The Technologies and Application of RPT and Rapid Tooling, Springer, London 2001.
3. Gebhardt A., Rapid prototyping, Hanser Gardener Publications, 2003.
4. Hilton P.D. and Jacobs P.F., Rapid Tooling: Technologies and Industrial Applications, CRC Press, 2005.
5. Rafiq Noorani, Rapid Prototyping: Principles and Applications in Manufacturing, John Wiley & Sons, 2006.

Online Learning Resources:

- NPTEL Course on Rapid Manufacturing https://nptel.ac.in/courses/112/104/112104265/
- https://www.hubs.com/knowledge-base/introduction-fdm-3d-printing/
- https://slideplayer.com/slide/6927137/
- https://www.mdpi.com/2073-4360/12/6/1334
- https://www.centropiaggio.unipi.it/sites/default/files/course/material/2013-11-29%20-%20FDM.pdf
- https://lecturenotes.in/subject/197

- https://www.cet.edu.in/noticefiles/258_Lecture%20Notes%20on%20RP-ilovepdf-compressed.pdf
- https://www.vssut.ac.in/lecture_notes/lecture1517967201.pdf
- https://www.youtube.com/watch?v=NkC8TNts4B4

Course Outcomes:

At the end of the course, the student will be able to

- Apply the fundamentals concepts of additive manufacturing to develop of effective process steps.
- Analyse the various fabrication techniques and apply them to manufacture a 3D printed part.
- Develop a 3D model in standard tessellation language format.
- Build the feasible designs of support structure to the 3D printing models.

Analyse the limitations of various additive manufacturing techniques for the selective applications.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech- VI Sem

L	T	P	C
3	0	0	3

(EE20AOE603) OPTIMIZATION TECHNIQUES THROUGH MATLAB

Course Objectives

- Introduce basics of MATLAB
- Familiarize the fundamentals of optimization
- Explain single variable optimization using various methods
- Implement multi variable optimization using various methods
- Train various evolutionary algorithms.

UNIT -I

Introduction to MAT LAB: Overview, MATLAB Preliminaries, Basics of MATLAB, Beyond the Basics of MATLAB, Popular Functions and Commands, Plotting using MATLAB, Optimization with MATLAB.

UNIT -II

Introduction to Optimization: Statement of an optimization problem, Classifications of optimization Problems: Single variable optimization, Multi variable optimization with no constraints, Multi variable optimization with equality constraints, Multi variable optimization with inequality constraints, Convex and Concave programming.

UNIT -III

Single Variable Optimization: Finite difference method, Central difference method, Runge-Kutta method, interval halving method, golden section method with MATLAB code.

UNIT- IV

Multi Variable Optimization: Conjugate gradient method, Newton's method, Powell's method, Flectcher- Reeves method, Hook and Jeeves method, interior penalty function with

UNIT -V

Evolutionary Algorithms: Overview, Genetic Algorithms: Basics of Genetic Algorithms, Options in MATLAB, Multi Objective Optimization using Genetic Algorithms, Ant Colony Optimization, Simulated Annealing, Particle Swarm Optimization.

Course Outcomes:

After completion of this course the student can be able to

CO1:Use optimization terminology and concepts, and understand how to classify an optimization problem.

CO2:Apply optimization methods to engineering problems.

CO3:Implement optimization algorithms.

CO4:Compare different genetic algorithms.

CO5:Solve multivariable optimization problems.

TEXT BOOKS:

1. Rao V.Dukkipati, MATLAB: “An Introduction with Applications”, Anshan, 2010.

2. Achille Messac, “Optimization in practice with MATLAB”, Cambridge University Press, 2015.

3. Jasbir S Arora, “Introduction to optimum design”, 2nd edition. Elsevier, 2004.

REFERENCES:

1. Cesar Perez Lopez, “MATLAB Optimization Techniques”, Academic press, Springer publications, 2014.

2. Steven C.Chapra, “Applied Numerical Methods with MATLAB for Engineers and scientists”: 4th edition, McGraw-Hill Education, 2018.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech- VI SEM

L	T	P	C
3	0	0	3

(CS20A0E602) JAVA Programming

Course Objectives:

- To understand object-oriented concepts and problem-solving techniques
- To obtain knowledge about the principles of inheritance and polymorphism
- To implement the concept of packages, interfaces, exception handling and concurrencymechanism.
- To design the GUIs using applets and swing controls.

UNIT - I

Introduction to OOP: OOP principles, Java Buzzwords, Implementing Java program, JVM, Data Types, Variables, Type conversions and Casting, Operators, Control statements, Arrays. Classes, Objects, Methods, Constructors, this keyword, static keyword, Overloading Methods and Constructors, Argument passing, Exploring String class.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand the syntax, semantics and features of Java Programming Language (L1).
- Learn object-oriented features and understanding type conversion and casting (L2).
- Understand different types of string handling functions and its usage (L1).

UNIT – II

Inheritance: Basics, Using Super, Creating Multilevel hierarchy, Method overriding, Dynamic Method Dispatch, Using Abstract classes, Using final with inheritance

Interfaces: Definition, Implementing Interfaces, Extending Interfaces, Nested Interfaces, Applying Interfaces, Variables in Interfaces.

Packages: Basics, finding packages and CLASSPATH, Access Protection, Importing packages.

Learning Outcomes:

At the end of this unit, the student will be able to

- Implement types of Inheritance and developing new classes based on existing classes(L3)
- Demonstrate features of interfaces to implement multiple inheritances (L2).
- Distinguish between system packages and user defined packages (L2).

UNIT – III

Exception handling - Fundamentals, Exception types, uncaught exceptions, using try and catch,Multiple catch clauses, nested try statements, throw, throws and finally, built- in exceptions,creating own exception sub classes.

I/O and Other Topics: – I/O basics, Reading Console input, Writing console Output, The PrintWriter class, Reading and writing files, Automatically closing a file, enumerations, type wrappers.

Learning Outcomes:

At the end of this unit, the student will be able to

- Learn what exceptions are and how they are handled (L1).
- Learn when to use exception handling and how to create user defined exceptions(L3)
- Learn the difference between various files and streams (L1).

UNIT - IV

Multithreading: The Java thread model, Creating threads, Thread priorities, Synchronizing threads, Inter thread communication.

The Collections Framework (java.util): Collections overview, Collection Interfaces, The Collection classes- Array List, Linked List, Hash Set, Hash table, Properties, Stack, Vector, String Tokenizer, Date, Calendar, Random, Scanner.

Applets- Definition, Life Cycle and Execution.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand concurrency, parallelism and multithreading(L1).
- Learn the importance of collections and use prebuilt generic data structures from Framework (L1).
- Develop applets for web applications(L5)

UNIT – V

Event Handling-Delegation Event Model, Event Sources, Event Classes, Event Listener Interfaces, Handling Mouse and Keyboard Events, Adapter classes.

AWT AND Swings: AWT: AWT Hierarchy, AWT controls, Layout Managers: FlowLayout, BorderLayout, GridLayout, CardLayout, and Limitations of AWT. SWINGS: JFrame, JPanel, JComponent- JLabel and ImageIcon, JTextField,JTabbedPane , Swing Buttons, JScrollPane, JComboBox, JTable.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand the GUI programming (L1).

Course Outcomes:

After completion of the course the student will be able

- To solve real world problems using OOP techniques (L3).
- To apply code reusability through inheritance, packages and interfaces(L3)
- To solve problems using java collection framework and I/O classes (L3).
- To develop applications by using parallel streams for better performance (L4).
- To build GUIs and handle events generated by user interactions (L4).

Text Books:

1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd.
2. Java How to Program, 10th Edition, Paul Dietel, Harvey Dietel, Pearson Education.

Reference Books:

1. T. Budd “Understanding Object-Oriented Programming with Java”, updated edition, Pearson Education.

2. Cay S. Horstmann “Core Java Volume – 1 Fundamentals”,Pearson Education.

3. Sagayaraj, Dennis, Karthik and Gajalakshmi “Java Programming for core and advanced learners, University Press.

4. Y. Daniel Liang, “Introduction to Java programming”, Pearson Education.

5. P. Radha Krishna “Object Oriented Programming through Java”, University Press.

6. S. Malhotra, S. Chudhary, “Programming in Java”, 2nd edition, Oxford Univ. Press.

7. R.A. Johnson, “Java Programming and Object-oriented Application Development”, Cengage Learning.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B.Tech - VI Sem **L T P C**

3 0 0 3

(AM20A0E502) Web Technologies

Course Objectives:

- Giving the students the insights of the Internet programming and how to design andimplementcomplete applications over the web.
- It covers the notions of Web servers and Web Application Servers, DesignMethodologieswithconcentrationonObject-Orientedconcepts, Client-Side
- Programming, Server-Side Programming, Active Server Pages, Database Connectivity to web applications, Adding Dynamic Content to web applications, Programming Common Gateway Interfaces, Programming the User Interface for theweb applications

UNITI:

Web Basics and Overview: Introduction to Internet, World Wide Web, Web Browsers, URL,MIME,HTTP, Web Programmers Tool box.HTML Common tags: List, Tables, images, forms, frames, Cascading Style Sheets (CSS) &its Types. Introduction to Java Script, Declaring variables, functions, Event handlers (on click, on submit, etc.,) and Form Validation.

Learning Outcomes:

At the end of the unit students will be able to:

- Create standard tags of HTML tags and Knowing the features of designing static web pages.(L6)
- List different types of CSS to design web page attractively.(L1)
- UtilizedifferenttoolslikeAdobeDreamweaverandMicrosoftFrontpage.(L3)

UNITII:

Introduction to XML: Document type definition, XML Schemas, Presenting XML, Introduction to XHTML, Using XML Processors: DOM and SAX. PHP: Declaring Variables, Data types, Operators, Control structures, Functions.

Learning Outcomes:

At the end of the unit, students will be able to:

- Explaindifferenttypesofclientsidescripting.(L2)
- ConstructdynamicwebpagesusingDHTML.(L6)
- Illustratevalidationforwebpages.(L2)

UNIT III:

Web Servers and Servlets: Introduction to Servlets, Life cycle of a Servlet, JSDK, Deploying Servlet, The Servlet API, The javax. Servlet Package, Reading Servlet parameters, Reading Initialization parameters. The javax. Servlet HTTP package, Handling Http Request & Responses, Cookies and Session Tracking.

LearningOutcomes:

Attheendofthe unit,students will be able to:

- AnalyzetheimportanceofServersidescripting.(L4)
- Demonstratedeploymentof theapplicationusingTomcatServer.(L2)
- ExperimentwithStoringandRetrievingdatafromJDBC.(L3)

UNIT IV:

Database Access: Database Programming using JDBC, JDBC drivers, Studying Javax.sql.*package, Connecting todatabase inPHP,Execute Simple Queries,Accessinga Databasefroma Servlet.Introductionto struts frameworks.

LearningOutcomes:

Attheendofthe unit,students will be able to:

- Understand how XML interacts with different applications.(L1)
- Develop PHP Programs using WAMP and XAMPP Server.(L3)
- Examine background applications using XSL and XSLT.(L4)

UNIT V:

JSP Application Development: The Anatomy of a JSP Page, JSP Processing. JSP Application Design and JSP Environment, JSPD eclarations, Directives, Expressions, Scripting Elements, implicit objects.

JavaBeans: Introduction to Beans, Deploying java Beans in a JSP page.

LearningOutcomes:

- ExplaintheimportanceofAJAXArchitecture.
- Integrateandtestweb services.

CourseOutcomes:

- Analyze aweb pageandidentifyits elementsand attributes.
- CreatewebpagesusingXHTMLandCascadingStyles sheets.
- Installationandusageof Server software‘s.
- DatabaseConnectivityto web applications
- BuildwebapplicationsusingServletand JSP

TEXTBOOKS:

1. Web Programming, building internet applications, Chris Bates 2nd edition, WILEYDreamtech(UNITs 1,2)
2. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIESByMartyHall andLarryBrown Pearson (UNITs3, 4,5)

REFERENCEBOOKS:

1. Programmingworldwideweb-Sebesta,PearsonEducation,2007.
2. Internet and World Wide Web – How to program by Dietel and Nieto PHI/ PearsonEducation Asia

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech– VI SEM

L	T	P	C
3	0	0	3

(EG20AOE601) TECHNICAL COMMUNICATION AND PRESENTATION SKILLS

Course Objectives:

- To develop awareness in students of the relevance and importance of technical communication and presentation skills.
- To prepare the students for placements
- To sensitize the students to the appropriate use of non-verbal communication
- To train students to use language appropriately for presentations and interviews
- To enhance the documentation skills of the students with emphasis on formal and informal writing

SYLLABUS

UNIT -1:

Basics of Technical Communication – Introduction – Objectives & Characteristics of Technical Communication – Importance and need for Technical communication - LSRW Skills – Barriers to effective communication

Learning Outcomes:
At the end of the module, the learners will be able to

- Understand the importance of LSRW skills
- Identify and overcome the barriers to effective communication
- Realize the need and importance of technical communication

UNIT -II

Informal and Formal Conversation - Verbal and Non-verbal communication –Kinesics, Proxemics, Chronemics, Haptics, Paralanguage

Learning Outcomes:
At the end of the module, the learners will be able to

- State the difference between formal and informal conversation.
- Apply the knowledge of the difference between the verbal and non-verbal communication
- Evaluate the different aspects of non-verbal communication.

UNIT -III

Written communication – Differences between spoken and written communication – Features of effective writing –Advantages and disadvantages of spoken and written communication- Art of condensation- summarizing and paraphrasing

Learning Outcomes:

At the end of the module, the learners will be able to

- Know the difference between written and spoken communication
- Apply the awareness of features of effective writing.
- Implement the understanding of summarizing and paraphrasing.

UNIT -IV

Presentation Skills – Nature and importance of oral presentation – Defining the purpose – Analyzing the audience - Planning and preparing the presentation, organizing and rehearsing the presentation –Individual and group presentations - Handling stage fright

Learning Outcomes:

At the end of the module, the learners will be able to

- State the importance of presentation skills in corporate climate.
- Analyze the demography of the audience.
- Plan, prepare and present individual and group presentations.

UNIT -V

Interview Skills – The Interview process –Characteristics of the job interview – Pre-interview preparation techniques – Projecting the positive image – Answering Strategies

Learning Outcomes:

At the end of the module, the learners will be able to

- Identify the characteristics of the job interview.
- Understand the process of Interviews.
- Develop a positive image using strategies in answering FAQs in interviews

Course Outcomes

- Understand the importance of effective technical communication
- Apply the knowledge of basic skills to become good orators
- Analyze non-verbal language suitable to different situations in professional life
- Evaluate different kinds of methods used for effective presentations
- Create trust among people and develop employability skills

TEXT BOOKS:

1. Ashrif Rizvi, "Effective Technical Communication", TataMcGrahill, 2011
2. Meenakshi Raman &Sangeeta Sharma, "Technical Communication", 3rd Edition, O U Press 2015

REFERENCES:

1. Pushpalatha & Sanjay Kumar, "Communication Skills", Oxford Univsesity Press
2. Barron's/Books on TOEFL/GRE/GMAT/CAT/IELTS DELTA/Cambridge University Press. 2012.
3. Butterfield Jeff, "Soft Skills for Everyone", Cengage Publications, 2011.
4. Universities Press (India) Pvt Ltd., "Management Shapers Series", Himayatnagar, Hyderabad 2008.
5. John Hughes & Andrew Mallett, "Successful Presentations" Oxford.
6. Edgar Thorpe and Showick Thorpe, "Winning at Interviews" Pearson
7. Munish Bhargava, "Winning Resumes and Successful Interviews", McGraw Hil

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VI Sem

L	T	P	C
0	0	3	1.5

(EC20APC604)DIGITAL SIGNAL PROCESSING LAB

Course Objectives:

1. Ability to apply knowledge of mathematics, science and engineering Construction of tools for visualizing the basic concepts of discrete signal representation such as Fourier Transforms, discrete time representations.
2. Students will learn numerous programming tools for design and Implementations of filtering algorithms.
3. Understand the concept of Multi-rate signal processing and sample rate Conversion.
4. Develop and Implement DSP algorithms in software using CCS with DSP Floating Point Processor.

The Programs shall be implemented in Software (Using MATLAB / Lab View / C Programming/ Equivalent) and Hardware (Using TI / Analog Devices / Motorola / Equivalent DSP processors).

List of Experiments:

1. Find energy and power of any given signal.
2. Generate random signals and plot its PSD.
3. Generate sum of two sinusoidal signals and find the frequency response (magnitude and phase).
4. Find frequency response of a system given by difference equation form.
5. Compute and implement the N-point DTFT of a given sequence and compute the power density spectrum of the sequence.
6. Compute and implement the N-point DFT of a given sequence and compute the power density spectrum of the sequence.
7. Implement and verify N-point FFT of a given sequence and find the frequency response (magnitude and phase).
8. Design IIR Butterworth filter and compare their performances with different orders (Low Pass Filter /High Pass Filter)
9. Design IIR Chebyshev filter and compare their performances with different orders (Low Pass Filter /High Pass Filter).
10. Design and implementation of IIR filter using bilinear transformation & Impulse invariant method.

11. Design FIR filter (Low Pass Filter /High Pass Filter) using windowing technique.
    i. Using rectangular window
    ii. Using hamming window
    iii. Using Kaiser window
12. Design and verify Filter IIR frequency response by using Filter design and Analysis Tool.
13. Design and verify Filter FIR frequency response by using Filter design and Analysis Tool.
14. Compute the Decimation and Interpolation for the given signal.

Note: Any TWELVE of the experiments are to be conducted.

References:

1. Matlab Simulink For Digital Signal Processing by Won,Y.Yang, Tbh/Yes Dee, 2014, Paperback
2. Fundamentals of Digital Signal Processing Using MATLAB 1st Edition (English, Paperback, Schilling Robert J.)

Course Outcomes:

CO1: Implement various DSP Algorithms using software packages.

CO2: Implement DSP algorithms with Digital Signal Processor.

CO3: Analyze and observe magnitude and phase characteristics (Frequency response Characteristics) of digital IIR-Butterworth, Chebyshev filters.

CO4: Analyze & observe magnitude and phase characteristics (Frequency response Characteristics) of digital FIR filters using window techniques.

CO5: Analyze digital filters using Software Tools.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VI Sem

L	T	P	C
0	0	3	1.5

(EC20APC605) MICROWAVE AND OPTICAL COMMUNICATIONS LAB

Course Objectives:

1. To Understand microwave waveguides, passive & active devices, tubes and network analysis.
2. To design microwave matching networks.
3. To Understand the S-matrix of Tee Junctions
4. To perform microwave measurements.

LIST OF EXPERIMENTS

Minimum of Ten experiments to be conducted (Any seven from Part-A)

Part –A (Microwave Experiments)

1. Reflex Klystron Characteristics.
2. Gunn Diode Characteristics.
3. Attenuation Measurement.
4. Directional Coupler Characteristics.
5. VSWR Measurement.
6. Impedance Measurement.
7. Frequency and Wavelength Measurement using slotted line section.
8. Scattering parameters of Magic Tee.
9. Scattering parameters of Isolator.
10. Scattering Parameters of Circulator.

Part –B (Optical Experiments)

1. Measurement of Numerical Aperture of the given fiber.
2. Measurement of Data rate for Digital Optical link.
3. Measurement of losses for Analog Optical link.
4. Characterization of LED.
5. Characterization of Laser Diode.

Course Outcomes:

CO1: Understand the mode characteristics of Reflex Klystron oscillator and negative resistance characteristics of Gunn Oscillator.

CO2: Determine the Scattering matrix of given passive device experimentally and verify the same theoretically.

CO3: Determine numerical aperture and bending losses of a given optical fiber.

CO4: Establish optical link between transmitter and receiver experimentally to find attenuation and signal strength of the received signal.

Equipment's Required:

1. Regulated Klystron Power Supply	:	6 Nos
2. VSWR Meter	:	6Nos
3. Milli/Micro Ammeters	:	10Nos
4. Multimeters	:	10Nos
5. CROs	:	8Nos
6. GUNN power supply & PIN modulator	:	4Nos
7. Relevant Microwave Components	:	---
8. Fiber Optic Analog Trainer Based LED	:	3Nos
9. Fiber Optic Analog Trainer Based Laser	:	2Nos
10. Fiber Optic Digital Trainer	:	1No
11. Fiber Cables	:	(Plastic, Glass)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VI Sem

L	T	P	C
0	0	3	1.5

(EC20APC606)VLSI DESIGN LAB

Course Objectives:

1. To understand and develop HDL source code for the given problem/experiment
2. To analyze the obtained results of the given experiment/problem
3. To simulate the given circuit with suitable simulator and verify the results
4. To understand how to use FPGA/CPLD hardware tools in the lab
5. To design and implement the experiments using FPGA/CPLD hardware tools

List of Experiments:

PART (A): FPGA Level Implementation (Any Seven Experiments)

Note 1: The students need to develop VHDL/ Verilog Source code, perform simulation using relevant simulator and analyze the obtained simulation results using necessary synthesizer.

Note 2: All the experiments need to be implemented on the latest FPGA/CPLD Hardware in the Laboratory.

Design and Implementation of the following

1. Implementation of Universal logic gates
2. 4-bit Parallel Adder/Subtractor circuit
3. 4-bit Carry Look Ahead Adder circuit
4. (2X2) Multiplexer
5. (16:1) Multiplexer through (4:1) Multiplexer
6. 8:3 Priority Encoder
7. 8-bit parity generator and checker
8. Ring Counter
9. Binary counter

EDA Tools/Hardware Required:

1. EDA Tool that supports FPGA Programming including Xilinx Vivado / Altera (Intel) / Cypress / Equivalent Industry Standard tool along with corresponding FPGA Hardware.
2. Desktop Computer with appropriate Operating system that supports the EDA tools.

PART (B): Back-end Level Design and Implementation (Any Three Experiments)

Note: The students need to design the following experiments at schematic level using CMOS logic and verify the functionality. Further students need to draw the corresponding layout and verify the functionality including parasitics. Available state of the art technology libraries can be used while simulating the design using Industry standard EDA Tools.

Design and Implementation of the following

1. Universal Gates
2. CMOS Inverter
3. Full Adder
4. Decoder
5. D-Flip-Flop

EDA Tools/Hardware Required:

1.Mentor Graphics Software / Cadence/Synopsys/Tanner or Equivalent Industry Standard Software/CAD Tool.

2.Desktop Computer with appropriate Operating system that supports the EDA tools.

Course Outcomes:

CO1: Understand how to use FPGA/CPLD hardware tools in the lab.

CO2: Develop HDL source code for the given problem/experiment, and simulate the given circuit with suitable simulator and verify the results.

CO3: Analyze the obtained results of the given experiment/problem.

CO4: Design and implement the experiments using FPGA/CPLD hardware tools.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VI Sem

L	T	P	C
1	0	2	2

(EC20ASC601)GRAPHICAL SYSTEM DESIGN USING Lab VIEW

Course Objectives:

1. To acquire familiarity with the LabVIEW Programming language and to know what is meant by 'Graphical Programming Language'.
2. To be able to write LabVIEW programs incorporating pre-written and new code.
3. To build graphical user interfaces (GUIs) for laboratory instrumentation.

Unit I

NAVIGATING LabVIEW:

Introducing LabVIEW environment, Comparison with Text Based Programming, Creating and using LabVIEW projects, Parts of VI-Front Panel-Block Diagram-Icon And Connector Panel-Controls Pallete-Functions Pallete.

LabVIEW ENVIRONMENT:

Indicators-Controls- wiring the controls and indicators- building VIs- run modes data, Types in labVIEW- development of GUIs- labVIEW help. Searching controls, VIs and functions-implementing a VI- basic arithmetics in LabVIEW, Understanding the dataflow programming model of LabVIEW, Recognizing different data types.

Unit II

LabVIEW FOUNDATION:

Arithmetic functions- Expression node- Formula node-Compound arithmetic-Comparison pallet, Boolean pallete, Arrays -Various functions of arrays-strings- various functions of strings-clusters -various functions of clusters.

Unit III

PROGRAMMING EXECUTION WITH STRUCTURES:

Case structure, For Loop - The While Loop - Placing Objects inside Objects - Counting the Loops - Shift Registers, Introduction to MyDAQ.

Practice Exercises: Any ten experiments are to be done

1. Verification of basic arithmetic operations.

2. Perform Boolean operations.

3. Verify even or odd of a given numbers.

4. Verify application using expression node, formula node.

5. Construct array maximum and minimum.

6. Verify applications of string functions.

7. Find the sum of ‘n’ numbers using loop.

8. Find the factorial of a give number using loop.

9. Verify applications of shift register.

10. Design traffic light control using case structure.

11. Design water level indicator (Nested loop).

12. Data acquisition using MyDAQ.

References:

1. https://www.ni.com/pdf/training/us/core-1-sample-course-manual

2. https://ptolemy.berkeley.edu/eecs20/labs/LabVIEW_Labs/Lab01/Lab01.pdf

Course Outcomes:

CO1: Able to develop and edit functional block diagrams and front panels.

CO2: Able to utilize composite data in the form of Arrays and Clusters.

CO3: Able to control program execution through structures such as ‘For-While’ loops and ‘Case Structures’.

CO4: Able to utilize features which will reconfigure the general physical and software layouts of the LabVIEW programming environment.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech – VI Sem

L	T	P	C
3	0	0	0

(BA20AMC502) INTELLECTUAL PROPERTY RIGHTS AND PATENTS

Course Objectives:

This course introduces the student to the basics of Intellectual Property Rights, Copy Right Laws,Cyber Laws, Trade Marks and Issues related to Patents. The overall idea of the course is to help and encourage the student for startups and innovations

UNIT-I

Introduction to Intellectual Property Law – Evolutionary past – Intellectual Property Law Basics –Types of Intellectual Property – Innovations and Inventions of Trade related Intellectual Property Rights – Agencies Responsible for Intellectual Property Registration – Infringement – Regulatory –Overuse or Misuse of Intellectual Property Rights–Compliance and Liability Issues.

UNIT-II

Introduction to Copyrights–Principles of Copyright–Subject Matters of Copy right–Rights Afforded by Copyright Law –Copyright Ownership– Transfer and Duration – Right to Prepare Derivative Works–Rights of Distribution–Rights of performers–Copy right Formalities and Registration – Limitations – Infringement of Copyright – International Copyright Law- Semiconductor Chip Protection Act.

UNIT-III

Introduction to Patent Law–Rights and Limitations–Rights under Patent Law–Patent Requirements– Ownership and Transfer– Patent Application Process and Granting of Patent– Patent Infringement and Litigation–International Patent Law–Double Patenting–Patent Searching–Patent Cooperation Treaty – New developments in Patent Law- Invention Developers and Promoters.

UNIT-IV

Introduction to Trade Mark – Trade Mark Registration Process – Post registration procedures – Trade Mark maintenance – Transfer of rights – Inter parties Proceedings – Infringement – Dilution of Ownership of Trade Mark – Likelihood of confusion – Trade Mark claims – Trade Marks Litigation –International Trade Mark Law.

UNIT-V

Introduction to Trade Secrets – Maintaining Trade Secret – Physical Security – Employee Access Limitation – Employee Confidentiality Agreement – Trade Secret Law – Unfair Competition – Trade Secret Litigation–Breach of Contract–Applying State Law. Introduction to Cyber Law–Information Technology Act – Cyber Crime and E-commerce – Data Security – Confidentiality –Privacy–International aspects of Computer and Online Crime.

Course Outcomes:

- Understand IPR law & Cyber law
- Discuss registration process, maintenance and litigations associated with trademarks
- Illustrate the copy right law
- Enumerate the trade secret

Textbooks:

- DeborahE.Bouchoux:“IntellectualProperty”.Cengagelearning,NewDelhi
- KompalBansal&ParishitBansal“FundamentalsofIPRforEngineers”,BSPublications(Press)
- CyberLaw. Texts &Cases, South-Western’s Special Topics Collections

References:

- PrabhuddhaGanguli:‘IntellectualPropertyRights”TataMcGraw–Hill,NewDelhi
- Richard Stim:“Intellectual Property”, Cengage Learning, NewDelhi.
- R.RadhaKrishnan,S.Balasubramanian:“IntellectualPropertyRights”,ExcelBook.NewDelhi.
- M.AshokKumar and Mohd. IqbalAli: “Intellectual Property Right” Serials Pub.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech – VI Sem **L T P C**

2 0 0 0

(AM20AMC601) AI TOOLS TECHNIQUES & APPLICATIONS

Course Outcomes:

At the end of the course, a student will be able to:

CO1: Demonstrate various AI applications, languages and Intelligent Agents.

CO2: Solve problems using search strategies and understand the basic process of Machine Learning. CO3: Apply classification and regression algorithms on real world data.

CO4: Develop an expert system.

CO5: Comprehend the structure of an artificial neural network and identify the building blocks of a convolutional neural network.

UNIT-I:

ARTIFICIAL INTELLIGENCE: Introduction, Definition of AI, Goals of AI, Turing Test, Applications of AI, AI Programming Languages; Introduction, Intelligent Systems, the Concept of rationality, types of Agents, Environments and its properties, PEAS.

Learning Outcomes:

At the end of the unit, student will be able to

1. classify various AI Applications. (L2)

2. list the AI Languages. (L1)

3. explain various types of Agents. (L2)

UNIT-II:

SEARCH STRATEGIES: Introduction, Brute Force or Blind Search, Breadth-First Search, Depth-First Search, Hill Climbing, Best-First Search.

MACHINE LEARNING: Introduction, Machine Learning Process, Feature Engineering-Feature Extraction, Feature Selection, Feature Engineering Methods, Feature Engineering, Data VisualizationLine Chart, Bar Chart, Pie Chart, Histograms, Scatter Plot, Seaborn-Distplot, joint plot.

Learning Outcomes:

At the end of the unit, student will be able to

1. apply informed search techniques to problems. (L3)

2. interpret the features using feature engineering. (L2)

3. analyse the data using different visualization techniques. (L4)

UNIT-III:

REGRESSION: Simple Regression, Multiple Regression, Model Assessment-Training Error, Generalized Error, Testing Error, Bias-Variance Tradeoff

CLASSIFICATION: Linear Classification, Logistic Regression, Decision Trees

Learning Outcomes:

At the end of the unit, student will be able to

1. analyse different classification models and make recommendations towards learning. (L4)

2. solve real world data using classification techniques. (L3)

3. understand different regression models and about its problems. (L2)

UNIT-IV:

CLUSTERING: K-Means Clustering. EXPERT SYSTEMS: Introduction, Need and Justification of ES, Knowledge Representation, Knowledge Acquisition and Variation, Utilisation and Functionality, Basics of Prolog.

Learning Outcomes:

At the end of the unit, student will be able to

1. Understand the concept of clustering over classification. (L2)

2. Distinguish between expert systems and traditional systems. (L2)

3. Identify different applications of expert systems. (L3)

UNIT-V:

ARTIFICIAL NEURAL NETWORKS (ANNs): Biological Neuron, Types of ANN, Optimization Techniques, Vanishing Gradient Problem, Exploding Gradient Problem, Weight Initialization.

CONVOLUTION NEURAL NETWORKS(CNNs): Introduction, Components of CNN Architecture Convolution Layer(with example), Pooling/Down sampling Layer, Flattening Layer, Fully Connected Layer; Rectified Linear Unit Layer, Exponential Linear Unit, Unique Properties of CNN, Architectures of CNNs, Applications of CNN.

Learning Outcomes:

At the end of the unit, student will be able to

1. Understand the architecture of an artificial neuron. (L2)

2. Illustrate different artificial neural network architecture. (L2)

3. Analyse the effect of different activation functions of a CNN unit. (L4)

TEXT BOOKS:

1. Dr.Nilakshi Jain, Artificial Intelligence, As per AICTE: Making a System Intelligent, Wiley Publications, 1st Edition,2019.

2. Vijayvargia, Abhishek, Machine Learning with Python: An Approach to Applied Machine Learning, BPB Publications; 1st edition,2018.

3. Dr.S.Lovelyn Rose, Dr. L.Ashok Kumar, Dr.D.Karthika Renuka, Deep Learning using Python, Wiley India Pvt. Ltd 2019.

REFERENCES:

1. Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, Pearson Publications, 4th Edition, 2020.

2. Saroj Kaushik, Artificial Intelligence, Cengage Learning India, 2011.

WEB REFERENCES: 1. https://keras.io/ 2. https://ai.google/ 3. https://www.coursera.org/learn/neural-networks-deep-learning#syllabus 4. https://swayam.gov.in/nd1_noc19_me71/preview

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VII Sem

L	T	P	C
3	0	0	3

(EC20APE701) ANALOG & DIGITAL IC DESIGN

Course Objectives:

1. Learn the operation of MOS transistor in Triode, Saturation and Cut-off regions.
2. Learn about the use of Current mirror circuits as resistive loads in the implementation of CMOS amplifier circuits.
3. Study the importance of Compensation circuits in the design of CMOS operational amplifiers.
4. Learn about the working principle of two, three and four input CMOS logic circuits.
5. Study the working cycles of DRAM and SRAM cells.

Unit I

MOS transistor and its Modelling:

Basic Operation, Large-Signal Modelling, Body Effect, p-Channel Transistors, Low-Frequency and High-Frequency Small-Signal Modelling in the Active Region, Small-Signal Modelling in the Triode and Cutoff Regions, Analog Figures of Merit and Trade-offs, MOS transistor equations and Advanced MOS Modelling concepts.

Unit II

Current Mirrors and Single-Stage Amplifiers:

Simple CMOS Current Mirror, Common-Source Amplifier, Source-Follower or Common-Drain Amplifier, Common-Gate Amplifier, Source-Degenerated Current Mirrors, Cascode Current Mirrors and Cascode Gain Stage.

Unit III

Operational Amplifier (OPAMP)Design and Compensation:

Two-Stage CMOS Opamp, Opamp Gain, Frequency Response, Slew Rate, n-Channel or p-Channel Input Stage, Systematic Offset Voltage, Opamp Compensation-Dominant-Pole Compensation and Lead Compensation, Compensating the Two-Stage Opamp, Making Compensation Independent of Process and Temperature.

Unit IV

Combinational and Sequential MOS Logic Circuits:

MOS logic circuits with Depletion nMOS loads, CMOS logic circuits, Complex logic circuits, Behavior of Bistable elements, SR Latch circuit, Clocked latch and Flip-Flop circuits, CMOS D-Latch and Edge–Triggered Flip-Flop.

Unit V

Semiconductor Memories:

Overview of Semiconductor memories, RAM array organization, DRAM-Cell types, Operation of Three-Transistor DRAM cell and One-Transistor DRAM cell, Leakage currents and Refresh operation, SRAM- Various configurations, Full CMOS SRAM cell, Memory structure of SRAM Cell array and Leakage currents.

Text Books:

1. T.C.Carusone, D.A.Johns & K.W.Martin, “Analog Integrated Circuit Design”, Second Edition, John Wiley & Sons, Inc., 2019.
2. S.M.Kang & Y.Leblebici,“CMOS Digital Integrated Circuits-Analysis and Design” Third edition, McGraw Hill Education (India) Pvt. Ltd., 2020.

References:

1. Neil H. E. Weste & D.M.Harris, “CMOS VLSI Design-A Circuits and Systems Perspective”, Fourth edition, Pearson Edition, 2020.
2. Kiat Seng Yeo and Kaushik Roy, “Low- Voltage, Low-Power VLSI Subsystems”, McGraw Hill Professional Engineering Education, 2018.

Course Outcomes:

CO1:Interpret the various Modelling effects encountered in a MOSFET

CO2:Evaluate the various parameters of CG, CD and CS amplifier circuits.

CO3:Summarize the various steps in the design of a Compensated CMOS Operational amplifier circuit.

CO4:Design two, three and four input CMOS logic circuits.

CO5: Illustrate the working cycles of DRAM and SRAM cells.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VII Sem

L	T	P	C
3	0	0	3

(EC20APE702)FPGA DESIGN

Course Objectives:

1. Introduce digital design concepts through various Programmable Logic Devices
2. Understand the FPGA architectures in detail
3. Analyze the physical design cycle in FPGA
4. Know the various applications of FPGAs

Unit I

Introduction to Programmable Logic Devices: Programmable logic devices (PLD)- Programmable Read Only Memory, Programmable Logic Arrays (PLA), Programmable Array Logic (PAL), Digital design using PLDs. Complex Programmable Logic Devices - Features and applications of complex programmable logic devices, Altera Max - 7000 series and Altera FLEX logic- 10K series CPLD.

Unit II

Field Programmable Gate Arrays: Features and applications of FPGAs, advantages and disadvantages of FPGA, architecture of FPGA, recent technology trends, programming technologies, commercially available FPGAs.

Unit III

SRAM Field Programmable Gate Arrays: SRAM Programming Technology, SRAM Programmable FPGAs: Xilinx XC4000, Spartan-3 FPGA Architectures.

Unit IV

Anti-Fuse Programmed FPGAs: Anti-fuse Programming technology, The Actel ACT1, ACT2 and ACT3 architectures.

Unit V

Physical Design Implementation on FPGAs: FPGA Design flow, Physical Design cycle for FPGAs, Partitioning, Routing-non-segmented, segmented and staggered models.

Design Applications: General design issues, Counter design using FPGA, Designing Adders with the ACT Architecture.

Text Books:

1. Field Programmable Gate Array Technology, Stephen M. Trimberger, Springer International Edition, 1994.
2. Field-Programmable Gate Arrays, Stephen D. Brown, Springer, 1992
3. Fundamentals of digital logic with verilog design, Stephen Brown and Zvonko Vranesic, McGraw-Hill, 2002.

References:

1. Algorithms for VLSI Physical Design Automation, Naveed Sherwani, 3rd Edition, Springer International Edition, 2005
2. Fundamentals of Logic Design, Charles H. Roth Jr, 5th Edition, Cengage Learning, 2004.

Course Outcomes:

CO1: Design digital applications using PLDs.

CO2: Analyze the architectural features of FPGAs.

CO3: Analyze the SRAM programming technology of FPGAs.

CO4: Analyze the Anti-Fuse Programmed FPGA.

CO5: Analyze Physical Design cycle for FPGA and implement various applications using FPGA.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VII Sem

L	T	P	C
3	0	0	3

(EC20APE703)LOW POWER VLSI CIRCUITS AND SYSTEMS

Course Objectives:

1. Learn the operation of MOS transistor in Triode, Saturation and Cut-off regions.
2. Learn about the implementation of MOS dynamic circuits.
3. Learn the various types of power dissipations in a MOS transistor.
4. Enable the students to learn about the Scaling Models and Scaling factors.
5. Study in detail about the various approaches for minimizing leakage power MOS transistor circuits.

Unit I

MOS Transistors:

Introduction, Historical background, why low power, sources of power dissipations, low-power design methodologies, Structure of MOS Transistor, the Fluid model, Modes of operation of MOS Transistor and Electrical characteristics of MOS Transistors, MOS Transistors as a switch.

Unit II

MOS Inverters: Introduction, inverter and its characteristics, configurations, inverter ratio in different situations, switching characteristics.

MOS Combinational Circuits: introduction, Pass-Transistor logic, Gate logic, MOS Dynamic Circuits: Single-phase, Two-phase and CMOS dynamic circuits, Domino CMOS circuits and NORA logic.

Unit III

Sources of Power Dissipation:

Introduction, Short-circuit power dissipation, Switching power dissipation, Glitching power dissipation and Leakage power dissipation.

Unit IV

Supply voltage scaling for low power:

Introduction, device features size scaling, architecture-level approaches, voltage scaling, multilevel voltage scaling, challenges, dynamic voltage and frequency scaling and adaptive voltage scaling.

Unit V

Leakage Power Minimization:

Introduction, fabrication of multiple threshold voltages, approaches for minimizing leakage power, VTCMOS approach, Transistor stacking, MTCMOS approach, Adiabatic Logic Circuits-Adiabatic Charging, Adiabatic Amplification and Adiabatic logic gates.

Text Books:

1. Ajit Pal, “Low Power VLSI Circuits and Systems”, Springer New Delhi, 2019.
2. W.Wolf “Modern VLSI Design IP based design” Fourth edition, PHI Learning Pvt. Ltd., 2020.

References:

1. K.Eshraghian, D.A. Pucknell and S.Eshraghian, “Essentials of VLSI Circuits and Systems”, Third Edition, PHI Learning Pvt. Ltd., 2019.
2. Neil H. E. Weste & D.M.Harris, “CMOS VLSI Design-A Circuits and Systems Perspective”, Fourth edition, Pearson Edition, 2020.

Course Outcomes:

CO1:Interpret the structure and various electrical characteristics of MOS transistor.

CO2:Compare Voltage–Current and transfer characteristics of inverters of different configurations

CO3:Evaluate the Power dissipation both at circuit level and system level.

CO4:Summarize the scaling effects of various key parameters of MOSFET devices.

CO5:Distinguish between standby and run-time leakage power dissipation.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VII Sem

L	T	P	C
3	0	0	3

(EC20APE704)DIGITAL IMAGE PROCESSING

Course Objectives:

1. To introduce fundamentals of Image Processing.
2. To expose various transforms in frequency domains.
3. To descript various intensity transformations in spatial and frequency domains.
4. To dissimilate various segmentation and compression techniques for image processing.
5. To discuss various color models and to introduce the concepts of color image processing.

Unit I

Digital Image Fundamentals:

A simple image model, Fundamental Steps in Digital Image Processing, Elements of visual perception, image sensing and acquisition, image sampling and quantization, basic relationships between pixels – neighborhood, adjacency, connectivity and distance measures

Unit II

Image Transforms:

Two dimensional Discrete Fourier transform, Walsh Transform, Discrete Cosine Transform, Hadamard transform, Haar transform, Slant transform, Wavelet Transforms – Introduction, continuous vs Discrete wavelet Transform, Discrete wavelet transform – Haar wavelet Transform.

Unit III

Image Enhancement and Filtering:

Gray level transformations, Histogram Processing, Histogram equalization and Specifications, Spatial Filtering, Smoothing filters, Sharpening filters, Enhancement in Frequency domain - Low-pass, High-pass and Homomorphic filtering.

Unit IV

Image Segmentation:

Point, Line and Edge Detection, Canny Edge Detection, Laplacian of Gaussian Edge Detection, Thresholding, Region Growing, Region Splitting and Merging

Image Compression:

Fundamentals of Compression, Image compression model, Types of Redundancy – Coding, Inter pixel and Psycho visual, Lossless compression – Huffman coding, Shannon-Fano coding, Lossy Compression - Transform coding.

Unit V

Color Image Processing:

Color Fundamentals, Color Models - RGB, YUV, HIS, Pseudo Color, Full Color image processing, Color transformations – formulation, Color complements, Color slicing, tone and Color corrections. Color image smoothing and Sharpening.

Text Books:

1. Rafael C. Gonzalez, Richard E woods and Steven L. Eddins, “Digital Image processing using MATLAB”, Tata McGraw Hill, 2010.
2. K.P Soman, “Insight Into Wavelets : from Theory to Practice”, PHI Learning Pvt. Ltd., 2010

References:

1. Milan Sonka, Vaclav Hlavac, Roger Boule, Image Processing, Analysis, and Machine Vision, Third Edition, Cengage Learning, 2016.
2. S Jayaraman, S Esakkirajan, T Veerakumar, “Digital Image processing”, Tata McGraw Hill.
3. William K. Pratt, “Digital Image Processing”, John Wiley, 3rd Edition, 2004.

Course Outcomes:

CO1: Understand fundamentals of digital image processing and apply engineering mathematics in processing of digital image.

CO2: Compute 2D transforms in frequency domains w.r.t digital image processing

CO3: Analyze different image enhancement techniques in spatial and frequency domains

CO4: Describe various techniques in image segmentation and apply various algorithms to perform image compression.

CO5: Illustrate various color models and apply color models in image processing.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VII Sem

L	T	P	C
3	0	0	3

(EC20APE705) ELECTRONIC DEFENSE SYSTEMS

Course Objectives:

1. Study about the need for Weapon systems.
2. Learn about various Artillery Systems and its performance parameters.
3. Learn about the operation of Radar Warning Receivers.
4. Study about the various Electronic Countermeasures in Defense systems.
5. Know about the Antistealth Techniques and State of the Art and its Perspectives.

Unit I

Electronic Defense:

Introduction, Systems in use in the Armed Forces, The main weapon systems, Objectives of Electronic Defense-Organization of Electronic Defense, Electronic Defense Systems and their Operational Objective, Information Operation (IO), Information Warfare (IW) and Need for the Study of Weapon Systems.

Unit II

Sensors:

Infrared Sensors: Review of Radiant Energy, Infrared Radiation Produced by Targets of Interest, IR Range Equation, Suppression of Background Effects and IR Systems

Weapon Systems:

Introduction, Artillery Systems-Firing Accuracy, Susceptibility to Jamming of an Artillery System, Missile Systems-Command Missiles, Beam-Riding Missiles, Semiactive Homing Missiles, Active Homing Missiles, Track-Via-Missile (TVM) Systems, Passive IR-Guided Missiles, Sea-Skimming Missiles and Passive Antiradiation Missiles

Unit III

Electronic Intercept Systems:

Introduction, Equation of a Passive System, Radar Warning Receivers-RWR Sensitivity, Electronic Support Measures-Omnidirectional Antennas, Antennas for Direction Finding and Frequency Measurement Receiver, Electronic Intelligence (ELINT) Systems- ELINT Sensors, Surveillance Network and ELINT Processing Center (EWAC), Infrared Intercept Systems- Missile Launch Warner/Missile Approach

Warner, Forward-Looking Infrared Systems, Communications ESM and Communication Intelligence- Communications ESM and COMINT.

Unit IV

Electronic Countermeasures Systems:

Introduction, Operational Jamming Modes: SPJ, SOJ, and EJ, Onboard ECM Systems-Passive Systems, Active Systems, The Jammer Equations, The DRFM, Transmitters, ECM Antennas, The Pod, ECM Techniques-Spot Noise, Barrage Noise, Swept Noise/CW and Gated Noise, High-Resolution Radar Jamming, Infrared Countermeasures(IRCM)-Modulated Sources, Laser IRCM, Off-Board ECM Systems-Passive Systems, Active Systems and Communications Countermeasures

Unit V

New Electronic Defense Techniques and Technologies:

Introduction, New Electronic Defense Architectures, ED Basic Technology Advances, Shared Apertures, HPM Weapons, Anti-Antiradiation Missile Techniques, Antistealth Techniques and State of the Art and Perspectives.

Text Books:

1. Filippo Neri, “Introduction to Electronic Defense Systems”, Second Edition, Artech House, Boston,2017.
2. Ray Tricker, “Defence Electronics” Second edition, Butterworth-Heinemann, 2015.

References:

1. Warren J. Boord and John B. Hoffman, “Air and Missile Defense Systems Engineering”, First Edition, CRC Press, Taylor and Francis Group, 2018.
2. William P. Delaney, “Perspectives on Defense Systems Analysis”, MIT Lincoln Laboratory Series, 2019.

Course Outcomes:

CO1: Summarize the objectives of Electronic Defense Systems.

CO2: Interpret the operating principles of various Artillery Systems.

CO3: Analyze Radar warning receivers, Electronic support systems and Electronic intelligence systems.

CO4: Illustrate the working principle of various jamming techniques in different operational modes.

CO5: Discuss newly designed systems to counter the recent threat embodied in stealth aircrafts.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VII Sem

L	T	P	C
3	0	0	3

(EC20APE706) SMART SENSOR NETWORKS

Course Objectives:

1. Study about the Sensor systems and its various characteristics.
2. Learn about Transduction Mechanisms and its Application range in Biosensors.
3. Learn about the parameters of interest related to Chemical sensors, Capacitive and Inductive Sensors for use in real-time applications.
4. Study the working principle and applications of Temperature and Nanotechnology-Enabled Sensors.
5. Understand the issues pertaining to sensor networks and the challenges involved in managing a sensor network.

Unit I

Sensor Fundamentals:

Introduction, Sensor Systems, Sensor Characteristics, System Characteristics, Instrument Selection, Data Acquisition and Readout, Installation and Conditioning Bridge Circuits

Unit II

Sensors-I:

Introduction, Technology Fundamentals, Selecting and Specifying Accelerometers, Applicable Standards, Interfacing and Designs.

Biosensors: What is a Biosensor, Applications of Biosensors, Origin of Biosensors, Bioreceptor Molecules, Transduction Mechanisms in Biosensors, Application Range of Biosensors and Future prospects.

Unit III

Sensors-II:

Chemical Sensors: Technology Fundamentals and Applications.

Capacitive and Inductive Displacement Sensors: Introduction, Capacitive Sensors, Inductive Sensors, Capacitive and Inductive Sensor Types, Selecting and Specifying Capacitance and Inductive Sensors, Comparing Capacitive and Inductive Sensors, Applications, Latest Developments.

Unit IV : Sensors-III

Temperature Sensors: Sensor Types and Technologies, Selecting and Specifying Temperature Sensors.

Nanotechnology-Enabled Sensors: Possibilities, Realities and Applications.

Unit V

Introduction to Wireless Sensor Networks: Challenges for Wireless Sensor Networks, Applications for Wireless Sensor Networks, Enabling Technologies for Wireless Sensor Networks, Single Node Architecture-Hardware Components, Energy Consumption of Sensor Nodes.(Only Operation Stats With Different Power Consumption of Sensor and Actuators is Included), Deployment Environments Sensor Network Architecture-Sensor network scenarios, Optimization Goals and Figures of Merit, Design Principles of WSN, Service Interfaces of WSNs and Gateway-Concepts.

Text Books:

1. John S. Wilson, “Sensor Technology Handbook”, Elsevier Inc., 2012.
2. Holger Karl and Andreas Willig, “Protocols and Architectures for Wireless Sensor Networks”, Third Edition, John Wiley & Sons, Ltd., 2016.

References:

1. Alan S Morris, “Measurement and Instrumentation Principles”, Third Edition, Butterworth-Heinemann, 2016.
2. John R.Taylor, “Introduction to Error Analysis: The Study of Uncertainties in Physical Measurements”, Second Edition, University Science Books, California, 2014.

Course Outcomes:

CO1: Discuss the various characteristics of Sensors and Systems.

CO2: Interpret the various Transduction Mechanisms in Biosensors.

CO3: Decide the appropriate sensor for a given application of interest.

CO4: Outline the Possibilities and Realities of Nanotechnology-Enabled Sensors.

CO5: Explore the Physical layer, Transceiver design considerations and Assignment of MAC addresses.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech- VII Sem

L T P C

3 0 0 3

(EC20APE707) DATA COMMUNICATION AND NETWORKING

Course Objectives:

1. Provide a solid conceptual understanding of the fundamentals of data communication.
2. Explore the various layers of TCP/IP and OSI network models and protocols.
3. Explore the various protocols used in data communication networks.
4. Make students to understand related to computer networks.

Unit I

Data Communication: Advantages and applications of Computer Networks, Components, Networks, Protocols and Standards, ISO-OSI and TCP/IP Network Models.

Physical Layer: Transmission media-guided and Unguided, Switching systems - Circuit switching, Packet switching - Datagram switching & Virtual circuit switching.

Unit II

Data link layer: Framing, Flow and Error control, Protocols - Stop-and-wait Protocol, Stop-and-wait ARQ, Sliding window protocol, Go-Back-N ARQ, Selective Repeat ARQ, HDLC, Point to Point Protocol.

Unit III

Medium Access Sub layer: Multiple access techniques - random access and controlled access, Channelization, multiple access protocols, IEEE standard 802.3 & 802.11 for LANS and WLAN, Connecting Devices - repeaters, hubs, bridges, switches, routers, Gateway, Backbone networks, Virtual LANs.

Unit IV

Network Layer: Addressing types - Physical, Logical & port address, Internetworking, IP addressing (Class full & Classless), Network layer protocols - ARP, RARP, BOOTP, DHCP, IPV4, ICMP, IPV6, ICMPV6, IGMP, Unicast and Multicast Routing protocols.

Unit V

Transport Layer: Process to process delivery, Connection oriented & Connectionless Transport, UDP, TCP, congestion control and Quality of Service.

Application Layer: Application layer protocols – DNS, WWW and HTTP, FTP, SMTP. Introduction to streaming Audio/Video.

Text Books:

1. Behrouz A. Forouzan, “Data Communications and Networking”, McGraw Hill, 4th Edition.
2. S. Tannenbum, D. Wetherall, “Computer Networks”, Prentice Hall, Pearson, 5th Edition.

Reference Books:

1. Fred Halsall, “Computer Networks”, Addison – Wesley Pub. Co. 1996.
2. Larry L, Peterson and Bruce S. Davie, “Computer Networks: A system Approach”, Elsevier, 4th Edition.
3. Tomasi, “Introduction To Data Communications & Networking”, Pearson 7th impression, 2011
4. William Stallings, “Data and Computer Communications”, Prentice Hall, Imprint of Pearson, 9th Edition.

Course Outcomes:

CO1. Choose the appropriate technology for data transmission based on the requirement by analysing various computer networks.

CO2. Analyze different flow and error control protocols.

CO3. Analyze different multiple access protocols and network standards, connecting devices.

CO4. Configure simple networks and assign IP addresses to hosts.

CO5. Apply the concept of different application layer protocols and provide congestion free quality service.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech- VII Sem

L T P C

3 0 0 3

(EC20APE708) SATELLITE COMMUNICATIONS

OBJECTIVES

1. To enable the student to become familiar with satellites and satellite services.
2. Study the satellite orbits and launching.
3. Study the earth segment and space segment components
4. Study the satellite access by various users.

UNIT I

SATELLITE ORBITS

Kepler's Laws, Newton's Law, Orbital Parameters, Orbital Perturbations, Station Keeping, Geo Stationary and Non Geo-Stationary Orbits, Look Angle Determination, Limits of Visibility, Eclipse, Sub Satellite Point, Sun Transit Outage, Launching Procedures Launch Vehicles and Propulsion.

UNIT II

SPACE SEGMENT

Spacecraft Technology, Structure, Primary Power, Attitude and Orbit Control, Thermal Control and Propulsion, Communication Payload and Supporting Subsystems, Telemetry, Tracking and Command, Transponders, The Antenna Subsystem.

UNIT III

SATELLITE LINK DESIGN

Basic Link Analysis, Interference Analysis, Rain Induced Attenuation and Interference, Ionospheric Characteristics, Link Design with and without Frequency Reuse.

UNIT IV

SATELLITE ACCESS AND CODING METHODS

Modulation and Multiplexing: Voice, Data, Video, and Analog, Digital Transmission System, Digital Video Broadcast, And Multiple Accesses: FDMA, TDMA, CDMA, DAMA Assignment Methods, Compression, Encryption, Coding Schemes.

UNIT V

SATELLITE APPLICATIONS

INTELSAT Series, INSAT, VSAT, Mobile Satellite Services: GSM, GPS, INMARSAT, LEO, MEO, Satellite Navigational System. GPS Position Location Principles, Differential GPS, Direct Broadcast satellites (DBS/DTH).

TEXT BOOKS

1.Dennis Roddy, “Satellite Communication”, 4th Edition, Mc Graw Hill International, 2006.

2. Timothy, Pratt, Charles, W.Bostain, Jeremy E. Allnutt,"Satellite Communication”, 2nd Edition, Wiley Publications, 2002.

REFERENCES

1. Wilbur L.Pritchard, Hendri G. Suyderhoud, Robert A. Nelson, “Satellite Communication Systems Engineering”, Prentice Hall/Pearson, 2007.

2. N.Agarwal, “Design of Geosynchronous Space Craft”, Prentice Hall, 1986.

3. Bruce R. Elbert, “The Satellite Communication Applications”, Hand Book, Artech House Bostan London, 1997.

COURSEOUTCOMES

CO1: Define orbital mechanics and launch methodologies.

CO2: Describe satellite subsystems.

CO3: Design link power budget for satellites.

CO4: Compare competitive satellite services.

CO5: Explain satellite access techniques and DTH and compression standards.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech- VII Sem

L	T	P	C
3	0	0	3

(EC20APE709)WIRELESS SENSOR NETWORKS

COURSE OBJECTIVES

1. To make students understand the basics of Wireless sensor Networks.
2. To familiarize with learning of the Architecture of WSN.
3. To understand the concepts of Networking and Networking in WSN.
4. To study the design consideration of topology control and solution to the various problems.
5. To introduce the hardware and software platforms and tool in WSN.

UNIT I

OVERVIEW OF WIRELESS SENSOR NETWORKS

Single Node Architecture- Hardware Components- Network Characteristics- unique constraints and challenges, Enabling Technologies for Wireless Sensor Networks-Types of wireless sensor networks

UNIT II

ARCHITECTURES

Network Architecture - Sensor Networks Scenarios - Design Principle, Physical Layer and Transceiver Design Considerations, Optimization Goals and Figures of Merit, Gateway Concepts, Operating Systems and Execution Environments - introduction to Tiny OS and nesC - Internet to WSN Communication.

UNIT III

NETWORKING SENSORS

MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts-SMAC, B-MAC Protocol, IEEE 802.15.4 standard and Zigbee, the Mediation Device Protocol, Wakeup Radio Concepts, Address and Name Management, Assignment of MAC Addresses, Routing Protocols Energy Efficient Routing, Geographic Routing.

UNIT IV

INFRASTRUCTURE ESTABLISHMENT

Topology Control, Clustering, Time Synchronization, Localization and Positioning, Sensor Tasking and Control.

UNIT V

SENSOR NETWORK PLATFORMS AND TOOLS

Sensor Node Hardware-Berkeley Motes, Programming Challenges, Node level software platforms, Node- level Simulators, State centric programming

BOOKS:

1. Kazem Sohraby, Daniel Minoli, & Taieb Znati, “Wireless Sensor Networks - Technology, Protocols, and Applications”, John Wiley, 2007.
2. Anna Hac, “Wireless Sensor Network Designs”, John Wiley, 2003

COURSE OUTCOMES

CO1: Understand challenges and technologies for wireless networks.

CO2: Understand architecture and sensors.

CO3: Describe the communication, energy efficiency, computing, storage and transmission.

CO4: Establishing infrastructure and simulations.

CO5: Explain the concept of programming the in WSN environment.

SRIVENKATESWARACOLLEGEOFENGINEERING

(Autonomous)

B.Tech- VIISem

L	T	P	C
3	0	0	3

(CE20AOE701) Air Pollution and Quality Control

CourseObjectives:

After studying this course, students will be able to:

- The objectives of the course are to understand the Air pollution Concepts
- Identify the source of air pollution
- To know about Air pollution Control devices and distinguish the Air quality monitoring devices

UNIT –I

Introduction to Air Pollution

Introduction: Sources, effects on ecosystems, classification and characterization of air pollutants, Air Pollution Episodes of environmental importance. Indoor air pollution –sources, Effects.

Learning outcomes:

- Understanding the basic Air pollution concepts
- Identifying the source of air pollution
- To understand the character of atmospheric pollutants and their effects

UNIT II

Effects of Air Pollution

Effects of Air pollutants on man, material and vegetation: Global effects of air pollution – Green House effect, Heat Islands, Acid Rains, Ozone Holes etc.

Learning outcomes:

- To know effects of air pollution on man
- To know effects of air pollution on material and vegetation

UNIT – III

Plume Behavior

Meteorology and plume Dispersion; properties of atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity, Influence of Meteorological phenomena on Air Quality-wind rose diagram.

Learning outcomes:

- Understand the composition and structure of atmosphere
- To Understand the wind rose diagram

UNIT – IV

Control Techniques

Particulate matter and gaseous pollutants- settling chambers, cyclone separators, scrubbers, filters & ESP.

Learning outcomes:

- Learning about air pollution control techniques
- Study on latest devices and advancements in existing devices
- Choose and design control techniques for particulate and gaseous emissions.

UNIT –V

Noise Pollution

Noise pollution–Sources, Measurements, effects and control, noise standards. Environmental issues, global episodes, laws, acts, protocols.

Learning outcomes:

- Learning about noise pollution.
- Understand the laws, acts and protocols related to noise pollution &control

Course Outcomes (CO):

After studying this course, students will be able to:

- Identify the major sources of air pollution
- Understand their effects on health and environment.
- Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models.
- Choose and design control techniques for particulate and gaseous emissions.
- Understand the noise pollution and control methods.

Textbooks:

1. Noel De Nevers, “Air Pollution Control Engineering” , Waveland PrInc 2016
2. Anjaneyulu Y, “Text book of Air Pollution and Control Technologies”, Allied Publishers
3. M.N. Rao and HVN Rao, Air Pollution, Tata McGraw Hill Publishers 2017

Reference Books:

1. Nevers, “Air Pollution Control Engineering”, McGraw-Hill, Inc., 2000.
2. Dr. B.S.N. Raju, “Fundamentals of Air Pollution” Oxford & I.B.H.
3. T. Holgate, Hillel S. Koren, Jonathan M. Samet, Robert L. “Air Pollution and Health” Maynard publisher Academic Press.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech - VII Sem

L	T	P	C
3	0	0	3

(ME20AOE703) INTRODUCTION TO INDUSTRIAL ENGINEERING

Pre-Requisite: Operation Research, Production & Operation Management

Course Objectives:

- Through reading the text, references and discussion of cases students should be able to understand the fundamentals underlying the management of an Organization.
- Understand where the plant is to be located based on facilities available and what are the important factors affecting the facilities location of a plant, and plant layout.
- Determine work measurement techniques for time study.
- Recognize the importance of Inventory control to ensure their availability with minimum capital lock up.
- Understand the concepts of TQM, ISO, BIS etc.

UNIT – 1:

Concepts of Management-Administration and Organization – Functions of Management– Schools of Management Thought: Taylor"s Scientific Management, Fayol"s Principles of Management, Douglas Mc-Gregor"s Theory X and Y, Mayo's Hawthorne Experiments, Hertzberg"s Two factor Theory of Motivation, Maslow"s Hierarchy of Human needs – Systems Approach to Management. Organizational Structures- Functional- Divisional- Matrix etc.,Basic Concepts Related to Organization.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand the concepts of Management, Scientific management, management theories etc. (L2)
- Define the types of structures of an organization. (L2)

UNIT – 2:

Plant Location: Definition, Factors affecting the Plant Location, Comparison of Rural and Urban sites, Selection of Plant Location, Plant Layout: Definition, Objectives, Types of Plant Layout.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand where the plant is to be located based on facilities available and what are the important factors affecting the facilities location of a plant, and plant layout. (L2)
- Analyze plant layout design to facilitate material flow and processing of a product in the most efficient manner through the shortest possible time. (L4)

UNIT – 3:

Work Study – Definition, Objectives, Method Study – Steps Involved – Various Types of Process Charts –Micro motion and Memo motion Studies. Work Measurement - Definition, Time Study, Steps involved - Equipment, Different Methods of Performance Rating - Allowances, Standard Time Calculation. Work Sampling - Definition, Steps Involved, Standard Time Calculations - Applications.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand the concepts of Work study, Method study, steps, process charts etc. (L2)
- Determine work measurement techniques for time study (L3)
- Evaluate Work sampling methods to calculate standard time. (L4)

UNIT – 4:

Inventory Models- Deterministic models- EOQ Models – With and Without Shortages Models; Inventory Models with Price Breaks -Probabilistic Models –Discrete Variable, Continuous Variable. Inventory Control Systems

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand the concepts of Inventory, Classification, Functions, it's associated costs etc., (L2)
- Determine the Economic order quantity. (L2)

UNIT – 5:

Inspection & Quality Control: Statistical Quality Control- Techniques-Variables and Attributes- Control Charts: X and R Charts; P Charts and C Charts. Introduction to TQM-Quality circles-BIS & ISO Standards-Importance.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand the Inspection and Quality control concepts. (L2)
- Apply SQC techniques of Variables and attribute charts for effective inspection. (L3)
- Understand the concepts of TQM, ISO, BIS etc. (L2)

Textbooks:

1. Manufacturing Organization and Management, T.Amrine/ Pearson, 2nd Edition, 2004
2. Industrial Engineering and Management ,O.P.Khanna, DhanpatiRai, 18th edition, 2013.
3. Industrial Engineering and Management, Dr. C.Nadamuni Reddy, New Age International Publishers, 1st edition, 2011.

Reference Books:

1. Industrial Engineering and production management, MartindTelsang S.Chand..
2. Work Study by ILO(International Labour Organization)
3. Management by James AF Stoner, Freeman 6th Ed, Pearson Education, New Delhi,2005
4. Production and Operations management, PanneerSelvam, PHI,2004.
5. Statistical Quality Control by EL Grantt, McGrawhil
6. Motion and time studies by Ralph M Barnes, John Wiley and Sons,2004

Course Outcomes:

At the end of the course, the student will be able to

- Understand the various concepts, principles and theories of management. (L2)
- Understand the structure of an organization through understanding various structures of organizations. (L2)
- Understand where the plant is to be located based on facilities available and what are the important factors affecting the facilities location of a plant, and plant layout. (L2)
- Understand the concepts of Work study, Method study, steps, process charts etc. (L2)
- Define Work sampling and methods of work sampling to calculate standard time. (L4)
- Understand the concepts of Inventory, Classification, Functions, it's associated costs etc., (L2)
- Recognize the importance of Inventory control to ensure their availability with minimum capital lock up. (L1)

Apply SQC techniques of Variables and attribute charts for effective inspection. (L4)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech- VII Sem

L T P C

3 0 0 3

(EE20AOE701) EMBEDDED SYSTEMS

Course Objectives:

The objective of this course is to

1. To understand the basics of an embedded system and RTOS.
2. To introduce the typical components of an embedded system and different communication interfaces.
3. To provide knowledge on the design process of embedded system

UNIT I - Introduction to Embedded Systems

Definition of Embedded System, Embedded Systems Vs General Computing Systems, History and classification of Embedded Systems, Major Application Areas, Characteristics and Quality Attributes of Embedded Systems.

UNIT II - Typical Embedded System

Core of the Embedded System - General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS), Memory - ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators, Communication Interface: Onboard and External Communication Interfaces

UNIT III - Embedded Firmware

Fundamental issues in hardware software co-design, Embedded Firmware Design Approaches and Development Languages.

UNIT-IV - RTOS based Embedded System Design

Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.

UNIT-V - Task Communication

Task Communication - Shared Memory, Message Passing, Remote Procedure Call and Sockets, Task Synchronization - Task Communication/Synchronization Issues, Task Synchronization Techniques, Device Drivers, Methods to Choose an RTOS.

Text Books:

1. Introduction to Embedded Systems - Shibu K.V, Mc Graw Hill.
2. An Embedded software primer - David E. Simon, Pearson Ed. 2005.

References:

1. Embedded Systems - Raj Kamal, TMH.
2. Embedded System Design - A Unified Hardware/Software Introduction - Frank Vahid, Tony d. Givargis, John Wiley, 2002.

Course Outcomes:

After completion of the course, student will be able to:

CO1: Understand the selection procedure of Processors in the embedded domain.

CO2: Explain different components of embedded system.

CO3: Design Procedure for Embedded Firmware.

CO4: Describe the role of Real time Operating Systems in Embedded Systems.

CO5: Evaluate the Correlation between task synchronization and latency issues.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech VII Sem

L	T	P	C
3	0	0	3

(AM20A0E601)Machine Learning Tools & Techniques

UNIT I

Introduction: Introduction to Machine Learning: Introduction. Different types of learning, Hypothesis space and inductive bias, Evaluation. Training and test sets, cross validation, Concept of over fitting, under fitting, Bias and Variance.

Linear Regression: Introduction, Linear regression, Simple and Multiple Linear regression, evaluating regression fit.

UNIT II

Decision tree learning: Introduction, Decision tree representation, appropriate problems for decision tree learning, the basic decision tree algorithm, hypothesis space search in decision tree learning, inductive bias in decision tree learning, issues in decision tree learning, Python exercise on Decision Tree.

(Principal Component Analysis) ,Python exercise on kNN and PCA.

UNIT III

Instance based Learning: K nearest neighbor, the Curse of Dimensionality, Feature Selection: forward search, backward search, univariate , multivariate feature selection approach, Feature reduction.

Probability and Bayes Learning(Move to Data Mining): Bayesian Learning, Naïve Bayes, Python exercise on Naïve Bayes, Logistic Regression.

UNIT IV

Support Vector Machine: Introduction, the Dual formulation, Maximum margin with noise, nonlinear SVM and Kernel function, solution to dual problem.

Artificial Neural Networks: Introduction, Biological motivation, ANN representation, appropriate, problem for ANN learning, Perceptron, multilayer networks and the back propagation algorithm;

UNIT V

Ensembles: Introduction, Bagging and boosting, Random forest, Clustering: Introduction, K-mean clustering, agglomerative hierarchical clustering, Python exercise on k-mean clustering.

TEXTBOOKS

1.Machine Learning. Tom Mitchell. First Edition, McGraw- Hill, 1997.

2.Alpaydin, Ethem. Introduction to machine learning. MIT press, 2020.

REFERENCES

1.Kevin P. Murphy, “Machine Learning: A Probabilistic Perspective”, MIT Press, 2012

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B.Tech - VII SEM

L	T	P	C
3	0	0	3

(CS20A0E503)Structured Query Language

Course Objectives:

- To be able to write SQL statements that edit existing data. Be able to write SQL statements that create database objects.
- To understand the structure and design of relational databases and understand the importance and major issues of database security and the maintenance of data integrity.
- To add, update, or delete records within a database.
- SQL can create new databases.
- SQL users can add new tables to an existing database.
- SQL can create views or stored procedures in a database.

UNIT-I

Introduction to Database and RDBMS, Introduction to SQL, Database Engine, SQL Syntax, Introduction to mysql workbench, mysql workbench usage. SQL Datatypes and operators.

Learning Outcomes:

At the end of the unit, students will be able to:

1.Distinguish between DBMS and RDBMS

2.Explain about mysql.

3.Know usage of mysql workbench.

4.List datatypes of sql for different workbench.

UNIT-II

SQL Database: create database, use database, drop database, rename database, delete database.

SQL table: create table,droptable,deletetable,rename table, truncate table,copy table and alter table.

Learning Outcomes:

At the end of the unit, students will be able to:

1.Create databases and tables

2.Perform operations on database as well as table.

3.Explain Databases and its usage.

UNIT-III

SQL SELECT: Select statement , select IN, Select Multiple, Select Date.

SQL WHERE clause, SQL AS, SQL HAVING clause.

DDL(data definition language) commands in sql.

Learning Outcomes:

At the end of the unit, students will be able to:

1.Use select statement to retrieve data.

2.List DDL commands

UNIT-IV

DML(Data manipulation Langugae) commands in SQL.

SQL Keys:Primarykey,foreign key, unique key.

Learning Outcomes:

At the end of the unit, students will be able to:

1.List DML commands

2.Construct key relationships on a table.

3.Explain types of keys and its uses

UNIT-V

SQL Insert: INSERT statement, INSERT INTO statement, INSERT multiple rows.

SQL joins:Types of joins(four types along with an examples).

Learning Outcomes:

At the end of the unit, students will be able to:

1.Insert data into the table.

2.Explain how to join more than one table..

TEXT BOOKS:

1. Getting Started with SQL Author: Thomas Nield ,Edition: 1st Edition
2. SQL: A Step-by-Step Guide for Beginners , by Daniel Bell.

REFERENCE BOOKS:

1.SQL Quickstart Guide: The Simplified Beginner's Guide to SQL Paperback – 11 March 2015

Online Learning Resources:

1.https://www.guru99.com/sql.html

2.https://www.w3schools.com/sql/

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech- VII Sem

L	T	P	C
3	0	0	3

(EE20AOE704) INTRODUCTION TO SMART GRID & ELECTRIC VEHICLES

COURSE OBJECTIVES

- To understand various aspects of smart grid.
- To Study about Smart Grid technologies, different smart meters and advanced metering infrastructure.
- To familiarize the power quality management issues in Smart Grid.
- To familiarize the high performance computing for Smart Grid applications.

UNIT 1 INTRODUCTION TO SMART GRID

Evolution of Electric Grid, Concept, Definitions and Need for Smart Grid, Smart grid drivers, functions, opportunities, challenges and benefits, Difference between conventional & Smart Grid, Concept of Resilient & Self Healing Grid, Present development & International policies in Smart Grid.

UNIT 2 SMART GRID TECHNOLOGIES AND SMART METERS

Components and Architecture of Smart Grid Design, Smart Grid Communication, Introduction to Smart Meters, Advanced Metering infrastructure (AMI) drivers and benefits, AMI protocols, standards and initiatives, AMI needs in the smart grid, Phasor Measurement Unit(PMU), Intelligent Electronic Devices(IED)

UNIT 3 POWER QUALITY MANAGEMENT IN SMART GRID

Power Quality & EMC in Smart Grid, Power Quality issues of Grid connected Renewable Energy Sources, Power Quality Conditioners for Smart Grid, Web based Power Quality monitoring, Power Quality Audit. Need of CLOUD Computing and Cyber Security for Smart Grid.

UNIT 4 Hybrid Electric Vehicles

Concepts of hybrid electric drive train, types, architecture of series and parallel hybrid electric drive train, merits and demerits, series and parallel hybrid electric drive train design.

UNIT 5 Energy Storages

Electrochemical batteries – lead acid batteries and lithium based batteries, Ultra capacitors, Flywheels. Basic principles of Fuel Cell and Solar Cell.

COURSE OUTCOMES

On completion of the course, student will be able to

CO1 - Illustrate the concepts of Smart Grid and its present developments.

CO2 - Analyze the various Smart Grid technologies.

CO3 - Realize the power quality management in Smart Grids.

CO4 - Analyze the concepts of Hybrid Electric Vehicles.

CO5 – Apply the Concepts of Energy Storage system technologies in Smart Grid.

TEXT BOOKS:

1. Stuart Borlase “Smart Grid: Infrastructure, Technology and Solutions”, CRC Press 2012.

2. Janaka Ekanayake, Nick Jenkins, Kithsiri Liyanage, Jianzhong Wu, Akihiko Yokoyama, “Smart Grid: Technology and Applications”, Wiley, 2012.

3. Larminie, J. and Lowry, J. (2012) Electric Vehicle Technology Explained, Second Edition.John Wiley & Sons, Chichester

4. Alfred Rufer, Energy Storage: Systems and Components, CRC Press, 2017

REFERENCE BOOKS:

1. Vehbi C. Güngör, Dilan Sahin, Taskin Kocak, Salih Ergüt, Concettina Buccella, Carlo Cecati, and Gerhard P. Hancke, “Smart Grid Technologies: Communication Technologies and Standards”, IEEE Transactions On Industrial Informatics, Vol. 7, No. 4, November 2011.

2. Xi Fang, Satyajayant Misra, Guoliang Xue, and Dejun Yang “Smart Grid – The New and Improved Power Grid: A Survey”, IEEE Transaction on Smart Grids,Vol.14, No.4, pp.944-980, 2012.

3. Denton, T. (2013) Automobile Electrical and Electronic Systems. Routledge, London.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech– VII Sem

L	T	P	C
3	0	0	3

(MA20AOE701) NUMERICAL METHODS FOR ENGINEERS

Course objectives:

This course aims at providing the student with the knowledge on various numerical methods for solving equations, interpolating the polynomials, evaluation of integral equations and solution of differential equations.

UNIT-I:

Solution of Algebraic & Transcendental Equations:

Introduction-Bisection method-Iterative method-Regula falsi method-Newton Raphson method. System of Algebraic equations: Gauss Jordan method-Gauss Siedal method.

Learning Outcomes:

Students will be able to

- Calculate the roots of equation using Bisection method and Iterative method.
- Calculate the roots of equation using Regula falsi method and Newton Raphson method.
- Solve the system of algebraic equations using Gauss Jordan method and Gauss Siedal method.

UNIT-II:

Curve Fitting

Principle of Least squares- Fitting of curves- Fitting of linear, quadratic and exponential curves.

Learning Outcomes:

Students will be able to

- understand curve fitting
- understand fitting of several types of curves

UNIT-III:

Interpolation

Finite differences-Newton's forward and backward interpolation formulae – Lagrange's formulae. Gauss forward and backward formula, Stirling's formula, Bessel's formula.

Learning Outcomes:

Students will be able to

- Understand the concept of interpolation.
- Derive interpolating polynomial using newton's forward and backward formulae.
- Derive interpolating polynomial using lagrange's formulae.
- Derive interpolating polynomial using gauss forward and backward formulae.

UNIT-IV:

Numerical Integration

Numerical Integration: Trapezoidal rule – Simpson's 1/3 Rule – Simpson's 3/8 Rule

Learning Outcomes:

Students will be able to

- Solve integral equations using Simson's 1/3 and Simson's 3/8 rule.
- Solve integral equations using Trapezoidal rule.

UNIT-V:

Solution of Initial value problems to Ordinary differential equations

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Modified Euler's Method-Runge-Kutta Methods.

Learning Outcomes:

Students will be able to

- Solve initial value problems to ordinary differential equations using Taylor's method.
- Solve initial value problems to ordinary differential equations using Euler's method and Runge Kutta methods.

Course Outcomes:

After the completion of course, students will be able to

- Apply numerical methods to solve algebraic and transcendental equations.
- Understand fitting of several kinds of curves.
- Derive interpolating polynomials using interpolation formulae.
- Solve differential and integral equations numerically.

Text Books:

1. B.S.Grewal, "Higher Engineering Mathematics", Khanna publishers.
2. Ronald E. "Probability and Statistics for Engineers and Scientists", Walpole,PNIE.
3. Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley India

Reference Books:

1. B.V.Ramana, "Higher Engineering Mathematics", Mc Graw Hill publishers.
2. Alan Jeffrey, "Advanced Engineering Mathematics", Elsevier.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech- VII Sem

L	T	P	C
3	0	0	3

(CE20AOE704) Environmental Impact Analysis & Management

Course Objectives:

- To impart knowledge on different concepts of Environmental Impact Assessment.
- To teach procedures of risk assessment.
- To teach the EIA methodologies and the criterion for selection of EIA methods.
- To teach the procedures for environmental clearances and audit.
- To know the impact quantification of various projects on the environment.

UNIT –I

Concepts and methodologies of EIA

Initial environmental Examination, Elements of EIA, - Factors affecting E-I-A Impact evaluation and analysis, preparation of Environmental Base map, Classification of environmental parameters- Criteria for the selection of EIA Methodology, E I A methods, Ad-hoc methods, matrix methods.

Learning outcomes:

After completion of this unit student will

- Understand the elements of EIA.
- Explain the criteria for selection of EIA methodology

UNIT II

Impact of Developmental Activities and Land Use

Introduction and Methodology for the assessment of soil and ground water, EIA in surface water, Air and Biological environment: Methodology for the assessment of Impacts on surface waterenvironment, Air pollution sources, Generalized approach for assessment of Air pollution Impact

Learning outcomes:

After completion of this unit student will

- Study the factors causing impact of development activities
- Decide mitigation measures of pollution on environment

UNIT – III

Assessment of Impact on Vegetation& Wildlife

Introduction - Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of deforestation.

Learning outcomes:

After completion of this unit student will

- Understand effect of development activities on environment.
- Know the design procedures for assessment of environmental risk

UNIT – IV

Environmental Audit

Introduction - Environmental Audit & Environmental legislation objectives of Environmental Audit, Types of environmental Audit, Audit protocol, stages of Environmental Audit, onsite activities, evaluation of Audit data.

Learning outcomes:

After completion of this unit student will

- Learn about the process of environmental auditing.
- Understand procedures for preparation of environmental audit report

UNIT –V

Environmental Acts and Notifications

The Environmental protection Act, The water preservation Act, The Air (Prevention & Control of pollution Act), Wild life Act - Provisions in the EIA notification, procedure for environmental clearance, procedure for conducting environmental impact assessment report- Evaluation of EIA report. Concept of ISO and ISO 14000.

Learning outcomes:

After completion of this unit student will

- Understand the importance of environmental protection acts
- Explain acts and notifications in Environmental legislation

CourseOutcomes (CO):

- To prepare EMP, EIS, and EIA report.
- To identify the risks and impacts of a project.
- To choose an appropriate EIA methodology.
- To evaluation the EIA report.
- To Estimate the cost benefit ratio of a project

Textbooks:

1. Canter Larry W., “Environmental Impact Assessment”, McGraw-Hill education Edi (1996)
2. Y. Anjaneyulu, “Environmental Impact Assessment Methodologies”, B. S. Publication, Hyderabad 2nd edition 2011

Reference Books:

1. Peavy, H. S, Rowe, “Environmental Engineering”, D. R, Tchobanoglous, G.Mc-Graw Hill International Editions, New York 1985
2. J. Glynn and Gary W. Hein Ke, “Environmental Science and Engineering”, Prentice Hall Publishers 1988
3. Suresh K. Dhaneja, S.K., “Environmental Science and Engineering”, Katania& Sons Publication, ND

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech - VII Sem

L	T	P	C
3	0	0	3

(ME20AOE704) INTRODUCTION TO PRODUCT MARKETING

Pre-Requisite: Managerial Economics & Financial Analysis

Course Objectives:

- Introduce the basic concepts of Product marketing.
- Familiarize with market information systems and research.
- Understand the nature and importance of industrial market.
- Discuss the major stages in new product development.
- Identify the factors affecting pricing decisions.

UNIT – 1:

Historical development of marketing management, Definition of Marketing, Core marketing concepts, Marketing Management philosophies, Micro and Macro Environment, Characteristics affecting Consumer behaviour, Types of buying decisions, buying decision process.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand the concepts of Marketing management, philosophies etc. (L2)
- Classification of consumer products, types of buying decisions. (L2)

UNIT – 2:

Components of marketing information system–benefits & uses marketing research system, marketing research procedure, Demand Estimation research, Test marketing, Sales forecasting: objective and subjective methods. Nature and importance of the Industrial market, major factors influencing industrial buying behavior, characteristics of industrial market demand.

Learning Outcomes:

At the end of this unit, the student will be able to

- Apply skills and techniques in designing data collection instruments including surveys. (L3)
- Sales Forecast of objective and subjective methods to analyze market demand. (L4)

UNIT – 3:

The concept of a product, features of a product, classification of products, product policies – product planning and development, product line, product mix – factors influencing change in product mix, product mix strategies, meaning of "New – product; major stages in new – product development product life cycle.

Learning Outcomes:

At the end of this unit, the student will be able to

- Demonstrate an understanding of fundamental concepts related to product and branding. (L2)
- Evaluate new product and branding ideas. (L5)

UNIT – 4:

Importance of Price, pricing objectives, factors affecting pricing decisions, procedure for price determination, kinds of pricing, pricing strategies and decisions Labeling: Types, functions advantages and disadvantages, Packaging: Meaning, growth of packaging, function of packaging, kinds of packaging.

Learning Outcomes:

At the end of this unit, the student will be able to

- Distinguish relevant from irrelevant costs when setting prices. (L3)
- Analyze competition for pricing decisions. (L3)

UNIT – 5:

Advertising and sales promotion: Objectives of advertisement, function of advertising, classification of advertisement copy, advertisement media – kinds of media, advantages of advertising. Objectives of sales promotion, advantages sales promotion. Personal Selling : Objectives of personal selling, qualities of good salesman, types of salesman, major steps in effective selling.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand the concepts of Advertisement and their classifications. (L2)
- Analyze a firm's marketing and promotional situation. (L4)

Textbooks:

1. Philip Kotler, Principles of Marketing, Prentice – Hall.
2. Philip Kotler, Marketing Management, Prentice – Hall.

Reference Books:

1. Wiliam J Stanton, Fundamentals of Marketing, McGraw Hill
2. R.S.N. Pillai and Mrs.Bagavathi, Marketing, S. Chand & Co. Ltd.
3. Rajagopal, Marketing Management Text & Cases, Vikas Publishing House.

Course Outcomes:

At the end of the course, the student will be able to

- Understand basic marketing management concepts and their relevance to business development. (L2)
- Prepare a questionnaire for market research. (L5)
- Design marketing research plan for business organizations. (L5)
- Optimize marketing mix to get competitive advantage. (L4)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech- VII Sem

L	T	P	C
3	0	0	3

(EE20AOE703) IOT APPLICATIONS IN ELECTRICAL ENGINEERING (OPEN ELECTIVE)

COURSE OBJECTIVES

• To program Arduino to control lights, motors, and other devices.

• To learn Arduino's architecture, including inputs and connectors for add-on devices.

• To add third-party components such as LCDs, accelerometers, gyroscopes, and GPS trackers to extend Arduino's functionality.

• To understand various options in programming languages, from C to drag-and-drop languages.

• To test, debug, and deploy the Arduino to solve real world problems.

UNIT 1: Introduction to sensors

Transducers, Classification, Roles of sensors in IOT, Various types of sensors, Design of sensors, sensor architecture, special requirements for IOT sensors, Role of actuators, types of actuators.

UNIT 2: Hardware

Physical device – Arduino Interfaces, Hardware requirement for Arduino, Connecting remotely over the network using VNC, GPIO Basics, Controlling GPIO Outputs Using a Web Interface, – Programming, APIs / Packages- Quark SOC processor, programming, Arduino Boards using GPIO (LED, LCD, Keypad, Motor control and sensor)

UNIT 3: Platforms

History - Creative Coding Platforms - Open Source Platforms – PIC - Arduino, Sketch, Iterative coding methodology – Python Programming - Mobile phones and similar devices - Arm Devices - Basic Electronics (circuit theory, measurements, parts identification) Sensors and Software: Understanding Processing Code Structure, variables and flow control, Interfacing to the Real World

Unit 4 Programming an Arduino IoT

Preparing the development environment (Arduino IDE), Exploring the Arduino language (C/C++) syntax, Coding, compiling, and uploading to the microcontroller, Working with Arduino Communication Modules: Bluetooth Modules, WiFi Modules and I2C and SPI, Interfacing arduino and Blynk via USB : LED Blinking, Controlling a Servomotor.

Unit 5 DOMAIN SPECIFIC APPLICATIONS OF IoT

Home automation, Industry applications, Surveillance applications, Other IoT applications – Introduction to different IoT tools, Developing applications through IoT tools, Developing sensor based application through embedded system platform – case studies: Soil moisture monitoring, Weather monitoring, Air quality Monitoring, Movement Detection

TEXT BOOKS :

1.Adrian McEwen and Hakim Cassimally, —Designing the Internet of Thingsǁ, John Wiley and Sons Ltd, UK, 2014.

2.Vijay Madisetti, Arshdeep Bahga, —Internet of Things (A Hands-on Approach), Universities Press, 2015.

REFERENCE BOOKS:

1.Dieter Uckelmann, Mark Harrison, Florian Michahelles, —Architecting the Internet of Thingsǁ, Springer, New York, 2011.

2.John H. Davies, —MSP430 Microcontroller Basicsǁ, First Edition, Newnes Publication. 2010.

COURSE OUTCOMES:

CO1: Recall the basics of sensors, its functioning.

CO2: Execute basic and advanced assembly language programs.

CO3: Learn the ways to interface I/O devices with processor for task sharing.

CO4: Recall the basics of co-processor and its ways to handle float values by its instruction set.

CO5: Apply the IOT technology in various fields.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B.Tech- VII Sem

L	T	P	C
3	0	0	3

(AM20A0E701) Cyber Security Techniques

Course Objectives:

This course is designed to:

- Understand essential building blocks and basic concepts of cyber security
- Explore Web security and Network security
- Explain the measures for securing the network sand cloud
- Understand privacy principles and policies
- Describe the legal issues and ethics in computer security

UNITI

Introduction: Introduction to Computer Security, Threats, Harm, Vulnerabilities, Controls, Authentication, Access Control, and Cryptography, Authentication, Access Control, Cryptography.

Programs and Programming: Unintentional (Non-malicious) Programming Oversights, Malicious Code—Malware, Countermeasures.

Learning Out comes:

AftercompletingthisUnit, studentswill beableto

- Explain Vulnerabilities, threats and. Counter measures for computer security[L2]
- Interpret the design of the malicious code [L2]

UNIT II

Web Security: User Side, Browser Attacks, Web Attacks Targeting Users, Obtaining User or Website Data, Email Attacks. Operating Systems Security: Security in Operating Systems, Security in the Design of Operating Systems, Rootkit.

LearningOutcomes:

AftercompletingthisUnit, studentswill beableto

- Outline the attacks on browser, Web and email. [L2]
- Explain the security aspects of Operating Systems. [L3]

UNIT III

Network Security: Network Concepts, Threatsto Network Communications, Wireless Network Security, Denial of Service, Distributed Denial-of service Strategic Defenses:Security Counter measures, Crypto graphy in Network Security, Firewalls, Intrusion Detection and Prevention Systems, Network Management. Cloud Computing and Security: Cloud Computing Concepts, Moving to the Cloud, Cloud Security Tools and Techniques, Cloud Identity Management, SecuringIaaS.

LearningOutcomes:

AftercompletingthisUnit, studentswill beableto

- Identify the network securitythreatsand attacks.[L3]
- Design the Counter measures to defend the network security attacks.[L6]
- Analyze the security tools and techniques for Cloud computing[L4]

UNIT IV

Privacy: Privacy Concepts, Privacy Principles and Policies, Authentication and Privacy, DataMining, Privacy on the Web, Email Security, Privacy Impacts of Emerging Technologies,Where theFieldIs Headed.

ManagementandIncidents:Security Planning, Business Continuity Planning, Handling Incidents, Risk Analysis,Dealing with Disaster.

Learning Outcomes:

AftercompletingthisUnit, studentswill beableto

- Interpret the need for Privacy and its impacts of Emerging Technologies.[L2]
- Explain how to handle incidents and deal with Disaster.[L2]

UNIT V

Legal Issues and Ethics: Protecting Programs and Data, Information and the Law, Rights ofEmployees and Employers, Redress for Software Failures, Computer Crime, Ethical Issues inComputer Security, Incident Analysis with Ethics, Emerging Topics: The Internet of Things,Economics,ComputerizedElections,CyberWarfare.

LearningOutcomes:

AftercompletingthisUnit, studentswill beableto

- Adaptlegalissuesandethics incomputersecurity.[L6]
- ElaborateontheEmerging topics.[L6]

Course Outcomes:

Uponcompletionofthe course,the studentsshouldbe able to:

- Illustrate the broad set of technical, social & political aspects of Cyber Securityandsecuritymanagementmethodstomaintainsecurityprotection(L2)
- Assessthevulnerabilitiesandthreatsposedbycriminals,terroristandnationstatestonationalinfrastructure(L5)
- Identifythenatureofsecuresoftwaredevelopmentandoperatingsystems(L3)
- Demonstratethe rolesecuritymanagementincybersecuritydefense(l2)
- Adaptthelegalandsocialissuesatplayindevelopingsolutions.(L6)

TextBooks:

1. Pfleeger,C.P.,SecurityinComputing,PrenticeHall,2010,5thedition.
2. Schneier,Bruce.AppliedCryptography, SecondEdition,JohnWiley&Sons,1996

ReferenceBooks:

1. Rhodes-Ousley, Mark. Information Security: The Complete Reference, SecondEdition,Information Security Management: Concepts and Practice, McGraw-Hill,2013.
2. Whitman, Michael E. and Herbert J. Mattord. Roadmap to Information Security for IT and Info sec Managers.Boston, MA:Course Technology,2011.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech – VII Sem

L	T	P	C
3	0	0	3

(CS20AOE601) Data Analysis Using R

Course Objectives:

- Understand the R Programming Language.
- Exposure on Solving of data science problems.
- Understand The Regression Model

Unit 1: INTRODUCTION TO COMPUTING

Installation of R , The basics of R syntax, workspace , Matrices and lists, Sub setting, System-defined functions; the help system, Errors and warnings; coherence of the workspace, Viewing and manipulating Data, Viewing and manipulating Data, Plotting data, Reading the data from console, file (.csv) local disk and web, Working with larger datasets

Unit 2: SHAPE OF DATA AND DESCRIBING RELATIONSHIPS

Tables, charts and plots, Univariate data, measures of central tendency, frequency distributions, variation, and Shape Multivariate data, relationships between a categorical and a continuous variable, Relationship between two continuous variables – covariance, correlation coefficients, comparing multiple correlations, Visualization methods – categorical and continuous variables, two categorical variables, two continuous variables.

Unit 3: PROBABILITY DISTRIBUTIONS

Sampling from distributions – Binomial distribution, normal distribution, tTest, zTest, Chi Square test, . Density functions, Data Visualization using ggplot – Box plot,histograms, scatter plotter, line chart, bar chart, heat maps.

EXPLORATORY DATA ANALYSIS Demonstrate the range, summary, mean, variance, median, standard deviation, histogram, box plot, scatter plot using population dataset.

Unit 4: TESTING HYPOTHESES

Null hypothesis significance testing, Testing the mean of one sample, Testing two means, Linear models, Simple linear regression, Multiple regression, Bias-variance trade-off – cross-validation

Unit 5: CORRELATION

How to calculate the correlation between two variables, How to make scatter plots, Use the scatter plot to investigate the relationship between two variables, Perform tests of hypotheses about the mean when the variance is known, Compute the p-value, . Explore the connection between the critical region, the test statistic, and the p-value, Least Squares Estimates, The R Function lm, scrutinizing the Residuals

Course Outcomes:

- Install and use R for simple programming tasks (L3).
- Extract data from files and other sources and perform various data manipulation tasks on them (L3).
- Explore statistical functions in R (L4).
- Use R Graphics and Tables to visualize results of various statistical operations on data (L3).
- Apply the knowledge of R gained to data Analytics for real-life applications (L3).

Reference Books:

1. SandipRakshit, “Statistics with R Programming”, McGraw Hill Education, 2018.

2. Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani, “AN Introduction to Statistical Learning: with Applications in R”, Springer Texts in Statistics, 2017.

3. Joseph Schmuller, “Statistical Analysis with R for Dummies”, Wiley, 2017.

4. K G Srinivasa, G M Siddesh, ChetanShetty, Sowmya B J, “Statistical Programming in R”, Oxford Higher Education, 2017

Web References:

- http://www.r-bloggers.com/how-to-perform-a-logistic-regression-in-r/
- http://www.ats.ucla.edu/stat/r/dae/rreg.htm
- http://www.coastal.edu/kingw/statistics/R-tutorials/logistic.html
- http://www.ats.ucla.edu/stat/r/data/binary.csv

SOFTWARE REQUIREMENTS:

SOFTWARE: R Software, R Studio Software

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech- VII Sem

L	T	P	C
3	0	0	3

(PH20AOE701) NANOMATERIALS

Course Objectives:

- To understand synthetic principles of Nanomaterials by various methods
- To characterize the synthetic nanomaterials by various instrumental methods
- To enumerate the applications of nanomaterials in engineering

Course Outcomes:

- Understand the state of art synthesis of nano materials
- Characterize nano materials using ion beam, scanning probe methodologies, position sensitive atom probe and spectroscopic ellipsometry.
- Analyze nanoscale structure in metals, polymers and ceramics
- Analyze structure-property relationship in coarser scale structures
- Understand structures of carbon nano tubes

UNIT I

Introduction: Scope of nanoscience and nanotecnology, nanoscience in nature, classification of nanostructured materials, importance of nano materials.

Synthetic Methods: Bottom-Up approach: Sol-gel synthesis, microemulsions or reverse micelles, co-precipitation method, solvothermal synthesis, hydrothermal synthesis, microwave heating synthesis and sonochemical synthesis.

UNIT II

Top-Down approach: Inert gas condensation, arc discharge method, aerosol synthesis, plasma arc technique, ion sputtering, laser ablation, laser pyrolysis, and chemical vapour deposition method, electrodeposition method, high energy ball milling.

UNIT III

Techniques for characterization: Diffraction technique, spectroscopy techniques, electron microscopy techniques for the characterization of nanomaterials, BET method for surface area analysis, dynamic light scattering for particle size determination.

UNIT IV

Studies of Nano-structured Materials: Synthesis, properties and applications of the following nanomaterials, fullerenes, carbon nanotubes, core-shell nanoparticles, nanoshells, self-assembled monolayers, and monolayer protected metal nanoparticles, nanocrystalline materials, magnetic nanoparticles and important properties in relation to nanomagnetic materials, thermoelectric materials, non-linear optical materials, liquid crystals.

UNIT V
Engineering Applications of Nanomaterials

Textbooks:

1. NANO: The Essentials: T Pradeep, MaGraw-Hill, 2007.
2. Textbook of Nanoscience and nanotechnology: B S Murty, P Shankar, BaldevRai, BB Rath and James Murday, Univ. Press, 2012.

References:

1. Concepts of Nanochemistry; Ludovico Cademrtiri and Geoffrey A. Ozin& Geoffrey A. Ozin, Wiley-VCH, 2011.
2. Nanostructures & Nanomaterials; Synthesis, Properties & Applications: Guozhong Cao, Imperial College Press, 2007.
3. Nanomaterials Chemistry, C. N. R. Rao, Achim Muller, K.Cheetham, Wiley-VCH, 2007.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VII Sem

L	T	P	C
3	0	0	3

(BA20AHS703) ENTREPRENEURSHIP & INCUBATION

Course Objectives:

- To make the student underst and about Entrepreneurship
- Toenable the student in knowing various sources of generating new ideas in setting up of new enterprise
- To facilitate the student in knowing various sources off in acne in starting up of a business
- To impart knowledge about various government sources which provide financial assistance toentrepreneurs / women entrepreneurs?
- To encourage the student in creating and designing business plans

UNIT-I

Entrepreneurship-Concept, knowledge and skills requirement - Characteristics of successfulentrepreneurs - Entrepreneurship process - Factors impacting emergence of entrepreneurship -Differences between Entrepreneur and Intrapreneur - Understanding individual entrepreneurial mindset and personality-Recent trends in Entrepreneurship.

Learning Outcomes:

AttheendiftheUnit, thelearnerswillbeableto

- Understandthe concept ofEntrepreneur andEntrepreneurshipinIndia
- KnowEntrepreneurshipprocessandemergenceofEntrepreneurship
- AnalyzethedifferencesbetweenEntrepreneurandIntrapreneur
- Developacreative mindsetandpersonality
- Understandrecenttrends inEntrepreneurshipacrosstheglobe

UNIT-II

Starting the New Venture - Generating business idea – Sources of new ideas & methods of generating ideas-Opportunity recognition-Feasibility study-Marketfeasibility, technical / operational feasibility - Financial feasibility - Drawing business plan – Preparingprojectreport-Presentingbusinessplant investors.

LearningOutcomes:

Attheend of the Unit, thelearnerswillbeableto

- Knowtheprocessofstarting anewventure

- Analyzethesourcesofnewmethods ingeneratingbusinessidea
- Evaluatemarket feasibility,financialfeasibilityandtechnicalfeasibility
- Designanddrawbusinessplansinprojectpreparationandprepareprojectreports

UNIT-III

Sources of finance - Various sources of Finance available - Long term sources - Short termsources - Institutional Finance – Commercial Banks, SFC's in India - NBFC's in India – theirway of financing in India for small and medium business -Entrepreneurship developmentprogramsinIndia-The entrepreneurial journey – Institutions in aid of entrepreneurship development

LearningOutcomes:

Attheend of the Unit, thelearnerswillbeableto

- Knowthevarioussourcesoffinanceto start anewventure
- Contrast&comparebetweenLong term&Shorttermfinancesources
- Analyze the role of banks and other financial institutions inpromoting entrepreneurship in India
- Evaluate the need and importance of MSMEs in the growth of country

UNIT-IV

Women Entrepreneurship - Entrepreneurship Development and Government - Role of CentralGovernment and State Government in promoting women Entrepreneurship - Introduction tovarious incentives, subsidies and grants – Export- oriented Units - Fiscal and Tax concessions available-Womenentrepreneurship-Roleandimportance-Growth of women entrepreneurship in India –Issues & Challenges –Entrepreneurialmotivations.

LearningOutcomes:

At the end of the Unit, the learners will be able to

- Understandtheroleofgovernmentinpromotingwomenentrepreneurship
- Knowvariousincentives,subsidiesandgrantsavailabletowomenentrepreneurs
- Analyzetheroleofexport-oriented units
- Knowaboutthetaxconcessionsavailablefor Womenentrepreneurs
- Preparetofacetheissuesandchallenges.

UNIT-V

Fundamentals of Business Incubation - Principles and good practices of business incubation- Process of business incubation and the business incubator and how they operate and influencethe Type/benefits of incubators - Corporate/educational / institutional incubators –

Broaderbusiness incubation environment - Pre-Incubation and Post - Incubation process - Idea lab,Businessplanstructure –Valueproposition

CourseOutcomes:

At theend ofthecourse,students will be ableto

- Understand the concept of Entrepreneurship and challenges in the world of Competition.
- Apply the Knowledge in generating ideas for New Ventures.
- Analyze various sources off in ance and subsidies to entrepreneur / women Entrepreneurs.
- Evaluate the role of central government and state government inpromoting Entrepreneurship.
- Create and design business plan structure through incubations.

Textbooks:

- D F Kuratko and T V Rao, “Entrepreneurship” - A South-Asian Perspective – CengageLearning, 2012. (For PPT, Case Solutions Facultymay visit:login.cengage.com)
- NandanH, “FundamentalsofEntrepreneurship”,PHI,2013

References:

- VasantDesai,“SmallScaleIndustries andEntrepreneurship”, HimalayaPublishing2012.
- RajeevRoy“Entrepreneurship”, 2ndEdition,Oxford, 2012.
- B.JanakiramandM.Rizwana“EntrepreneurshipDevelopment: Text&Cases”,Excel Books, 2011.
- Stuart Read, Effectual“Entrepreneurship”,Routledge, 2013.

E-RESOURCES

- Entrepreneurship-Through-the-Lens-of-VentureCapital
- http://www.onlinevideolecture.com/?course=mba-programs&subject=entrepreneurship
- http://nptel.ac.in/courses/122106032/Pdf/7_4.pd

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VII Sem

L	T	P	C
3	0	0	3

(BA20AHS704) ENTERPRISE RESOURCE PLANNING

Course Objectives:

- To provide a contemporary and forward-looking on the theory and practice of Enterprise Resource Planning
- To enable the students in knowing the Advantages of ERP
- To train the students to develop the basic understanding of how ERP enriches the
- Business organizations in achieving a multi-dimensional growth.
- Impart knowledge about the historical back ground of BPR
- Toaimatpreparingthestudents,technologicallycompetitiveandmakethemreadytoself-upgradewiththehighertechnicalskills

UNIT-I

Introduction to ERP: Enterprise–An Overview Integrated Management Information, Business Modeling, Integrated Data Model Business Processing Reengineering(BPR), Data Warehousing, Data Mining, On-line Analytical Processing (OLAP), Supply Chain Management(SCM), Customer Relationship Management(CRM)

UNIT-II

Benefits of ERP: Reduction of Lead-Time, On-time Shipment, Reduction in Cycle Time, Improved Resource Utilization, Better Customer Satisfaction, Improved Supplier Performance, Increased Flexibility, Reduced Quality Costs, Improved Information Accuracy and Design-making Capability

UNIT-III

ERP Implementation Lifecycle :Pre-evaluation Screening, Package Evaluation, Project Planning Phase, Gap Analysis, Reengineering, Configuration, Implementation Team Training, Testing, Going Live,End-userTraining,Post-implementation(Maintenance mode)

UNIT-IV

BPR: Historical background: Nature, significance and rationale of business process reengineering (BPR), Fundamentals of BPR. Major issues in process redesign: Business vision and process objectives, Processes to be redesigned, Measuring existing processes

UNIT-V

IT in ERP: Role of information technology (IT) and identifying IT levers. Designing and building aprototype of the new process: BPR phases, Relationship between BPR phases. MIS– Management Information System, DSS-Decision Support System, EIS- Executive Information System

CourseOutcomes:

- UnderstandthebasicuseofERPPackageandits roleinintegratingbusinessfunctions.
- ExplainthechallengesofERPsystemintheorganization
- ApplytheknowledgeinimplementingERPsystemforbusiness
- EvaluatetheroleofITintakingdecisions withMIS
- Createreengineeredbusinessprocesses withprocessredesign

Textbooks:

- PankajSharma. “EnterpriseResourcePlanning”.AphPublishingCorporation,New Delhi, 2004.
- AlexisLeon, “Enterprise Resource Planning”, IVEdition,Mc.GrawHill,2019

References:

- MarianneBradford“ModernERP”, 3rdedition.
- “ERP making it happen Thomas F. Wallace and Michael
- Directing the ERP Implementation Michael wpelphrey

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VII Sem

L	T	P	C
3	0	0	3

(BA20AHS705) MANAGEMENT SCIENCE

Course Objectives:

- To provide fundamental knowledge on Management, Administration, Organization & its concepts.
- To make the students understand the role of management in Production
- To impart the concept of HR Min order to have an idea on Recruitment, Selection, Training & Development, job evaluation and Merit rating concepts
- To create awareness on identify Strategic Management areas & the PERT/CPM for better Project Management
- To make the students aware of the contemporary issues in management

UNIT-I

INTRODUCTION TO MANAGEMENT:

Management- Concept and meaning- Nature- Functions-Management as a Science and Art and both. Schools of Management Thought - Taylor's Scientific Theory-Henry Fayol's principles –EltanMayo's Human relations - Systems Theory - Organisational Designs - Line organization - Line &StaffOrganization-FunctionalOrganization-MatrixOrganization-Project Organization-Committeeform of Organization – Social responsibilities of Management.

UNIT-II

OPERATIONS MANAGEMENT– Principles and Types of Plant Layout - Methods of Production (Job, batch and Mass Production),Work Study - Statistical Quality Control-Deming's contribution to Quality. Material Management -Objectives - Inventory-Functions - Types, Inventory Techniques - EOQ-ABC Analysis – Purchase Procedureand Stores Management-MarketingManagement-Concept-Meaning-Nature-Functionsof Marketing - Marketing Mix- Channels of Distribution –Advertisement and Sales Promotion-Marketing Strategies based on Product Life Cycle.

UNIT-III

HUMAN RESOURCES MANAGEMENT(HRM)– HRM - Definition and Meaning – Nature - Managerial and Operative functions - Evolution of HRM -Job Analysis - Human Resource Planning(HRP) - Employee Recruitment-Sources of Recruitment –Employee Selection-Process and Tests in Employee Selection-Employee Training and Development-On-the-job& Off-the-

job training methods-Performance Appraisal Concept-Methods of Performance Appraisal– Placement-Employee Induction-Wage and Salary Administration

UNIT-IV

STRATEGIC&PROJECT MANAGEMENT: Differences between Leader & Manager - Leadership – Leadership styles Leadership theories – Managerial Grid – Transactional Vs Transformational Leadership – Qualities of a good leader- Women Leadership in India.

UNIT-V

CONTEMPORARY ISSUES IN MANAGEMENT –The concept of Management Information System(MIS) - Materials Requirement Planning (MRP) -Customer Relations Management(CRM) - Total Quality Management (TQM) - Six Sigma Concept –Supply Chain Management(SCM)-Enterprise Resource Planning(ERP)-Performance Management- Business Process Outsourcing (BPO) - Business Process Re-engineering and Bench Marking –Balanced Score Card -Knowledge Management.

Course Outcomes:

- Understand the concepts &principles of management and designs of organization in a practical world
- Apply the knowledge of Work-study principles & Quality Control techniques in industry
- Analyze the concepts of HR Min Recruitment, Selection and Training& Development.
- Evaluate PERT/CPM Techniques for projects of an enterprise and estimate time &cost of project & to analyze the business through SWOT.
- Create Modern technology in management science.

Textbooks:

- A.R.Aryasri,“Management Science”, TMH,2013
- Stoner,Freeman,Gilbert, Management,PearsonEducation, NewDelhi,2012.

References:

- Koontz&Weihrich, “EssentialsofManagement”, 6thedition, TMH, 2005.
- ThomasN.Duening&JohnM.Ivancevich,“ManagementPrinciplesandGuidelines”,Biztantra KanishkaBedi, “Production and Operations Management”, oxford University Press, 2004.
- SamuelC.Certo, “ModernManagement”, 9thedition,PHI,2005

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech- VII Sem

L	T	P	C
1	0	2	2

(EC20ASC701) IOT AND INDUSTRIAL AUTOMATION

Course Objectives:

1. Introduce the fundamental concepts of IoT and physical computing
2. Expose the student to a variety of embedded boards and IoT Platforms
3. Create a basic understanding of the communication protocols in IoT communications.
4. Familiarize the student with application program interfaces for IoT.
5. Enable student's to create simple IoT applications.

UNIT-I

Overview of IoT:

The Internet of Things: An Overview, The Flavour of the Internet of Things, The "Internet"of "Things", The Technology of the Internet of Things, Enchanted Objects, Who is Making the Internet of Things?

DesignPrinciplesforConnectedDevices: Calm and Ambient Technology, Privacy, Web Thinking for Connected Devices, Affordances.

Prototyping: Sketching,Familiarity,Costs Vs Ease of Prototyping,Prototypes and Production, Open source Vs Close source, Tapping into the community.

- Explain IoT architecture.[L2]
- Interpret the design principles that govern connected devices[L2]

UNIT-II

Embedded Devices:

Electronics, Embedded Computing Basics, Arduino, RaspberryPi, Mobile phones and tablets, Plug Computing: Always-on Internet of Things

- Explain the basics of microcontrollers [L2]
- Outline the architecture of Arduino [L2]

UNIT-III

Communication in the IoT:

InternetCommunications: An Overview, IP Addresses, MAC Addresses, TCP and UDP Ports, Application Layer Protocols

Prototyping Online Components:

GettingStartedwithanAPI, Writing a NewAPI,Real-Time Reactions,Other ProtocolsProtocol

- Interpret different protocols and compare them [L2]
- Select which protocol can be used for a specific application [L3]

Practice Exercises:

Any 10 experiments are to be done (Any Software 6 +4 Hardware)

1. Data acquisition using MyDAQ. Select any one development board (Eg., Arduino or Raspberry Pi) and control LED using the board.
2. Using the same board as in (1), read data from a sensor. Experiment with both analog and digital sensors.
3. Control any two actuators connected to the development board using Bluetooth.
4. Read data from sensor and send it to a requesting client. (using socket communication) Note: The client and server should be connected to same local area network.
5. Create any cloud platform account, explore IoT services and register a thing on the platform. Push sensor data to cloud.
6. Control an actuator through cloud.
7. Accesses the data pushed from sensor to cloud and apply any data analytics or visualization services.
8. Create a mobile app to control an actuator.
9. Design an IoT based air pollution control system which monitors the air pollution by measuring carbon monoxide, ammonia, etc and gives alarm or sends message when the pollution level is more than permitted range.
10. Design an IoT based system which measures the physical and chemical properties of the water and displays the measured values.
11. Identify a problem in your local area or college which can be solved by integrating the things you learned and create a prototype to solve it (Mini Project).
12. Design a business model canvas for a digital display

Course outcomes:

CO1: Choosethe sensors and actuators foranIoT application (L1)

CO2: Select protocols foraspecificIoT application (L2)

CO3: Utilizethe cloud platform and APIsforIoTapplications (L3)

CO4: Experiment with embedded boards for creatingIoT prototypes (L3)

CO5: Design a solution foragivenIoT application (L6)

Text Books:

1. Adrian McEwen, Hakim Cassimally- Designing the Internet of Things, WileyPublications, 2012.
2. Alexander Osterwalder, and Yves Pigneur – Business Model Generation – Wiley, 2011.

ReferenceBooks:

1. ArshdeepBahga, Vijay Madisetti- Internet of Things: A Hands-On Approach, Universities Press, 2014.
2. TheInternetofThings,Enablingtechnologiesandusecases–PethuruRaj,AnupamaC.Raman, CRC Press.

Referencesites:

1. https://www.arduino.cc/
2. https://www.raspberrypi.org/

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- V Sem

L	T	P	C
3	0	0	3

(EC20AOE501) BASIC VLSI DESIGN

Course Objectives:

1. Learn about the various processing steps involved in the fabrication of a nMOS, pMOS and CMOS transistors.
2. Learn about the various Design rules and Layout of MOS transistors.
3. Enable the students to learn about the Scaling Models and Scaling factors of MOS transistors.
4. Study the various examples of structured design.
5. Learn about the Testing concepts in VLSI Chip design.

Unit I

Review of Microelectronics and Introduction to MOS technology:

The IC era, Basic MOS transistors- Enhancement mode and Depletion mode transistor action, nMOS fabrication, CMOS fabrication-P-Well, N-Well and Twin-tub process, Drain-to-Source Current versus Voltage V_{DS} relationships, MOS transconductance, output conductance and Figure of Merit.

Unit II

MOS circuits and Design process:

The Pass transistor, nMOS inverter, Pull-up to Pull-down ratio of different cases, CMOS inverter and Latch-up in CMOS circuits, MOS layers, Stick diagrams-nMOS and CMOS design styles, Design rules and Layout- Lambda-based design rules, Contact cuts.

Unit III

Circuit Concepts and Scaling of MOS circuits:

Sheet resistance concept, Area Capacitance of layers and calculations, The Delay unit, Inverter delay, Driving large capacitance loads, Propagation delays and Wiring capacitances, Scaling Models and Scaling factors, Scaling factors for various device parameters and its summary.

Unit IV

Subsystem Design:

Architectural issues, Switch logic, Gate restoring logic-The inverter, Two-input nMOS, CMOS and BiCMOS NAND and NOR gates and Other forms of CMOS logic.

Unit V

Test and Testability:

System partitioning, Layout and Testability, Reset/Initialization, Design for Testability, Testing Combinational Logic and Sequential Logic, Practical Design for Test guidelines, Scan Design Techniques and Built-In-Self-Test (BIST).

Text Books:

1. K.Eshraghian, D.A. Pucknell and S.Eshraghian, “Essentials of VLSI Circuits and Systems”, Third Edition, PHI Learning Pvt. Ltd., 2019.
2. W.Wolf “Modern VLSI Design IP based design” Fourth edition, PHI Learning Pvt. Ltd., 2020.

References:

1. Mead, C.A and Conway, L.A., “Introduction to VLSI Systems”, Addison –Wesley, USA, 1980.
2. Neil H. E. Weste & D.M.Harris, “CMOS VLSI Design-A Circuits and Systems Perspective”, Fourth edition, Pearson Edition, 2020.

Course Outcomes:

CO1: Outline the processing steps in the fabrication of a nMOS, pMOS and CMOS structure.

CO2: Illustrate the Layout procedure of simple MOS circuit using Lambda based design rules.

CO3: Summarize the scaling effects of various key parameters of MOSFET devices.

CO4: Design various MOS based logic circuits.

CO5: Develop algorithms for automatic test generation for combinational and sequential circuits.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- V Sem

L	T	P	C
3	0	0	3

(EC20AOE502) DIGITAL ELECTRONICS

Course Objectives:

1. To introduce basic postulates of Boolean algebra and the methods for simplifying Boolean expressions
2. To learn about Gate Minimization techniques.
3. To illustrate the concepts and study the procedures for the analysis and design of Combinational circuits.
4. To study the procedures for the analysis and design of Sequential circuits.
5. To introduce the concepts of programmable logic devices.

UNIT I

Number System & Boolean Algebra:

Digital Systems, Binary Numbers, Number base conversions, Complements of numbers, Signed binary numbers, Binary codes.

Boolean Algebra-Basic definition, Basic theorems and properties, Boolean Functions, Canonical & Standard forms, other logic operations & Logic gates.

UNIT II

Gate Level Minimization:

The map method, four variable & Five variable K-map, POS & SOP Simplification, Don't care conditions, NAND & NOR Implementation, Other two level Implementation, Ex-or Function, Tabular Method- Simplification of Boolean function using tabulation Method.

UNIT III

Combinational Logic Circuits:

Combinational circuits, Analysis & Design procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude comparator, Decoder, Encoders, Multiplexers.

UNIT IV

Sequential Logic Circuits:

Sequential Circuits, Latches, Flips-Flops - RS, JK, Master-Slave JK, D & T flip flops, Analysis of Clocked sequential circuits, State Reduction & Assignment, Design procedure, Registers &

Counters – Registers, Shift Registers, Ripple Counters, Synchronous counters, and Asynchronous counters.

UNIT V

Programmable Devices:

Memory organization, classification of semiconductor memories, ROM, PROM, DROM, EPROM, EEPROM, RAM, expansion of memory, CCD, Flash memories, content addressable memory and Programmable logic devices-PROM, Programmable logic array (PLA) and Programmable array logic (PAL), field programmable gate array (FPGA).

Text Books:

1. M.Morris Mano & Michel D. Ciletti, "Digital Design", 5th Edition, Pearson education.
2. Zvi Kohavi and Nirah K.Jha, "Switching theory and Finite Automata Theory", 3rd Edition Cambridge.

References:

1. Subratha Goshal, "Digital Electronics", Cambridge Publishers.
2. Comer, "Digital & State Machine Design", Third Indian edition, OXFORD publishers.

Course Outcomes:

CO1: Apply basic postulates of Boolean Algebra in the design of design systems.
CO2: Design digital logic circuits using K-Map minimization technique.
CO3: Develop an Arithmetic Logic Unit using different Combinational circuits.
CO4: Design Sequential circuits.
CO5: Compare various Programmable logic devices.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VI Sem

L	T	P	C
3	0	0	3

(EC20AOE601) ELECTRONIC INSTRUMENTATION & MEASUREMENTS

Course Objectives:

1. To understand various measurement metrics for performance analysis and basic principles of various measurements like voltage, current, Resistance
2. To familiarize the characteristics, operations, calibrations and applications of the different oscilloscopes.
3. To explain principles of operation and working of different electronic instruments like signal generators, wave analyzers etc.
4. Understand the basic principle of various DC/AC bridges for the measurement of unknown passive elements like R, L and C.
5. To provide exposure to working principles of different sensors and transducers.

UNIT-I

Performance characteristics of Instruments: Static characteristics, Accuracy, Precision, Resolution, Sensitivity, static and dynamic calibration, Errors in Measurement, and their statistical analysis, dynamic characteristics-speed of Response, fidelity, Lag and dynamic error. DC ammeters, DC voltmeters-multirange, range extension/solid state and differential voltmeters, AC voltmeters –multirange, range extension. Thermocouple type RF ammeter, ohm meters, series type, shunt type, multimeter for voltage, current and resistance measurements.

Learning Outcomes:

- Define different terms used for characterizing the performance of an instrument/measurement system (L1)
- Understand the principle of operation of various meters (L1)

UNIT-II

Oscilloscopes-I: Standard specifications of CRO,CRT features, vertical and horizontal amplifiers, horizontal and vertical deflection systems, sweep trigger pulse, delay line, sync selector circuits, probes for CRO – active, passive, and attenuator type,

Learning Outcomes:

- Understand the basic blocks of analog CROs (L1)
- Measure amplitude and frequency utilizing oscilloscopes (L2)

UNIT-III

Oscilloscopes-II: Dual trace/beam CRO, Principles of sampling oscilloscope, storage oscilloscope, and digital storage oscilloscope, Digital frequency counters, time & Period measurements.

Learning Outcomes:

- Understand the basic blocks of digital CROs (L1)
- Measure amplitude and frequency utilizing oscilloscopes (L2)

UNIT-IV

Signal generators & Analyzers: Specifications & principles of working (Block diagram approach) Signal generators-fixed and variable, AF oscillators, function generators, pulse, random noise, sweep, and Wave analyzers, Harmonic distortion analyzers, Spectrum analyzers.

Learning Outcomes:

- Understand the basic principle of various signal generators and analyzers (L1)
- Describe characteristics of signal generators and analyzers (L2)

UNIT-V

Review of DC Bridges: Wheatstone bridge, Kelvin Bridge, errors and precautions in using bridges.

AC bridges: Measurement of inductance-Maxwell's bridge, Anderson Bridge. Measurement of capacitance- Schering Bridge. Measurement of frequency- Wein Bridge, Q-meter.

Learning Outcomes:

- Understand principles of measurements associated with different DC/AC bridges(L2)
- Ability to derive balance condition of various bridges to find unknown values (L2)

TEXT BOOKS:

1. A.D. Helfrick and W.D. Cooper, "Modern Electronic Instrumentation and Measurement Techniques", PHI, 5th Edition,2002.
2. H.S.Kalsi, "Electronic instrumentation", second edition, Tata McGraw Hill, 2004.
3. K. Lal Kishore, "Electronic Measurements & Instrumentations", Pearson Education,2009.

REFERENCES:

1. Robert A. Witte, “Electronic Test Instruments, Analog and Digital Measurements”, Pearson Education, 2nd Ed., 2004.
2. David A. Bell, “Electronic Instrumentation & Measurements”, PHI, 2nd Edition, 2003.

Course Outcomes:

CO 1: Describe the basic principles involved in the meters for measuring voltage, current, resistance and frequency (L2).

CO 2: Analyze CRO for measuring signal characteristics (L4).

CO3: Analyze different waveforms using advanced instruments such as signal generators, logic analyzer & Spectrum analyzer (L4).

CO4: Apply the principles of various DC/AC bridges to solve various measurement parameters (L3).

CO5: Analyze various parameters using sensors and transducers (L4).

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VI Sem

L	T	P	C
3	0	0	3

(EC20AOE602) SIGNAL PROCESSING

Course Objectives:

1. To introduce students to the basic idea of signal and system analysis and its characterization in time and frequency domains.
2. To present Fourier tools through the analogy between vectors and signals.
3. To teach concept of sampling and reconstruction of signals.
4. To analyze characteristics of linear systems in time and frequency domains.
5. To understand Laplace and z-transforms as mathematical tool to analyze continuous and discrete-time signals and systems.

UNIT I

SIGNALS & SYSTEMS:

Definition and classification of Signal and Systems (Continuous time and Discrete time), Elementary signals such as Dirac delta, unit step, ramp, sinusoidal and exponential and operations on signals. Analogy between vectors and signals-orthogonality-Mean Square error-Fourier series: Trigonometric & Exponential and concept of discrete spectrum

UNIT II

CONTINUOUS TIME FOURIER TRANSFORM:

Definition, Computation and properties of Fourier Transform for different types of signals. Statement and proof of sampling theorem of low pass signals.

UNIT III

SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS:

Linear system, impulse response, Response of a linear system, linear time-invariant (LTI) system, linear time variant (LTV) system, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, system bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Poly-Wiener criterion for physical realization, Relationship between bandwidth and rise time. Energy and Power Spectral Densities

UNIT IV

DISCRETE TIME FOURIER TRANSFORM:

Definition, Computation and properties of Fourier Transform for different types of signals.

UNIT V

LAPLACE TRANSFORM:

Definition-ROC-Properties-Inverse Laplace transforms-the S-plane and BIBO stability-Transfer functions-System Response to standard signals-Solution of differential equations with initial conditions.

The Z–TRANSFORM: Derivation and definition-ROC-Properties- Inverse Z-Transform-System analysis-Transfer function-BIBO stability-System.

TEXT BOOKS:

1. B. P. Lathi, “Linear Systems and Signals”, Second Edition, Oxford University press.
2. A.V. Oppenheim, A.S. Willsky and S.H. Nawab, “Signals and Systems”, Pearson, 2nd Edition.
3. A. Ramakrishna Rao, “Signals and Systems”, 2008, TMH.

REFERENCES:

1. Simon Haykin and Van Veen, “Signals & Systems”, Wiley, 2nd Edition.
2. B.P. Lathi, “Signals, Systems & Communications”, 2009,BS Publications.

Course Outcomes:

CO1: Understand the mathematical description and representation of continuous-time and discrete-time signals and systems. Also understand the concepts of various transform techniques.

CO2: Apply sampling theorem to convert continuous-time signals to discrete-time signals and reconstruct back, different transform techniques to solve signals and system related problems.

CO3: Analyze the frequency spectra of various continuous-time signals using different transform methods.

CO4: Analyze the systems based on their properties and determine the response of them.

CO5: Analyze the frequency spectra of various discrete-time signals using different transform methods.

SRI VENKATESWARA COLLEGE OF ENGINEERING
(Autonomous)

B.Tech-VII Sem

L T P C
3 0 0 3

(EC20AOE701) IC APPLICATIONS

Course Objectives:

1. To introduce the basic building blocks of Opamp
2. To explain linear and nonlinear applications of opamp
3. To introduce the concept of IC 555 and PLL
4. To study working principle of data converters
5. To illustrate combinational & sequential circuits

UNIT I:

LINEAR INTEGRATED CIRCUITS

Introduction, Classification of ICs, Ideal and Practical Op-Amp, Op-amp characteristics-DC and AC Characteristics. 741 Op-Amp and its Features, Modes of operation-inverting, non-inverting, differential.

Linear Applications of Op-Amp, adder ,subtractor, AC Amplifier, V to I and I to V Converters, Differentiators and Integrators.

Learning outcomes:

1. Understand ideal and practical Op-Amps (L2)
2. Understand internal blocks and characteristics of Op-Amp (L2)

UNIT II:

OSCILLATORS& WAVEFORM GENERATORS

Comparators, Schmitt Trigger. Multivibrators-Astable and monostable Principle of Operation and Types of Oscillators – RC, Wien Bridge.

Waveform Generators - Triangular. Saw Tooth, Square Wave.

Learning outcomes:

1. Illustrate the applications using Op-Amp (L3)
2. Demonstrate waveform generators using Op-Amp (L3)

UNIT III:

TIMERS & PHASE LOCKED LOOPS

Introduction to 555 Timer, Functional Diagram, Monostable and Astable Operations and Applications, Schmitt Trigger, PLL- Introduction, Block Schematic, Principles and Description of individual Blocks of 565.

Learning outcomes:

1. Describe internal circuit operation of 555 timer (L2)
2. Illustrate the concept of PLL (L3)

UNIT IV:

D-A AND A- D CONVERTERS

Introduction, Basic DAC Techniques - Weighted Resistor Type. R-2R Ladder Type, inverted R-2R Type. Different types of ADCs - Parallel Comparator Type. Counter Type. Successive Approximation Register Type and Dual Slope Type DAC and ADC Specifications.

Learning outcomes:

1. Explain operation principles of different A/D & D/A converters (L2)
2. Demonstrate different types of A /D & D/A converter circuits (L3)

UNIT V:

COMBINATIONAL & SEQUENTIAL LOGIC DESIGN

COMBINATIONAL CIRCUIT ICs: Use of TTL-74XX Series–Logic gates using 74XX ICs, adders, Comparator, multiplexers, encoders, Decoders, Demultiplexers, Priority Encoders(Pin Diagram, Function table)

SEQUENTIAL CIRCUIT ICs: Commonly Available 74XX ICs –Latches, Flip flops- RS, JK, D and T-Type Flip-Flops, Binary counter, Decade counter. Shift Registers & applications.

Learning outcomes:

1. Describe internal circuit operation of different Combinational I Cs(L2)
2. Demonstrate Sequential circuits using 74XX ICs (L3)

TEXT BOOKS:

1. Linear Integrated Circuits -D. Roy Chowdhury, New Age International (p)Ltd, 3rd Ed., 2008.
2. Wakerly J.F. Digital Design: Principles and Practices, 4th Edition, Pearson India, 2008.

REFERENCE BOOKS:

1. R. P. Jain, Modern Digital Electronics, McGraw Hill Education (India Private Limited), 4th edition, 2012.
2. Op-Amps & Linear ICs - Ramakanth A. Gayakwad, PHI, 1987.

Course Outcomes:

CO1: Understand the basic building blocks of Op-Amp.

CO2: Illustrate waveform generators and oscillators using Op-Amp.

CO3: Analyze concept of 555 timer and PLL.

CO4: Analyze the operation & characteristics of data converters.

CO5: Study the design of various 74XX ICs, Combinational & sequential.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech-VII Sem

L	T	P	C
3	0	0	3

(EC20AOE702) PRINCIPLES OF COMMUNICATION ENGINEERING

Course Objectives:

1. To understand the concept of various modulation schemes and multiplexing.
2. To apply the concept of various modulation schemes to solve engineering problems.
3. To analyze various modulation schemes.
4. To evaluate various modulation scheme in real time applications.

UNIT I

Amplitude Modulation

Introduction, An overview of Electronic Communication Systems. Need for Frequency Translation, classification of modulation schemes, Amplitude Modulation: DSB-FC, DSB-SC, SSB-SC and VSB, Modulators and demodulators. The Superheterodyne Receiver.

UNIT II

Angle Modulation

Basic definitions, Frequency Modulation: Narrow Band FM, Wide Band FM, Transmission bandwidth of FM Signals, Generation of FM Signals, Demodulation of FM Signals, FM Stereo Multiplexing, Phase modulation, AM vs PM.

UNIT III

Pulse Modulation

Sampling Theorem, Quantization, Pulse Amplitude Modulation, Pulse Width Modulation, Pulse position modulation, Pulse code modulation.

Concept of Time Division Multiplexing, Frequency Division Multiplexing.

UNIT IV

Digital Modulation

Digital Representation of Analog Signals. Phase shift keying-Binary Amplitude Shift Keying, Binary Phase Shift Keying ,Differential phase shift keying, and Quadrature Phase Shift Keying, Frequency Shift Keying— Comparison.

UNIT V

MULTI-USER RADIO COMMUNICATION

Global System for Mobile Communications (GSM),Mobile &Cellular communication

Concept – Overview of Multiple Access Schemes – Code division multiple access (CDMA) ,Frequency division multiple access (FDMA),Satellite Communication – Bluetooth.(Block diagram approach only).

Note: The main emphasis is on qualitative treatment. Complex mathematical treatment may be avoided.

Textbooks:

1. Herbert Taub, Donald L Schilling and Goutam Saha, "Principles of Communication Systems", 3rdEdition, Tata McGraw-Hill Publishing Company Ltd., 2008.
2. Simon Haykin, "Communication Systems", 4th Edition, John Wiley & Sons, 2004

References:

1. B. P. Lathi, Zhi Ding and Hari M. Gupta, "Modern Digital and Analog Communication Systems", 4th Edition, Oxford University Press, 2017.
2. K. Sam Shanmugam "Digital and Analog Communication Systems", Wiley India Edition, 2008.
3. Martin S.Roden, "Analog and Digital Communication System", 3rd Edition, Prentice Hall of India, 2002.

Course Outcomes:

CO1. Analyze and design of various continuous wave modulation and demodulation techniques.
CO2. Attain the knowledge about angle modulation and FM Transmitters and Receivers.
CO3. Analyze and design the various Pulse Modulation Techniques.
CO4. Understand the concepts of Digital Modulation Techniques and Baseband transmission.
CO5.Comprehend the principles of radio communication systems like GSM.CDMA, Bluetooth, Mobile and satellite communications etc.,

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VII Sem

L	T	P	C
3	0	0	3

(EC20AOE703) SENSORS AND SYSTEMS

Course Objectives:

1. To learn about the characterization of sensors.
2. To understand about the working of Electromechanical, Thermal, Magnetic and radiation sensors
3. To understand the concepts of Electro analytic and smart sensors.
4. To learn about the various characteristics of radiation sensors.
5. To learn about the usage of different sensors in various real time applications.

UNIT I

Sensors / Transducers:

Principles, Classification, Parameters, Characteristics, Environmental Parameters (EP), Characterization Electromechanical Sensors: Introduction, Resistive Potentiometer, Strain Gauge, Resistance Strain Gauge, Semiconductor Strain Gauges -Inductive Sensors: Sensitivity and Linearity of the Sensor -Types-Capacitive Sensors: Electrostatic Transducer, Force/Stress Sensors Using Quartz Resonators, Ultrasonic Sensors.

UNIT II

Thermal Sensors-I:

Introduction ,Gas thermometric Sensors ,Thermal Expansion Type Thermometric Sensors ,Acoustic Temperature Sensor ,Dielectric Constant and Refractive Index thermo sensors ,Helium Low Temperature Thermometer ,Nuclear Thermometer and Magnetic Thermometer.

UNIT III

Magnetic sensors:

Introduction, Sensors and the Principles Behind, Magneto-resistive Sensors, Anisotropic Magneto resistive Sensing, Semiconductor Magneto resistors, Hall Effect and Sensors, Inductance and Eddy Current Sensors, Angular/Rotary Movement Transducers and Synchros.

UNIT IV

Radiation Sensors:

Introduction, Basic Characteristics, Types of Photo resistors/ Photo detectors, X-ray and Nuclear Radiation Sensors, Fiber Optic Sensors Electro analytical Sensors: The Electrochemical Cell, The Cell Potential – Standard Hydrogen Electrode (SHE), Liquid Junction and Other Potentials, Polarization, Concentration Polarization, Reference Electrodes, Sensor Electrodes, Electro ceramics in Gas Media.

UNIT V

Smart Sensors:

Introduction, Primary Sensors, Excitation, Amplification, Filters, Converters, Compensation, Information Coding/Processing – Data Communication, Standards for Smart Sensor Interface, the Automation Sensors -Applications: Introduction, On-board Automobile Sensors (Automotive Sensors), Home Appliance Sensors, Aerospace Sensors, Sensors for Manufacturing and Environmental Monitoring.

Text Books:

1. Sensors and Actuators, D. Patranabis, 2nd Ed., PHI, 2013.
2. Introduction to sensors- John Veteline, Aravindraghu, CRC press, 2011.

References:

1. Sensors handbook- Sabrie soloman, 2nd Ed. TMH, 2009
2.Make sensors: Terokarvinen, kemo, karvinen and Villey valtokari, 1st edition, maker media, 2014.

Course Outcomes:

CO1: Understand Classification and Characterization of Sensors.
CO2: Explore the working of Electromechanical, Thermal, Magnetic, radiation and Electro analytic sensors.
CO3: Analyze and Model various losses occurring in Magnetic sensors.
CO4: Compare the working performance of various radiation sensors.
CO5:Design a complete system for monitoring of environmental parameters.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VII Sem

L	T	P	C
3	0	0	3

(EC20AOE704) INTERNET OF THINGS

Course Objectives:

1. Understand IOT design requirements.
2. Understand various technologies and protocols.
3. Understand storage and intelligent analytics.
4. Analyze security requirements along with threat model.
5. Create and Design various applications.

UNIT 1

Introduction to IoT: Architectural overview, Design principles and needed capabilities, IoT Applications, Sensing, Actuation, Basics of Networking, M2M and IoT Technology Fundamentals- Devices and gateways, Data management, Business processes in IoT, Role of cloud in IoT.

UNIT II

Elements of IoT: Hardware components – computing (Arduino, Raspberry Pi), communication, Sensing, Actuation, I/O interfaces Software Components- Programming APIs (Using Python/Arduino) for communication protocols-MQTT, Zigbee, Bluetooth, CoAP, UDP and TCP.

UNIT III

Sensing and Actuation: Definition of Sensor, Sensor features, Resolution, Classes, Different types of sensors, Actuator, Different types of Actuators, purpose of Sensors and Actuators in IoT.

UNIT IV

IoT Application Development: Solution frame work for IoT Applications-Implementation of Device integration, Data acquisition and Integration, Device data storage on cloud/local server, Authentication, authorization of Devices.

UNIT V

IoT Case Studies: IoT Case studies and mini projects based on industrial Automation, Transportation, Agriculture, Healthcare and Home Automation.

Textbooks:

1. Vijay Madisetti, Arshdeep Bahga, “Internet of Things a Hands-On- Approach”,2014.
2. Dr SRN Reddy, Rachit Thukral and Manasi Mishra ,” Introduction to Internet of Things”: A practical Approach” ETI Labs

References:

1. Raj Kamal, “Internet of Things: Architecture and Design”, McGraw Hill Education.
2. Adrian McEwen, “Designing the Internet of Things”, Wiley Publishers, 2013.

Course Outcomes:

CO1: Understand the concepts of Internet of Things.

CO2: Identify hardware and software components of Internet of Things.

CO3: Analyze basic communication protocols.

CO4: Discuss various techniques related to authorization of Devices.

CO5: Design IoT applications in different domain and be able to analyze their performance.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech- VII Sem

L	T	P	C
3	0	0	3

(EC20AOE705) INTRODUCTION TO IMAGE PROCESSING

Course Objectives:

1. To introduce fundamentals of Image Processing
2. To expose various relationships between pixels
3. To descript various intensity transformations in spatial domains.
4. To descript various spatial and frequency domains filters.
5. To dissimilate various segmentation and compression techniques for image processing.

Unit I

Fundamentals of Image Processing – I:

Introduction, A simple image model, Components of image processing system, Fundamental Steps in digital image processing, image sensing and acquisition, Applications of image processing.

Unit II

Fundamentals of Image Processing – II:

Image sampling and quantization, basic relationships between pixels – neighbourhood, adjacency, connectivity, distance measures, mathematical operations in image processing.

Unit III

Image Enhancement in spatial domain:

Introduction to gray level transformations, Point processing - Image negative, contrast stretching, intensity slicing, Bit plane slicing and grey level slicing, Histogram Processing, Histogram equalization and Specifications.

Unit IV

Image Enhancement in frequency domain:

Spatial Filtering, Smoothing filters, Sharpening filters, Enhancement in Frequency domain –image smoothing, image sharpening and Homomorphic filtering.

Unit V

Image Segmentation and compression:

Point, Line and Edge Detection, Fundamentals of Compression, Image compression model, Types of Redundancy – Coding, Inter pixel and Psycho visual, Lossless compression – Huffman coding, Shannon-Fano coding.

Text Books:

1. Rafael C. Gonzalez, Richard E woods and Steven L. Eddins, “Digital Image processing using MATLAB”, Tata McGraw Hill, 2010.
2. S. Jayaraman, S.Esakkirajan, T.Veerakumar, “Digital Image processing”, Tata McGraw Hill.

References:

1. Milan Sonka, Vaclav Hlavac, Roger Boule, Image Processing, Analysis, and Machine Vision, Third Edition, Cengage Learning, 2016.
2. William K. Pratt, “Digital Image Processing”, John Wiley, 3rd Edition, 2004

Course Outcomes:

CO1: Understand fundamentals of digital image processing and apply engineering mathematics in processing of digital image.

CO2: Compute the relationship between the pixels in image processing

CO3: Analyze different image enhancement techniques in spatial domain.

CO4: Describe various image spatial filters and Analyze different image enhancement techniques in frequency domain

CO5: Analyze various techniques in image segmentation and apply various algorithms to perform image compression.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech-VII Sem

L	T	P	C
3	0	0	3

(EC20AOE706) MICROCONTROLLER AND APPLICATIONS

Course Objectives:

4. To introduce architectural concepts of 8051 microcontroller.
5. To impart knowledge on addressing modes and instruction set of 8051.
6. To describe timers, counters and serial communication in 8051.
7. To explain interfacing concepts of 8051.

UNIT I

Microprocessor Vs Microcontroller, Embedded Systems, Embedded Microcontrollers, 8051 Architecture- Registers, I/O ports functions, Internal Memory organization, External Memory, 8051 Pin diagram.

UNIT II

8051 - Addressing Modes, instruction set. Simple Assembly language programs.

UNIT III

8051 - Stack, Timers and Counters – Operation and Assembly language programming to generate a pulse using Mode-1 and a square wave using Mode- 2 on a port pin.

UNIT-IV

8051 Serial Communication- Basics of Serial Data Communication, RS- 232 standard, Simple Serial Port programming in C to transmit a message and to receive data serially. 8051 - Interrupts, Assembly language programming to generate an external interrupt using a switch.

UNIT-V

Interfacing 8051 with LCD, Stepper Motor Interfacing, PWM generation using 8051.

Text Books:

1. Muhammad Ali Mazidi and Janice Gillespie Mazidi and Rollin D. McKinlay; “The 8051 Microcontroller and Embedded Systems – using assembly and C”, PHI, 2006 / Pearson, 2006.
2. Kenneth J. Ayala, “The 8051 Microcontroller”, 3rd Edition, Thomson/Cengage Learning.

References:

1. Manish K Patel, “The 8051 Microcontroller Based Embedded Systems”, McGraw Hill, 2014, ISBN: 978-93-329-0125-4.
2. Raj Kamal, “Microcontrollers: Architecture, Programming, Interfacing and System Design”, Pearson Education, 2005.

Course Outcomes:

CO1: Understand the architecture of 8051 microcontroller.
CO2: Develop 8051 assemble language programming.
CO3: Develop assembly language programs based on timers and counters of 8051 .
CO4: Understand the serial communication basics of 8051 microcontroller.
CO5: Describe 8051 Microcontroller interfacing with I/O devices.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech IV Sem

L	T	P	C
4	0	0	4

(EC20AHO401) ELECTRONICS PACKAGING
(Honors)

Unit 1

Introduction and Role of Packaging:

Integrated Circuits, IC Packaging, Semiconductor Roadmap, IC Packaging Challenges, Summary and Future Trends, Role of Packaging in the Computer Industry, Telecommunication Industry, Automotive Systems, Medical Electronics, Consumer Electronics and MEMS Products

Unit 2

Design for Reliability and Thermal Management:

What Is Design for Reliability, Microsystems Failures and Failure Mechanisms, Fundamentals of Design for Reliability, Thermomechanically-Induced Failures, Electrically-Induced Failures, Chemically-Induced Failures.

Introduction to thermal management, Cooling Requirements for Microsystems, Thermal Management Fundamentals, Thermal Management of IC and PWB Packages, Electronic Cooling Methods.

Unit 3

Single Chip Packaging and Multichip Packaging:

Single Chip Package: Introduction and Functions, Types and Fundamentals, Materials, Processes, Properties and Characteristics of Single Chip Packages.

Multichip Packaging: Functionality, Multichip, Advantages, Multichip Modules at the System Level, Types of Multichip Module Substrates, Multichip Module Design, Multichip Module Technology Comparisons.

Unit 4

IC Assembly and Wafer-Level Packaging:

IC Assembly: Introduction and Purpose, Requirements, IC Assembly Technologies Wire bonding, Tape Automated Bonding and Introduction to Flip Chip.

Wafer-Level Packaging: Introduction, Various Technologies, Reliability and Wafer-level Burn-in and Test.

Unit 5

Sealing and Encapsulation:

Introduction and Fundamentals of Encapsulation and Sealing, Encapsulation Requirements, Encapsulant Materials, Encapsulation Processes and Hermetic Sealing.

Text Books:

1. Rao. R. Tummala, “Fundamentals of Microsystems Packaging”, McGraw Hill, 3rd edition, 2019.
2. William D. Brown, “Advanced Electronic Packaging”, Second edition, IEEE Press, 2011.

References:

1. Walter C Bosshart, “Printed Circuit Boards: Design and Technology”, TMGH 1998.
2. Glenn R.Blackwell, “The Electronic Packaging Handbook”, CRC Press, 2010.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech IV Sem

L	T	P	C
4	0	0	4

(EC20AHO402)STRUCTURED DIGITAL SYSTEM DESIGN
(HONORS)

Course Objectives:

1. To study about structural functionality of different Digital blocks (Both combinational and Sequential).
2. To provide an exposure to ASM charts, their notations and their realizations.
3. To provide an exposure to VHDL and different styles of modelling using VHDL.
4. To introduce concept of micro programming and study issues related to micro programming.

UNIT-1

BUILDING BLOCKS FOR DIGITAL DESIGN: Multiplexer, Demultiplexer, Decoder, Encoder, Comparator, Adder, ALU, Carry-look-ahead adder.

BUILDING BLOCKS WITH MEMORY: Clocked building blocks, register building blocks, RAM, ROM, PLA, PAL, Timing devices.

UNIT -II

DESIGN METHODS: Elements of design style, top-down design, separation of controller and architecture, refining architecture, and control algorithm, Algorithmic State Machines, ASM chart notations.

UNIT-III

REALISING ASMS - Traditional synthesis from ASM chart, multiplexer controller method, one-shot method, ROM based method.

ASYNCHRONOUS INPUTS AND RACES - Asynchronous ASMs, Design for testability, test vectors, fault analysis tools.

UNIT-IV

MICROPROGRAMED DESIGN: Classical Microprogramming with Modem Technology; Enhancing the Control Unit; The 2910 Microprogram Sequencer; Choosing a Microprogram Memory; A Development System for Microprogramming; Designing a Microprogrammed Minicomputer

UNIT-V

MODELLING WITH VHDL: CAD tools, simulators, schematic entry, synthesis from VHDL.

DESIGN CASE STUDIES: Single pulse, system clock, serial to parallel data conversion, traffic light controller.

TEXT BOOKS:

1. Franklin P. Prosser and David E. Winkel, "The Art of Digital Design", Prentice Hall.
2. Roth, “Digital System Design using VHDL”, McGraw Hill, 2000.

REFERENCE BOOKS:

1. William Fletcher, An Engineering Approach to Digital Design, 1st Edition, Prentice-Hall India, 1997.
2. William J Dally and John W Poulton, Digital Systems Engineering, Cambridge University Press, 2008.
3. Jayaram Bhasker, A VHDL Primer, 3rd edition, Prentice-Hall India, 2009.
4. Kevin Skahill, VHDL for Programmable Logic, Cypress Semiconductors.

Course Outcomes:

CO1: Understand structural functionality of different digital blocks.
CO2: Represent and Realize their designs in ASM charts.
CO3: Represent their designs in different modelling styles by using VHDL.
CO4: Understand concept of Micro program and issues related to microprogramming.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech - V Sem

L	T	P	C
4	0	0	4

(EC20AHO501) MEMS TECHNOLOGY
(HONORS)

UNIT I

Introduction: Introduction to MEMS & Microsystems, Introduction to Microsensors, Evaluation of MEMS, Microsensors, Market Survey, Application of MEMS, MEMS Materials and its Properties.

UNIT II

Microelectronic Technology for MEMS: Microelectronic Technology for MEMS, Micromachining Technology for MEMS, Micromachining Process, Etch Stop Techniques and Microstructure, Surface and Quartz Micromachining, Fabrication of Micromachined Microstructure and Microstereolithography.

UNIT III

Micro Sensors: MEMS Microsensors, Thermal Microsensors, Mechanical Micromachined Microsensors, MEMS Pressure Sensor, MEMS Flow Sensor, Micromachined Flow Sensors, MEMS Inertial Sensors, MEMS Gyro Sensor.

UNIT IV

MEMS Accelerometers: Micromachined Micro accelerometers for MEMS, MEMS Accelerometers for Avionics, Temperature Drift and Damping Analysis, Piezoresistive Accelerometer Technology, MEMS Capacitive Accelerometer and its design process, MEMS for Space Applications.

UNIT V

MEMS Applications: Polymer MEMS & Carbon Nano Tubes CNT, Wafer Bonding & Packaging of MEMS, Interface Electronics for MEMS, Introduction to Bio-MEMS and Micro Fluidics, Introduction to Bio-Nano Technology, Bio-Sensors, Fluidics, MEMS for Biomedical Applications (Bio-MEMS).

Text Books:

1. Nadim Maluf Kirt Williams “An Introduction to Microelectromechanical Systems Engineering”, Second Edition, Artech House, Inc. Boston London, International Standard Book Number: 1-58053-590-9.
2. G. K. Ananthasuresh, K. J. Vinoy, S. Gopalakrishnan, K. N. Bhat and V. K. Atre,

"Micro and smart systems", Wiley India, 2010.

References:

1. M.J. Usher, "Sensors and Transducers", McMillian Hampshire, second edition, 2014.
2. R.S. Muller, Howe, Senturia and Smith, "Micro sensors", IEEE Press.

Course Outcomes:

CO1: Understand the Basic concept of MEMS Fabrication Technologies,Piezo-resistance Effect, Piezo electricity and Piezoresistive Sensor.
CO2: Explain Mechanics of Beam and Diaphragm Structures.
CO3: Understand the Basic concept of Air Damping and Basic Equations for Slide-film Air Damping, Couette-flow Model, Stokes-flow Model.
CO4: Analyze the modeling of Electrostatic Actuation.
CO5: Analyze various applications of MEMS in RF.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech-V Sem

L	T	P	C
4	0	0	4

(EC20AHO502) MODERN COMMUNICATION SYSTEMS
(HONORS)

Unit I:

Digital Communication Systems

Introduction to communications systems, digital communication systems, review ofdigital modulation techniques, PCM, BPSK, QPSK, GMSK, Delta Modulation, Adaptive Delta Modulation, Sigma Delta Modulation, Basic principles of orthogonality, Single vs Multicarrier Systems, OFDM block diagram and its Explanations, Shannon- Fano Coding, Huffman Coding, Hamming Coding.

Unit II:

Stochastic Process

Introduction, Mathematical definition of a stochastic process, Mean-Square Stochastic Integrals, Mean-Square Stochastic Differential Equations, Markov process, Poisson process, Ergodic Process.

Unit III:

Optimum Receivers

Optimum receivers for signals corrupted by additive white gaussian noise, Correlation demodulator, Optimum detector. ML sequence detector, Probability of error for binary modulation techniques.

Unit IV:

Software Defined Radio

Need for software radio, general structure for transceiver for SDR, third generation SDR system architecture, trends in SDR, cognitive radio, spectrum sensing in cognitive radio.

Unit V:

MIMO Systems

Introduction, space diversity and systems based on space diversity, MIMO based system architecture, MIMO channel modeling, MIMO channel measurement, MIMO channel capacity.

Text Books:

1. U. Dalal, “Wireless Communication”, Oxford University Press, fifth edition, 2012.
2. H. Stark and J. Woods, “Probability, Statistics, and Random Processes for Engineers”,4th Edition, Pearson, 2012.

References:

1. John G. Proakis, “Digital Communication”, 5/e , McGraw Hill Education, 2014.
2. W. Tomasi, “Advanced Communication Systems”, Pearson Education.
3. S. Haykin “Digital Communication Systems”, John Wiley& sons, 2013.

Course Outcomes:

CO1: Discuss about the concept of Multicarrier Modulation.

CO2: Analyze errors in system using optimum receivers and detectors.

CO3: Comprehend the concepts of related to stochastic processes.

CO4: Contribute in the areas of software defines radio and cognitive radio.

CO5: Understand MIMO systems and channel modeling.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech VI Sem

L	T	P	C
4	0	0	4

(EC20AHO601) ADVANCED COMPUTER ARCHITECTURE
(Honors)

UNIT-I:

Pipeline and vector processing:

Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

UNIT-II:

Computer Arithmetic:

Addition and Subtraction, Hardware Implementation, Multiplication Algorithms and Hardware Implementation, Division Algorithms and Hardware Implementation, Floating Point Arithmetic Operations.

UNIT-III:

Parallel Computer Models:

Evolution of Computer Architecture, System Attributes to Performance, Shared Memory Multiprocessors, Distributed Memory Multicomputers, Vector Super Computers, SIMD Super Computers.

UNIT-IV:

Processors and Memory Hierarchy:

Advanced Processor Technology: Design Space of Processors, Instruction-Set Architectures, CISC scalar Processors, RISC scalar Processors, Super Scalar and Vector Processors: Superscalar Processors.

UNIT-V:

Pipelining and Superscalar Techniques:

Linear Pipeline Processors: Asynchronous and Synchronous models, Clocking and Timing Control, Speedup, Efficiency and Throughput, Pipeline Schedule Optimization, Instruction Pipeline Design: Instruction Execution Phases, Mechanisms for Instruction Pipelining, Dynamic Instruction Scheduling, Branch Handling Techniques.

Text Books:

1.Computer System Architecture, Morris M. Mano, 3rd edition, Pearson/Prentice Hall India.

2. Advanced Computer Architecture, Kai Hwang, McGraw-Hill, India.

References:

1. Computer Organization and Architecture, William Stallings ,8th edition, PHI.

2. Computer Organization, Carl Hamacher, Z. Vranesic, S. Zaky, 5th edition, McGraw Hill.

Course Outcomes:

CO1: Understand the Concept of Parallel Processing and its applications.

CO2: Implement the Hardware for Arithmetic Operations.

CO3: Analyze the performance of different scalar Computers.

CO4: Develop the Pipelining Concept for a given set of Instructions.

CO5: Distinguish the performance of pipelining and non-pipelining environment in a processor.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech VI Sem

L	T	P	C
4	0	0	4

(EC20AHO602) DIGITAL SPEECH PROCESSING (HONORS)

UNIT-I:

Fundamentals of Digital Speech Processing

Anatomy & Physiology of Speech Organs, The process of Speech Production, Acoustic Phonetics, Articulatory Phonetics, The Acoustic Theory of Speech Production- Uniform lossless tube model, effect of losses in vocal tract, effect of radiation at lips, Digital models for speech signals.

UNIT-II:

Time Domain Models for Speech Processing

Introduction- Window considerations, Short time energy and average magnitude Short time average zero crossing rate, Speech Vs Silence discrimination using energy and zero crossing, Pitch period estimation using a parallel processing approach, The short time autocorrelation function, The short time average magnitude difference function, Pitch period estimation using the autocorrelation function.

UNIT-III:

Linear Predictive Coding (LPC) Analysis:

Basic principles of Linear Predictive Analysis: The Autocorrelation Method, The Covariance Method, Solution of LPC Equations: Cholesky Decomposition Solution for Covariance Method, Durbin's Recursive Solution for the Autocorrelation Equations, Comparison between the Methods of Solution of the LPC Analysis Equations, Applications of LPC Parameters: Pitch Detection using LPC Parameters, Formant Analysis using LPC Parameters.

UNIT-IV:

Homomorphic Speech Processing:

Introduction, Homomorphic Systems for Convolution: Properties of the Complex Cepstrum, Computational Considerations, The Complex Cepstrum of Speech, Pitch Detection, Formant Estimation, The Homomorphic Vocoder. Speech Enhancement:

Nature of interfering sounds, Speech enhancement techniques: Single Microphone Approach : spectral subtraction, Enhancement by re-synthesis, Comb filter, Wiener filter, Multi microphone Approach.

UNIT-V:

Automatic Speech & Speaker Recognition:

Basic pattern recognition approaches, Parametric representation of speech, Evaluating the similarity of speech patterns, Isolated digit Recognition System, Continuous digit Recognition System. Hidden Markov Model (HMM) for Speech: Hidden Markov Model (HMM) for speech recognition, Viterbi algorithm, Training and testing using HMMS. Speaker Recognition: Recognition techniques, Features that distinguish speakers, Speaker Recognition Systems: Speaker Verification System, Speaker Identification System.

Text Books:

1. L.R. Rabiner and S. W. Schafer, "Digital Processing of Speech Signals", 2nd Ed., Pearson Education.
2. Douglas O'Shaughnessy, "Speech Communications: Human & Machine", 2nd Ed., Wiley India, 2000.

References:

1. Thomas F. Quateri, "Discrete Time Speech Signal Processing: Principles and Practice", 1st Edition., PE.
2. Ben Gold & Nelson Morgan, "Speech & Audio Signal Processing", 1st Edition, J.Wiley

Course Outcomes:

CO1:Express the speech signal in terms of its time domain and frequency domain representations and the different ways in which it can be modeled.

CO2: Derive expressions for simple features used in speech classification applications.

CO3: Discuss the operation of example algorithms covered in lectures, and discuss the effects of varying parameter values within these.

CO4: Synthesize block diagrams for speech applications, explain the purpose of the various blocks, and describe in detail algorithms that could be used to implement them.

CO5: Deduce the behavior of previously unseen speech processing systems and hypothesize about their merits.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech VII Sem

L	T	P	C
4	0	0	4

(EC20AHO701) DIGITAL VIDEO PROCESSING

(ECE)

UNIT-I:

Introduction and Fundamentals:

Representation of video, analog video, spatio-temporal sampling, sampling of analog and digital video, sampling of 3-D structures, reconstruction from samples.

UNIT-II:

Video Motion Estimation-I:

Real versus apparent motion, spatial-temporal constraint methods (optical flow equation), general methodologies-Block matching algorithm, Deformable block matching algorithm.

UNIT-III:

Video Motion Estimation-II:

Mesh based motion estimation, Global motion estimation, Region based motion estimation, Multiresolution motion estimation Feature based Motion Estimation and Direct motion Estimation.

UNIT-IV:

Video Coding:

Content dependent video coding, Region based video coding, Object based video coding, Knowledge based video coding, Semantic video coding, Scalable video coding, Applications of motion estimator in video coding.

UNIT-V:

Digital Video Compression Standards:

Inter-frame and intra-frame compression, Lossy and Loss less compression techniques, MPEG-1 and MPEG-2 Standard, H.265/HEVC.

Text Books:

1. M.Tekalp, Digital Video Processing, Prentice Hall, 2nd Edition, 2018.

2. Alan C. Bovik, The Essential Guide to Video Processing, Elsevier Science, 2nd Edition, 2016.

References:

1.Y.Wang, J. Ostermann and Y.-Q. Zhang, Video Processing and Communications. Signal Proc. Series, Prentice Hall, 2012.

2. J. Watkinson, The Art of Digital Video, 3rd edition, Focal Press, 2014.

Course Outcomes:

CO1: Understand the video sampling and reconstruction.

CO2: Describe algorithms of video motion estimation.

CO3: Interpret video coding and segmentation algorithms.

CO4: Analyze various applications of motion estimator in video coding.

CO5: Familiarize with video compression standards.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech VII Sem

L	T	P	C
4	0	0	4

(EC20AHO702) TESTING & TESTABILITY
(HONORS)

UNIT-I:

Need for testing, the problems in digital Design testing, the problems in Analog Design testing, the problems in mixed analog/digital design testing, design for test, printed-circuit board (PCB) testing, software testing, Fault in Digital Circuits: General Introduction, Controllability and Observability, Fault Models, stuck at faults, bridging faults, CMOS technology considerations, intermittent faults.

UNIT-II:

General Introduction to test pattern generation, Test Pattern generation for combinational logic circuits, Manual test pattern generation, automatic test pattern generation, Boolean difference method, Roth's D- algorithm, Developments following Roth's D-algorithm, Pseudorandom test pattern generation.

UNIT-III:

Pseudorandom test pattern generators, Design of test pattern generator using Linear feedback shift registers (LFSRs) and Cellular Automata (CAs).

UNIT-IV:

Design for Testability for combinational circuits: Basic Concepts of testability, controllability and observability, the Reed Muller's expansion techniques, use of control logic and syndrome testable designs.

UNIT-V:

Making sequential circuits testable, testability insertion, full scan DFT technique-Full scan insertion, flip- flop structures, Full scan design and test, scan architectures-full scan design, shadow register DFT, partial scan methods, multiple scan design, other scan designs.

Text Books:

1. Digital Systems Testing and Testable Design-Miron Abramovici, Melvin A. Breuer

and Arthur D. Friedman, IEEE, Wiley-Interscience, 2008.
2. Michael. L. Bushnell, and Vishwani. D. Agrawal, “Essentials of Electronic Testing For Digital, Memory And Mixed Signal VLSI Circuits” Kluwer Academic Publishers, Third Edition, 2012.

References:

1. H. Fujiwara, “Logic Testing and Design for testability” MIT Press, 1985.
2. Chris Spear, “System Verilog for Verification,” Springer Publications, second edition 2008.

Course Outcomes:

CO1: Model the digital circuits at logic level and register level.
CO2: Identify the problems associated with testing of semiconductor circuits at earlier design levels so as to significantly reduce the testing costs.
CO3: Analyze various Trade-Offs and Techniques for Testability.
CO4: Explain the concepts of built-in-self-test.
CO5: Illustrate the Memory Test Architectures and Techniques.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech IV Sem

L	T	P	C
4	0	0	4

(EC20AMI401) COMMUNICATION SYSTEMS-I

(Minor)

UNIT-I:

Amplitude Modulation

Time-Domain Description, Frequency domain description, Generation of AM waves, Detection of AM waves, AM/DSB, Time-Domain Description, Frequency domain description Generation of DSBSC waves, Coherent Detection of DSBSC Modulated waves, Costas loop, Quadrature Carrier multiplexing, Comparison of amplitude modulation techniques, frequency translation, FDM.

UNIT-II:

Angle Modulation

Basic Concepts, Frequency Modulation, Spectrum Analysis Of sinusoidal FM wave, NBFM,WBFM, Constant Average power, Transmission bandwidth of FM waves, Generation of FM waves, Direct FM, demodulation of FM waves, frequency discriminator, ZCD, phase locked loop (1st order) comparison of AM and FM.

UNIT-III:

Noise in Analog Modulation Systems

Signal-to-noise ratios, AM receiver model, DSBSC receiver, noise in AM receivers using envelope detection, threshold effect, FM receiver model, noise in FM reception, FM threshold effect, pre-emphasis and de-emphasis in FM systems.

UNIT-IV:

Pulse Modulation

Sampling theorem for low-pass and band-pass signal, statement and proof, PAM, Channel Bandwidth for a PAM signal, natural sampling, flat-top sampling, signal recovery through holding, quantization of signals, quantization error, PCM, electrical representations of binary digits, PCM systems, DPCM , delta Modulation, Adaptive delta modulation.

UNIT-V:

Digital Modulation

Introduction, Binary Shift Keying, DPSK, QPSK, QPSK transmitter, QPSK receiver, signal space representation, BFSK, spectrum, receiver for BFSK, line codes, TDM. Application of analog/digital communication in Instrumentation and Automation.

Text Books:

1.H Taub, D L Schilling, G Saha, “Principles of Communication Systems” 3/e, TMH 2017.

2. S. Haykin “Digital Communications” John Wiley 2015.

References:

1. B.P.Lathi, “Modern Digital and Analog Communication Systems”, 3rd edition, Oxford University Press, 2017.

2. H P Hsu, “Analog and Digital Communications”, Schaum’s Outline Series TMH 2016.

Course Outcomes:

CO1: Define, understand and explain the concept of modulation, demodulation, figure of merit ,sampling, quantization, multiplexing.

CO2: Apply the knowledge of basic systems to articulate the building blocks of the given analog/digital communication system and derive figure of merit for the system.

CO3: Analyze interaction among various blocks of a given analog/digital communication system to obtain waveform at different points for given specifications and obtain noise performance parameters.

CO4: Design and decide the modulators, demodulators, sampling rate, type of encoding for given specifications of analog/digital communication systems.

CO5: Design the modulator-demodulator for the given analog/digital communication system using modern tools.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech IV Sem

L	T	P	C
4	0	0	4

(EC20AMI402)ELECTRONIC INSTRUMENTATION
(Minor)

Course Objectives:

1. Understand the measurement of electrical parameters such as voltage, current, resistance.
2. Apply the basic concepts signals to illustrate working of CRO and signal generators
3. Design of Ammeters, Voltmeter and Multimeters
4. Analyze the working of Display Devices and Recorders in practical fields.
5. Learn the different measurement techniques for non-physiological parameters.

UNIT 1

Measurements: Introduction, Functions of instruments and measurement systems, Applications of measurement systems. Static & dynamic characteristics. Measurement Errors: Introduction Gross errors and systematic errors, Absolute and relative errors, Measurement error combinations. Basic concepts of accuracy, Precision, Resolution and Significant figures.

UNIT 2

Ammeters, Voltmeter and Multimeters: Introduction, DC ammeter principle only, DC voltmeter, Multi-range voltmeter, Extending voltmeter ranges, Loading. Digital Voltmeters: Introduction, Ramp type, Dual slope integrating type (V–T), integrating type (V–F) and Successive approximation type (relevant problems). Digital Instruments: Introduction, Block diagram of a Basic Digital Multimeter. Digital frequency meters.

UNIT 3

Oscilloscopes: Introduction, Basic principles, CRT features, Block diagram and working CRO, Typical CRT connections, Dual beam and dual trace CROs, Special Oscilloscopes: Analog storage oscilloscopes, Digital storage oscilloscopes Sampling Oscilloscope.

Signal Generators: Introduction, Fixed and variable AF oscillator, Standard signal generator, Modern laboratory signal generator, AF sine and Square wave generator, Function generator, Square and Pulse generator.

UNIT 4

Display Devices and Recorders: Introduction, Segmental Displays: Seven segmental display, dot matrices, LED, LCD, decade counting assemblies, display systems. Recorders: Recording requirements, analog recorders- Graphic recorders, strip chart recorders & its types, X-Y recorder.

Sensors and Transducers - Active and passive transducers: Measurement of displacement (Resistance, capacitance, inductance; LVDT) Force (strain gauges) Pressure (piezoelectric transducers) Temperature (resistance thermometers, thermocouples, and thermistors).

UNIT 5

Biomedical Measurements:

Bio signals characteristics – frequency and amplitude ranges. ECG – Einthovens triangle, standard lead system, Principles of EEG,EMG- unipolar and bipolar mode. Recording of ERG, EOG and EGG.

Biochemical sensors – pH, pO2 and pCO2, Ion selective Field effect Transistor (ISFET), Immunologically sensitive FET (IMFET), Blood glucose sensors, Blood gas analyzers - colorimeter, Sodium Potassium Analyser, spectrophotometer, blood cell counter, auto analyzer (simplified schematic description) – Bio Sensors – Principles – amperometric and voltometric techniques.

Text books:

1. "Electronic Instrumentation", H. S. Kalsi, TMH, 2004.
2. "Electronic Instrumentation and Measurements", David A Bell, PHI / Pearson Education 2006 / Oxford Higher Education, 2013.
3. Electrical and Electronic Measurements and Instrumentation – A. K. Sawhney, 17th Edition (Reprint 2004), Dhanpat Rai & Co. Pvt. Ltd., 2004.
4. Leslie Cromwell, Biomedical Instrumentation and measurement, 2nd edition, Prentice hall of India, New Delhi, 2015.

Reference Books:

1. "Modern Electronic Instrumentation and Measuring Techniques", Cooper D & A D Helfrick, PHI, 1998.
2. Joseph J. Carr and John M. Brown, Introduction to Biomedical Equipment Technology, Pearson Education, 2004.
3. Khandpur R.S, Handbook of Biomedical Instrumentation, 3rd edition, Tata McGraw-Hill New Delhi, 2014

Course Outcomes:

CO1: Understand instrument characteristics, errors and generalized measurement system.

CO2: Analyze and use the circuits for the measurement of R, L, C, F, I, V etc.

CO3: Use of Ammeters, Voltmeter and Multimeters and CRO for measurement.

CO4: Interpret different signal generator circuits for the generation of various waveforms.

CO5: Demonstrate different biochemical measurement techniques.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech V Sem

L	T	P	C
4	0	0	4

(EC20AMI501) AUTOMOTIVE ELECTRONICS

(Minor)

UNIT-I:

Fundamentals of Automotive Electronics

Components for electronic engine management system, open and closed loop control strategies, PID control, Lookup tables, introduction to modern control strategies like Fuzzy logic and adaptive control. Parameters to be controlled in SI and CI engines.

UNIT-II:

Sensors &Actuators

Hall Effect, hot wire, thermistor, piezo electric, piezoresistive, based sensors. Introduction, basic sensor arrangement, types of sensors, oxygen concentration sensor, lambda sensor, crankshaft angular position sensor, cam position sensor, Mass air flow (MAF) rate, Manifold absolute pressure (MAP), Throttle plate angular position, engine oil pressure sensor, vehicle speed sensor, stepper motors, relays, detonation sensor and emission sensors.

UNIT-III:

Digital Engine Control System

Open loop and close loop control system, engine cooling and warm up control, idle speed control, acceleration and full load enrichment, deceleration fuel cutoff. Fuel control maps, open loop control of fuel injection and closed loop lambda control exhaust emission control, on-board diagnostics, diagnostics, future automotive electronic systems, Electronic dash board instruments – Onboard diagnosis system.

UNIT-IV:

SI Engine Management

Feedback carburetor system, throttle body injection and multi point fuel injection system, injection system controls, advantage of electronic ignition systems, three way catalytic converter, conversion efficiency versus lambda. Working of the fuel system components. Advantages of electronic ignition systems. Types of solid state ignition systems and their principle of operation, Contactless electronic ignition system and Electronic spark timing control.

UNIT-V:

CI Engine Management

Fuel injection system, parameters affecting combustion, noise and emissions in CI engines. Pilot, main, advanced, post injection and retarded post injection. Working of components like fuel injector, fuel pump, rail pressure limiter, flow limiter, EGR valve control in electronically controlled systems.

Text Books:

1.Automobile Electrical & Electronic Equipments - Young, Griffitns - Butterworths, London.

2.Understanding Automotive Electronics, Wiliam B. Ribbens, 5th Edition, Newnes, Butterworth–Heinemann.

References:

1. Fundamentals of Automotive Electronics - V.A.W.Hilliers - Hatchin, London.

2. Automotive Computer & Control System – Tom wather J. R., Cland Hunter, Prentice Inc. NJ.

Course Outcomes:

CO1: Acquire an overview of automotive components, subsystems, and basics of Electronic Engine Control in today's automotive industry.

CO2: Gain fundamental knowledge to develop electronic controls for automotive subsystems.

CO3: Use available automotive sensors and actuators while interfacing with microcontrollers / microprocessors during automotive system design.

CO4: Understand the networking of various modules in automotive systems, communication protocols and diagnostics of the sub systems.

CO5: Design and implement the electronics that attribute the reliability, safety, and smartness to the automobiles, providing add-on comforts and get fair idea on future Automotive Electronic Systems.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech V Sem

L	T	P	C
4	0	0	4

(EC20AMI502) COMMUNICATION SYSTEMS-II

(Minor)

UNIT I

Optical Fiber Transmission Media:

Introduction, History of optical fiber communications, Optical Fibers vs metallic cable facilities, electromagnetic spectrum, block diagram of an optical fiber communication system, optical fiber types, light propagation, optical fiber configurations, optical fiber classifications, losses in optical fiber cables, light sources, optical sources, light detectors, lasers, optical fiber system link budget.

UNIT II

Microwave Radio Communications and System Gain

Introduction, Advantages and Disadvantages of Microwave radio, Analog vs digital microwave, frequency vs amplitude modulation, frequency modulated microwave radio system, FM microwave radio repeaters, diversity, protection switching arrangements, FM microwave radio stations, microwave repeater station, light of sight path characteristics, microwave radio system gain.

UNIT III

Digital Telephone Transmission:

Pulse Modulation, PCM, PCM Sampling, Signal to Quantization Noise ratio, linear vs nonlinear pcm codes, idle channel noise, coding methods, companding, vocoders, pcm line speed, delta modulation pcm, adaptive delta modulation pcm, differential pcm, pulse transmission, signal power in binary digital signals. Time division multiplexing, frequency division multiplexing, Public Telephone Network: Telephone transmission system environment, public telephone network, instruments, local loops, trunk circuits and exchanges.

UNIT IV

Cellular Telephone Concepts

Mobile Telephone Service, evolution of cellular telephone, cellular telephone,

frequency reuse, interference, cell splitting, sectoring, segmentation and dualization, cellular system topology, roaming and handoffs, cellular telephone network components, cellular telephone call processing.

UNIT V

Cellular Telephone Systems

Introduction, First generation analog cellular telephone, personal communications, system, second generation cellular telephone systems, Digital Cellular telephone, interim standard 95 (IS-95), Global system for mobile communications, personal satellite communication systems.

Text Books:

1. W. Tomasi, Advanced Electronic Communication Systems, 6/e, Pearson, 2019.
2. Theodore S. Rappaport: Wireless communication principles and practice, 2/e, Pearson Education, 1990.

References:

1. George Kennedy, Electronic Communication systems, TMGH, 2016.
2. John Bellamy, Digital Telephony, Wiley Publications, 2015.

Course Outcomes:

CO1:Appreciate the importance of microwave signal and learn important microwave devices.

CO2: Describe the working principle of different RADAR systems and their applications.

CO3:Understand the Satellite fundamentals and types of satellite.

CO4: Analyze the working of a Satellite communication system and its inner modules.

CO5: Explain the working principle of Mobile communication and GSM Services.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech VI Sem

L	T	P	C
4	0	0	4

(EC20AMI601) DIGITAL INTEGRTAED CIRCUITS

(ECE)

Course Objectives:

1. Learn the modeling of MOS transistors
2. Learn about the use resistive Load inverter circuits in VLSI.
3. Learn about the calculation of delay times in MOS inverter circuits.
4. Learn about the working principle of two, three and four input CMOS logic circuits.
5. Study the working cycles of DRAM and SRAM cells.

Unit I

Modeling of MOS Transistors using SPICE:

Basic Concepts, The LEVEL 1 Model Equations, The LEVEL 2 Model Equations, The LEVEL 3 Model Equations, Capacitance Models and Comparison of the SPICE MOSFET Models.

Unit II

MOS Inverters: Static Characteristics

Introduction, Resistive-Load Inverter, Inverters with n-Type MOSFET Load and CMOS Inverter.

Unit III

MOS Inverters: Switching Characteristics:

Introduction, Delay-Time Definitions, Calculation of Delay Times, Inverter Design with Delay Constraints.

Unit IV

Combinational and Sequential MOS Logic Circuits:

MOS logic circuits with Depletion nMOS loads, CMOS logic circuits, Complex logic circuits, Behavior of Bistable elements, SR Latch circuit, Clocked latch and Flip-Flop circuits, CMOS D-Latch and Edge–Triggered Flip-Flop.

Unit V

Semiconductor Memories:

Overview of Semiconductor memories, RAM array organization, DRAM-Cell types, Operation of Three-Transistor DRAM cell and One-Transistor DRAM cell, Leakage

currents and Refresh operation, SRAM- Various configurations, Full CMOS SRAM cell, Memory structure of SRAM Cell array and Leakage currents.

Text Books:

1. S.M.Kang & Y.Leblebici, “CMOS Digital Integrated Circuits-Analysis and Design” Third edition, McGraw Hill Education (India) Pvt. Ltd., 2020.
2. Neil H. E. Weste & D.M.Harris, “CMOS VLSI Design-A Circuits and Systems Perspective”, Fourth edition, Pearson Edition, 2020.

References:

1. T.C.Carusone, D.A.Johns & K.W.Martin, “Analog Integrated Circuit Design”, Second Edition, John Wiley & Sons, Inc., 2019.
2. Kiat Seng Yeo and Kaushik Roy, “Low- Voltage, Low-Power VLSI Subsystems”, McGraw Hill Professional Engineering Education, 2018.

Course Outcomes:

CO1: Interpret the various Modelling effects encountered in a MOSFET

CO2: Analyze CMOS inverter circuits using different loads.

CO3: Design a inverter for a specified delay.

CO4: Design two, three and four input CMOS logic circuits.

CO5: Illustrate the working cycles of DRAM and SRAM cells.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech VI Sem

L	T	P	C
4	0	0	4

(EC20AMI602) NANOTECHNOLOGY
(Minor)

Unit-I:

Introduction: History and Scope, Can Small Things Make a Big Difference? Classification of Nanostructured Materials, Fascinating Nanostructures, Applications of Nanomaterials, Nature: The Best of Nanotechnologist, Challenges and Future Prospects.

Unit-II:

Unique Properties of Nanomaterials:

Microstructure and Defects in Nanocrystalline Materials: Dislocations, Twins, stacking faults and voids, Grain Boundaries, triple and disclinations, Effect of Nano-dimensions on Materials Behavior: Elastic properties, Melting Point, Diffusivity, Grain growth characteristics, Enhanced solid solubility, Magnetic Properties: Softmagnetic nanocrystalline alloy, Permanent magnetic nanocrystalline materials, Giant Magnetic Resonance, Electrical Properties, Optical Properties, Thermal Properties and Mechanical Properties.

Unit-III:

Synthesis Routes:

Bottom up approaches: Physical Vapor Deposition, Inert Gas Condensation, Laser Ablation, Chemical Vapor Deposition, Molecular Beam Epitaxy, Sol-gel method ,Self-assembly, Top down approaches: Mechanical alloying, Nano-lithography, Consolidation of Nanopowders: Shock wave consolidation, Hot isostatic pressing and Cold isostatic pressing Spark plasma sintering.

UNIT-IV:

Tools to Characterize nanomaterials:

X-Ray Diffraction (XRD), Small Angle X-ray scattering (SAXS), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Atomic Force Microscopy (AFM), Scanning Tunneling Microscope (STM), Field Ion Microscope (FEM).

UNIT-V:

Applications of Nanomaterials:

Nano-electronics, Micro- and Nanoelectromechanical systems (MEMS/NEMS), Nanosensors, Nanocatalysts, Food and Agricultural Industry, Cosmetic and Consumer Goods, Structure and Engineering, Automotive Industry, Water- Treatment and the environment, Nano-medical applications, Textiles, Paints, Energy, Defence and Space Applications, Concerns and challenges of Nanotechnology.

Text Books:

1. Text Book of Nano Science and Nano Technology – B.S. Murthy, P. Shankar, Baldev Raj, B.B. Rath and James Munday, University Press IIM.
2. Introduction to Nanotechnology – Charles P. Poole, Jr., and Frank J. Owens, Wiley India Edition, 2018.

References:

1. Nano: The Essentials by T.Pradeep, McGraw- Hill Education.
2. Nanomaterials, Nanotechnologies and Design by Michael F. Ashby, Paulo J. Ferreira and Daniel L. Schodek.

Course Outcomes:

CO1:Explain the fundamental principles of nanotechnology and their application to biomedical engineering.

CO2: Apply engineering and physics concepts to the nano-scale and non-continuum domain.

CO3: Identify and compare state-of-the-art nanofabrication methods and perform a critical analysis of the research literature.

CO4: Design processing conditions to engineer functional nanomaterials.

CO5: Apply and transfer interdisciplinary systems engineering approaches to the field of bio and nanotechnology projects.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech VII Sem

L	T	P	C
4	0	0	4

(EC20AMI701) DIGITAL IMAGE AND VIDEO PROCESSING
(Minor)

UNIT-I:

Introduction and Image Enhancement:

Digital image fundamentals, Concept of pixels and gray levels, Applications of image processing, Introduction to image enhancement, spatial domain methods: point processing – intensity transformations, histogram processing, image averaging, image subtraction, Spatial filtering- smoothing filters, sharpening filters, Frequency domain methods: low pass filtering, high pass filtering, Homomorphic filtering.

UNIT-II:

Image Restoration:

Introduction to Image restoration, Degradation model, Restoration in the presence of Noise only-Spatial Filtering, Periodic Noise reduction by Frequency domain Filtering, Algebraic approaches- Inverse filtering, Wiener filtering, Constrained Least squares restoration. Color Image Processing: Introduction, Fundamentals of Color image processing: Color models- RGB, CMY, YIQ, HSI, Pseudo color image processing – intensity slicing, gray level to color transformation, Basics of Full Color image processing.

UNIT-III:

Image Compression:

Introduction, Need for image compression, Redundancy in images, Classification of redundancy in images, image compression scheme, Classification of image compression schemes, Huffman coding, Arithmetic coding, Predictive coding, Transformed based compression, Image compression standards, Wavelet-based image compression.

UNIT-IV:

Image Segmentation:

Introduction to image segmentation, Detection of discontinuities -point, line and edge and combined detection; Edge linking and boundary description - local and

global processing using Hough transform, Thresholding, Region oriented segmentation – basic formulation, region growing by pixel aggregation, region splitting and merging.

UNIT-V:

Digital Video & Coding:

Basics of Video, Time-varying Image formation Models, Spatio Temporal Sampling, Optical flow, General methodologies, Overview of coding systems, Video Compression Standards.

Text Books:

1. R. Gonzalez, R.E.Woods, "Digital Image Processing", 3rd Edition, Pearson Education, India, 2019.
2. M. Tekalp, "Digital Video Processing", Prentice-Hall, 2015.

References:

1. Rafael C. Gonzalez, Richard E Woods and Steven L. Eddins,"Digital Image Processing using MAT LAB" , Pearson Edu., 2018.
2. Bovik, "Handbook of Image & Video Processing", Academic Press, 2016.

Course Outcomes:

CO1: Comprehend the image processing fundamentals and enhancement techniques in spatial and frequency domain.

CO2: Describe the color image fundamentals, models and various restoration techniques.

CO3: Design and Analyze the image compression systems.

CO4: Outline the various image segmentation operations.

CO5: Comprehend the basics of video processing and video coding.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech VII Sem

L	T	P	C
4	0	0	4

(EC20AMI604) EMBEDDED SYSTEM DESIGN

(Minor)

UNIT-I:

Embedded Systems Basics:

Introduction to Embedded systems, Examples of embedded systems, Typical Hardware, Gates, Timing Diagrams, Memory, Microprocessors, Buses, Direct Memory Access, Interrupts, Microprocessor Architecture, and Interrupt Basics.

UNIT-II:

8051 Architecture:

Introduction, 8051 Micro controller Hardware, Input/output Pin Ports and Circuits, External Memory, Serial data Input/output, Interrupts.

UNIT-III:

Basic Assembly Language Programming Concepts:

The Assembly Language Programming Process, Programming Tools and Techniques, Programming the 8051.

UNIT-IV:

Moving Data:

Introduction, Addressing Modes, External Data Moves, Code Memory Read Only Data Moves, Push and Pop Opcodes, Data Exchanges.

Basic Design Using a Real-Time Operating System:

Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment.

UNIT-V:

Applications:

Introduction, keyboards, Human Factor, Key Switch Factors, Keyboard Configurations, Displays, Seven-Segment Numeric Display, D/A and A/D Conversions.

Embedded Software Development Tools:

Host and Target machines, Linker/Locators for Embedded Software, Getting Embedded Software into the Target System; Debugging Techniques: Testing on Host Machine, Using Laboratory Tools, An Example System.

Text Books:

1. An Embedded Software Primer, David E. Simon, Pearson Education.
2. The 8051 Microcontroller, Third Edition, Kenneth J.Ayala, Thomson.

References:

1. 8051 Microcontrollers, Satish Shah, Oxford Higher Education.
2.Embedded Microcomputer Systems Real Time Interfacing, Jonathan W. Valvano, Cengage Learning.

Course Outcomes:

CO1: Understand the microprocessor architecture and its components used in embedded systems.
CO2: Write the 8051 assembly language code for specific purposes.
CO3: Implement code for interfacing various devices.
CO4: Develop simple embedded systems for real time operations.
CO5: Compose simple embedded system with error free software to obtain target system.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech IV Sem

L	T	P	C
4	0	0	4

(EC20AMI403) INTRODUCTION TO SIGNAL PROCESSING
(Minor)

Unit I

Signals & Systems:

Basic definitions and classification of Signals and Systems (Continuous time and discrete time), operations on signals, Concepts of Convolution and Correlation of signals, Fourier series: Trigonometric & Exponential, concept of discrete spectrum, Illustrative Problems.

Unit II

Continuous Time Fourier Transform:

Definition, Computation and properties of Fourier transform for different types of signals and systems, Inverse Fourier transform. Statement and proof of sampling theorem of low pass signals, Illustrative Problems.

Unit III

Discrete Time Fourier Transform:

Definition, Computation and properties of Discrete Time Fourier transform for different types of signals and systems, Illustrative Problems.

Unit IV

Laplace Transform:

Definition, ROC, Properties, Inverse Laplace transforms, the S-plane and BIBO stability, Transfer functions.

Z–Transform:

Definition, ROC, Properties, Poles and Zeros in Z-plane, The inverse Z- Transform, System analysis, Transfer function, Solution of difference equations with initial conditions, Illustrative Problems.

Unit V

Discrete Fourier Transform:

Discrete Fourier series, Properties of Discrete Fourier series, Discrete Fourier Transform (DFT), The DFT as a linear transformation, Properties of DFT.

Fast Fourier Transforms:

Efficient computation of DFT algorithms - Radix 2-Decimation- in-Time & Decimation-in-Frequency algorithms, Inverse FFT, Illustrative problems.

Text Books:

1 A.V. Oppenheim, A.S. Willsky and S.H. Nawab, "Signals and Systems", 2nd Edition, PHI, 2009.

2 John G. Proakis, Dimitris G. Manolakis, "Digital signal processing, principles, Algorithms and applications," Pearson Education/PHI, 4th ed., 2007.

References:

1 B P Lathi, "Principles of Linear Systems and Signals", 2nd Edition, Oxford University Press, 015.

2 Simon Haykin and Van Veen, "Signals & Systems", 2nd Edition, Wiley, 2005.

3 Avtar Singh and S. Srinivasan, "Digital Signal Processing," Thomson Publications, 2004.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech IV Sem

L	T	P	C
4	0	0	4

(EC20AMI402)ELECTRONIC INSTRUMENTATION
(Minor)

Course Objectives:

1. Understand the measurement of electrical parameters such as voltage, current, resistance.
2. Apply the basic concepts signals to illustrate working of CRO and signal generators
3. Design of Ammeters, Voltmeter and Multimeters
4. Analyze the working of Display Devices and Recorders in practical fields.
5. Learn the different measurement techniques for non-physiological parameters.

UNIT 1

Measurements: Introduction, Functions of instruments and measurement systems, Applications of measurement systems. Static & dynamic characteristics. Measurement Errors: Introduction Gross errors and systematic errors, Absolute and relative errors, Measurement error combinations. Basic concepts of accuracy, Precision, Resolution and Significant figures.

UNIT 2

Ammeters, Voltmeter and Multimeters: Introduction, DC ammeter principle only, DC voltmeter, Multi-range voltmeter, Extending voltmeter ranges, Loading. Digital Voltmeters: Introduction, Ramp type, Dual slope integrating type (V–T), integrating type (V–F) and Successive approximation type (relevant problems). Digital Instruments: Introduction, Block diagram of a Basic Digital Multimeter. Digital frequency meters.

UNIT 3

Oscilloscopes: Introduction, Basic principles, CRT features, Block diagram and working CRO, Typical CRT connections, Dual beam and dual trace CROs, Special Oscilloscopes: Analog storage oscilloscopes, Digital storage oscilloscopes Sampling Oscilloscope.

Signal Generators: Introduction, Fixed and variable AF oscillator, Standard signal generator, Modern laboratory signal generator, AF sine and Square wave generator, Function generator, Square and Pulse generator.

UNIT 4

Display Devices and Recorders:

Introduction, Segmental Displays: Seven segmental display, dot matrices, LED, LCD, decade counting assemblies, display systems. Recorders: Recording requirements, analog recorders- Graphic recorders, strip chart recorders & its types, X-Y recorder.

Sensors and Transducers –

Active and passive transducers: Measurement of displacement (Resistance, capacitance, inductance; LVDT) Force (strain gauges) Pressure (piezoelectric transducers) Temperature (resistance thermometers, thermocouples, and thermistors).

UNIT 5

Biomedical Measurements:

Bio signals characteristics – frequency and amplitude ranges. ECG – Einthovens triangle, standard lead system, Principles of EEG,EMG- unipolar and bipolar mode. Recording of ERG, EOG and EGG.

Biochemical sensors –

pH, pO2 and pCO2, Ion selective Field effect Transistor (ISFET), Immunologically sensitive FET (IMFET), Blood glucose sensors, Blood gas analyzers -colorimeter, Sodium Potassium Analyser, spectrophotometer, blood cell counter, auto analyzer (simplified schematic description) – Bio Sensors – Principles – amperometric and voltometric techniques.

Text books:

1. Electronic Instrumentation, H. S. Kalsi, TMH, 2004.
2. Electronic Instrumentation and Measurements, David A Bell, PHI / Pearson Education 2006 / Oxford Higher Education, 2013.
3. Electrical and Electronic Measurements and Instrumentation – A. K. Sawhney, 17th Edition (Reprint 2004), Dhanpat Rai & Co. Pvt. Ltd., 2004.
4. Leslie Cromwell, Biomedical Instrumentation and measurement, 2nd edition, Prentice hall of India, New Delhi, 2015.

Reference Books:

1. “Modern Electronic Instrumentation and Measuring Techniques”, Cooper D & A D Helfrick, PHI, 1998.
2. Joseph J. Carr and John M. Brown, Introduction to Biomedical Equipment Technology, Pearson Education, 2004.
3. Khandpur R.S, Handbook of Biomedical Instrumentation, 3rd edition, Tata McGraw-Hill New Delhi, 2014

Course Outcomes:

CO1: Understand instrument characteristics, errors and generalized measurement system.

CO2: Analyze and use the circuits for the measurement of R, L, C, F, I, V etc.

CO3: Use of Ammeters, Voltmeter and Multimeters and CRO for measurement.

CO4: Interpret different signal generator circuits for the generation of various waveforms.

CO5: Demonstrate different biochemical measurement techniques.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech V SEM

L	T	P	C
4	0	0	4

(EC20AMI401) COMMUNICATION SYSTEMS-I

(Minor)

UNIT-I:

Amplitude Modulation

Time-Domain Description, Frequency domain description, Generation of AM waves, Detection of AM waves, AM/DSB, Time-Domain Description, Frequency domain description Generation of DSBSC waves, Coherent Detection of DSBSC Modulated waves, Costas loop, Quadrature Carrier multiplexing, Comparison of amplitude modulation techniques, frequency translation, FDM.

UNIT-II:

Angle Modulation

Basic Concepts, Frequency Modulation, Spectrum Analysis Of sinusoidal FM wave, NBFM,WBFM, Constant Average power, Transmission bandwidth of FM waves, Generation of FM waves, Direct FM, demodulation of FM waves, frequency discriminator, ZCD, phase locked loop (1st order) comparison of AM and FM.

UNIT-III:

Noise in Analog Modulation Systems

Signal-to-noise ratios, AM receiver model, DSBSC receiver, noise in AM receivers using envelope detection, threshold effect, FM receiver model, noise in FM reception, FM threshold effect, pre-emphasis and de-emphasis in FM systems.

UNIT-IV:

Pulse Modulation

Sampling theorem for low-pass and band-pass signal, statement and proof, PAM, Channel Bandwidth for a PAM signal, natural sampling, flat-top sampling, signal recovery through holding, quantization of signals, quantization error, PCM, electrical representations of binary digits, PCM systems, DPCM , delta Modulation, Adaptive delta modulation.

UNIT-V:

Digital Modulation

Introduction, Binary Shift Keying, DPSK, QPSK, QPSK transmitter, QPSK receiver, signal space representation, BFSK, spectrum, receiver for BFSK, line codes, TDM. Application of analog/digital communication in Instrumentation and Automation.

Text Books:

1.H Taub, D L Schilling, G Saha, “Principles of Communication Systems” 3/e, TMH 2017.

2. S. Haykin “Digital Communications” John Wiley 2015.

References:

1. B.P.Lathi, “Modern Digital and Analog Communication Systems”, 3rd edition, Oxford University Press, 2017.

2. H P Hsu, “Analog and Digital Communications”, Schaum’s Outline Series TMH 2016.

Course Outcomes:

CO1: Define, understand and explain the concept of modulation, demodulation, figure of merit ,sampling, quantization, multiplexing.

CO2: Apply the knowledge of basic systems to articulate the building blocks of the given analog/digital communication system and derive figure of merit for the system.

CO3: Analyze interaction among various blocks of a given analog/digital communication system to obtain waveform at different points for given specifications and obtain noise performance parameters.

CO4: Design and decide the modulators, demodulators, sampling rate, type of encoding for given specifications of analog/digital communication systems.

CO5: Design the modulator-demodulator for the given analog/digital communication system using modern tools.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech V SEM

L	T	P	C
4	0	0	4

(EC20AMI504) MATLAB PROGRAMMING
(Minor)

UNIT-I:

Introduction to MATLAB

MATLAB Interactive Sessions, Menus and the toolbar, computing with MATLAB, Script files and the Editor Debugger, MATLAB Help System, Programming in MATLAB.

UNIT-II:

Arrays

Arrays, Multidimensional Arrays, Element by Element Operations, Polynomial Operations Using Arrays, Cell Arrays, Structure Arrays.

UNIT-III:

Functions & Files:

Elementary Mathematical Functions, User Defined Functions, Advanced Function Programming, Working with Data Files.

UNIT-IV:

Programming Techniques:

Program Design and Development, Relational Operators and Logical Variables, Logical Operators and Functions, Conditional Statements, Loops, the Switch Structure, Debugging Mat Lab Programs.

Plotting :XY- plotting functions, Subplots and Overlay plots, Special Plot types, Interactive plotting, Function Discovery, Regression, 3-D plots.

UNIT-V:

Linear Algebraic Equations:

Elementary Solution Methods, Matrix Methods for (Linear Equations), Cramer's Method, Undetermined Systems, Order Systems.

Text Books:

1.G. H. Golub and C. F. Van Loan, Matrix Computations, 3rd Ed., Johns Hopkins University Press, 2014.

2. Delores M. Etter, David C. Kuncicky, Holly Moore, “Introduction to MATLAB 7.0”, Pearson, 2018.

References:

1. RudraPratap, “Getting Started with MATLAB”, OXFORD University Press, 2017.

2. Agam Kumar Tyagi, “MATLAB and Simulink for Engineers”, University Press, 2019.

Course Outcomes:

CO1: Use MATLAB Tool and help system to solve problems.

CO2: Analyze the concepts of Arrays and examine the Operations in MATLAB.

CO3: Develop various Functions and Files in MATLAB Programming.

CO4: Develop MATLAB programming techniques using logical and conditional operators.

CO5: Solve Linear Equations using MATLAB.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech VI SEM

L	T	P	C
4	0	0	4

(EC20AMI604) EMBEDDED SYSTEM DESIGN

(Minor)

UNIT-I:

Embedded Systems Basics:

Introduction to Embedded systems, Examples of embedded systems, Typical Hardware, Gates, Timing Diagrams, Memory, Microprocessors, Buses, Direct Memory Access, Interrupts, Microprocessor Architecture, and Interrupt Basics.

UNIT-II:

8051 Architecture:

Introduction, 8051 Micro controller Hardware, Input/output Pin Ports and Circuits, External Memory, Serial data Input/output, Interrupts.

UNIT-III:

Basic Assembly Language Programming Concepts:

The Assembly Language Programming Process, Programming Tools and Techniques, Programming the 8051.

UNIT-IV:

Moving Data:

Introduction, Addressing Modes, External Data Moves, Code Memory Read Only Data Moves, Push and Pop Opcodes, Data Exchanges.

Basic Design Using a Real-Time Operating System:

Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment.

UNIT-V:

Applications:

Introduction, keyboards, Human Factor, Key Switch Factors, Keyboard Configurations, Displays, Seven-Segment Numeric Display, D/A and A/D Conversions.

Embedded Software Development Tools:

Host and Target machines, Linker/Locators for Embedded Software, Getting Embedded Software into the Target System; Debugging Techniques: Testing on Host Machine, Using Laboratory Tools, An Example System.

Text Books:

1. An Embedded Software Primer, David E. Simon, Pearson Education.
2. The 8051 Microcontroller, Third Edition, Kenneth J.Ayala, Thomson.

References:

1. 8051 Microcontrollers, Satish Shah, Oxford Higher Education.
2. Embedded Microcomputer Systems Real Time Interfacing, Jonathan W. Valvano, Cengage Learning.

Course Outcomes:

CO1: Understand the microprocessor architecture and its components used in embedded systems.

CO2: Write the 8051 assembly language code for specific purposes.

CO3: Implement code for interfacing various devices.

CO4: Develop simple embedded systems for real time operations.

CO5: Compose simple embedded system with error free software to obtain target system.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VI Sem **L T P C**
4 0 0 4

(EC20AMI605) INTRODUCTION TO CMOS VLSI DESIGN
(Minor)

Course Objectives:

1. Learn about the various MOSFET models.
2. Learn about the implementation of logic functions using CMOS.
3. Study the design principles involved in the design of Combinational circuits.
4. Study the design principles involved in the design of Sequential circuits.
5. Learn about the Testing concepts in VLSI Chip design.

UNIT 1

MOS Transistor Theory: Introduction, Long-Channel I-V Characteristics and C-V Characteristics, Simple MOS Capacitance Models, Detailed MOS Gate Capacitance Model, Detailed MOS Diffusion Capacitance Model, Non-deal I-V Effects, Mobility Degradation and Velocity Saturation, Channel Length Modulation, Threshold Voltage Effects, Leakage, Temperature Dependence and Geometry Dependence.

UNIT II

CMOS Logic and Fabrication: CMOS Logic - The Inverter, The NAND Gate, CMOS Logic Gates, The NOR Gate, Compound Gates, Pass Transistors and Transmission Gates, Tristates, Multiplexers, and Sequential Circuits.

CMOS Fabrication-Inverter Cross-Section and Fabrication Process.

UNIT III

Combinational circuit design: Introduction, Circuit Families- Static CMOS, Ratioed Circuits, Cascode Voltage Switch Logic, Dynamic Circuits and Pass-Transistor Circuits.

UNIT IV

Sequential circuit design: Circuit Design of Latches and Flip-Flops, Conventional CMOS Latches, Conventional CMOS Flip-Flops, Pulsed Latches, Resettable Latches and Flip-Flops, Enabled Latches and Flip-Flops, Incorporating Logic into Latches, Klass Semi-dynamic Flip-

Flop (SDFF), Differential Flip-Flops, Dual Edge-Triggered Flip-Flops, Radiation-Hardened Flip-Flops, True Single-Phase-Clock (TSPC) Latches and Flip-Flops.

UNIT V

Testing and Verification: Introduction- Logic Verification and Manufacturing Tests , Testers and Test Fixtures, Test Programs, and Handlers, Test Vectors, Test benches and Harnesses and Regression Testing.

Manufacturing Test Principles- Fault Models, Observability, Controllability, Repeatability, Survivability, Fault Coverage, Automatic Test Pattern Generation and Delay Fault Testing.

Design for Testability: Ad Hoc Testing, Scan Design, Built-In Self-Test (BIST) and IDDQ Testing.

Text Books:

1. Neil H. E. Weste & D.M.Harris, “CMOS VLSI Design-A Circuits and Systems Perspective”, Fourth edition, Pearson Edition, 2020.
2. K.Eshraghian, D.A. Pucknell and S.Eshraghian, “Essentials of VLSI Circuits and Systems”, Third Edition, PHI Learning Pvt. Ltd., 2019.

References:

1. Mead, C.A and Conway, L.A., “Introduction to VLSI Systems”, Addison –Wesley, USA, 1980.
2. W.Wolf “Modern VLSI Design IP based design” Fourth edition, PHI Learning Pvt. Ltd., 2020.

Course Outcomes:

CO1: Summarize the modeling effects of MOSFET.
CO2: Implement various logic functions using CMOS logic.
CO3: Design CMOS based Switching circuits.
CO4: Design CMOS based Flip-flops.
CO5: Develop algorithms for automatic test generation for combinational and sequential circuits.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech VII SEM

L	T	P	C
4	0	0	4

(EC20AMI501) AUTOMOTIVE ELECTRONICS
(Minor)

UNIT-I:

Fundamentals of Automotive Electronics

Components for electronic engine management system, open and closed loop control strategies, PID control, Lookup tables, introduction to modern control strategies like Fuzzy logic and adaptive control. Parameters to be controlled in SI and CI engines.

UNIT-II:

Sensors & Actuators

Hall Effect, hot wire, thermistor, piezo electric, piezoresistive, based sensors. Introduction, basic sensor arrangement, types of sensors, oxygen concentration sensor, lambda sensor, crankshaft angular position sensor, cam position sensor, Mass air flow (MAF) rate, Manifold absolute pressure (MAP), Throttle plate angular position, engine oil pressure sensor, vehicle speed sensor, stepper motors, relays, detonation sensor and emission sensors.

UNIT-III:

Digital Engine Control System

Open loop and close loop control system, engine cooling and warm up control, idle speed control, acceleration and full load enrichment, deceleration fuel cutoff. Fuel control maps, open loop control of fuel injection and closed loop lambda control exhaust emission control, on-board diagnostics, diagnostics, future automotive electronic systems, Electronic dash board instruments – Onboard diagnosis system.

UNIT-IV:

SI Engine Management

Feedback carburetor system, throttle body injection and multi point fuel injection system, injection system controls, advantage of electronic ignition systems, three way catalytic converter, conversion efficiency versus lambda. Working of the fuel

system components. Advantages of electronic ignition systems. Types of solid state ignition systems and their principle of operation, Contactless electronic ignition system and Electronic spark timing control.

UNIT-V:

CI Engine Management

Fuel injection system, parameters affecting combustion, noise and emissions in CI engines. Pilot, main, advanced, post injection and retarded post injection. Working of components like fuel injector, fuel pump, rail pressure limiter, flow limiter, EGR valve control in electronically controlled systems.

Text Books:

1. Automobile Electrical & Electronic Equipments - Young, Griffitns - Butterworths, London.
2. Understanding Automotive Electronics, Wiliam B. Ribbens, 5th Edition, Newnes, Butterworth–Heinemann.

References:

1. Fundamentals of Automotive Electronics - V.A.W.Hilliers - Hatchin, London.
2. Automotive Computer & Control System – Tomwather J. R., Cland Hunter, Prentice Inc. NJ.

Course Outcomes:

CO1: Acquire an overview of automotive components, subsystems, and basics of Electronic Engine Control in today's automotive industry.

CO2: Gain fundamental knowledge to develop electronic controls for automotive subsystems.

CO3: Use available automotive sensors and actuators while interfacing with microcontrollers / microprocessors during automotive system design.

CO4: Understand the networking of various modules in automotive systems, communication protocols and diagnostics of the sub systems.

CO5: Design and implement the electronics that attribute the reliability, safety, and smartness to the automobiles, providing add-on comforts and get fair idea on future Automotive Electronic Systems.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VII SEM **L T P C**
4 0 0 4

(EC20AMI702) INTRODUCTION TO IoT

(Minor)

Course Objectives:

1. Study about the genesis and impact of IoT applications, architectures in real world.
2. Learn about the diverse methods of deploying smart objects and connect them to network.
3. Study different Application protocols for IoT.
4. Study the role of Data Analytics and Security in IoT.
5. Learn about the sensor technologies for sensing real world entities and understand the role of IoT in various domains of Industry

UNIT 1

What is IoT, Genesis of IoT, IoT and Digitization, IoT Impact, Convergence of IT and IoT, IoT Challenges, IoT Network Architecture and Design, Drivers Behind New Network Architectures, Comparing IoT Architectures, A Simplified IoT Architecture, The Core IoT Functional Stack, IoT Data Management and Compute Stack.

UNIT II

Smart Objects- The “Things” in IoT, Sensors, Actuators, and Smart Objects, Sensor Networks, Connecting Smart Objects, Communications Criteria, IoT Access Technologies.

UNIT III

IP as the IoT Network Layer, The Business Case for IP, The need for Optimization, Optimizing IP for IoT, Profiles and Compliances, Application Protocols for IoT, The Transport Layer, IoT Application Transport Methods.

UNIT IV

Data and Analytics for IoT, An Introduction to Data Analytics for IoT, Machine Learning, Big Data Analytics Tools and Technology, Edge Streaming Analytics, Network Analytics, Securing IoT, A Brief History of OT Security, Common Challenges in OT Security, How IT and OT Security Practices and Systems Vary, Formal Risk Analysis Structures: OCTAVE and FAIR, The Phased Application of Security in an Operational Environment.

UNIT V

IoT Physical Devices and Endpoints - Arduino UNO: Introduction to Arduino, Arduino UNO, Installing the Software, Fundamentals of Arduino Programming. IoT Physical Devices and Endpoints - RaspberryPi: Introduction to RaspberryPi, About the RaspberryPi Board: Hardware Layout, Operating Systems on RaspberryPi, Configuring RaspberryPi, Programming RaspberryPi with Python, Wireless Temperature Monitoring System Using RaspberryPi Pi, DS18B20 Temperature Sensor, Connecting Raspberry Pi via SSH, Accessing Temperature from DS18B20 sensors, Remote access to RaspberryPi, Smart and Connected Cities, An IoT Strategy for Smarter Cities, Smart City IoT Architecture. Smart City Security Architecture, Smart City Use-Case Examples.

Textbooks:

1. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", 1st Edition, Pearson Education (Cisco Press Indian Reprint). (ISBN: 978-9386873743)
2. Srinivasa K G, "Internet of Things",CENGAGE Leaning India, 2017.

References:

1. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014. (ISBN: 978-8173719547)
2. Raj Kamal, "Internet of Things: Architecture and Design Principles", 1st Edition, McGraw Hill Education, 2017. (ISBN: 978-9352605224)

Course Outcomes:

CO1: Interpret the impact and challenges posed by IoT networks leading to new architectural models.

CO2: Compare and contrast the deployment of smart objects and the technologies to connect them to network.

CO3: Appraise the role of IoT protocols for efficient network communication.

CO4: Elaborate the need for Data Analytics and Security in IoT.

CO5: Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.

R23 ACADEMIC REGULATIONS

COURSE STRUCTURE AND SYLLABI

of

I & II B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING

FOR

B.TECH. REGULAR FOUR YEAR DEGREE PROGRAM

(For the batches admitted from 2023-24)

&

B.TECH. LATERAL ENTRY PROGRAM

(For the batches admitted from 2024-25)

CHOICE BASED CREDIT SYSTEM

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

(Affiliated to J.N.T. University Anantapur, Ananthapuramu, Accredited by NBA & NAAC "A")

Karakambadi Road, Tirupati - 517 507

Vision

To be a centre of excellence focusing on high quality technical education, research and technical services with global leadership competence to succeed in employment and higher education with ethical, social, entrepreneurial aspects updating to the real time requirements.

Mission

M 1: To impart high quality technical education by providing the state-of-the art infrastructure, core instruction.

M 2: Advanced research and technical consultancy services with qualified and senior faculty.

M 3: To prepare the students professionally deft and intellectually adept possessing excellent skill, knowledge and behavior with global competence.

Department of Electronics and Communication Engineering

Vision

To be a focal centre for Academic excellence in competing global standards and dynamics in the field of Electronics and Communication Engineering with research and services focusing on effective communication skills, entrepreneurial, ethical and social concern.

Mission

M 1: To impart quality technical education in Electronics and Communication Engineering with well established infrastructure, state-of-art laboratories core instructions and cognizant faculty.

M 2: To prepare the young and dynamic Electronics and Communication Engineers professionally deft and intellectually adept with knowledge, behavior and information competency.

M 3: To enable the learners for changing trends in the field of Electronics and Communication Engineering with a focus on career guidance, placements and higher education by industry institute relationship.

PROGRAM EDUCATIONAL OBJECTIVES

PEO1: Graduates should be cognizant in basic science, fundamental engineering stream along with core related domains in ECE and Allied fields.

PEO2: Graduates should understand issues related to design, problem solving, and intellectually adept with knowledge, behavior and information competency.

PEO3: Graduates should demonstrate their technical, communication, research, aptitudes along with leadership skills in professional environment to empower employability, higher education and entrepreneurs successfully through industry-institute interaction.

PEO4: Graduates should be motivated with high ethical, human values and team work towards development of the society.

PROGRAM OUTCOMES

PO1: **Engineering Knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: **Problem Analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: **Design/Development of Solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations

PO4: **Conduct Investigations of Complex Problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: **Modern Tool Usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: **The Engineer and Society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: **Environment and Sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: **Individual and Team Work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES

PSO 1: An ability to get an employment in Electronics and Communication Engineering field and related industries and to participate & succeed in competitive examinations like GRE, GATE, TOEFL, PSUs, etc.

PSO 2: Should be able to design and test various electronic systems that perform analog and digital processing functions.

PRELIMINARY DEFINITIONS AND NOMENCLATURE

AICTE: Means All India Council for Technical Education, New Delhi.

Autonomous Institute: Means an institute designated as Autonomous by University Grants Commission (UGC), New Delhi in concurrence with affiliating University (**Jawaharlal Nehru Technological University Anantapur**).

Academic Autonomy: Means freedom to an institute in all aspects of conducting its academic programmes granted by UGC for promoting excellence.

Academic Council: The Academic Council is the highest academic body of the institute and is responsible for the maintenance of standards of instruction, education and examination within the institute. Academic Council is an authority as per UGC regulations and it has the right to take decisions on all academic matters including academic research.

Branch: Means specialization in a programme like B.Tech. degree programme in Civil Engineering, B.Tech. degree programme in Computer Science and Engineering etc.

Board of Studies (BOS): BOS is an authority as defined in UGC regulations, constituted by Head of the Organization for each of the departments separately. They are responsible for curriculum design and updation in respect of all the programmes offered by a department.

Backlog Course: A course is considered to be a backlog course, if the student has obtained a failure grade in that course.

Commission: Means University Grants Commission (UGC), New Delhi.

Certificate Course: It is a course that makes a student to have hands-on expertise and skills required for holistic development in a specific area/field.

Internal Examination: It is an examination conducted towards sessional assessment.
Core: The courses that are the essential constituents of each engineering discipline are categorized as professional core courses for that discipline.

Course: A course is a subject offered by a department for learning in a particular semester.

Course Outcomes: The essential skills that need to be acquired by every student through a course.

Credit: A credit is a unit that gives weight to the value, level or time requirements of an academic course. The number of 'Contact Hours' in a week of a particular course determines its credit value.

Credit Point: It is the product of grade point and number of credits for a course.

Cumulative Grade Point Average (CGPA): It is a measure of cumulative performance of a student overall the completed semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of the total credits of all courses in all the semesters. It is expressed up to two decimal places.

Curriculum: Curriculum incorporates the planned interaction of students with instructional content, materials & resources.

Department: An academic entity that conducts relevant curricular and co-curricular activities, involving both teaching and non-teaching staff, and other resources in the process of study for a degree.

Detention in a Semester: Student who does not obtain minimum prescribed attendance in a Semester shall be detained in that particular Semester. A Student can also be detained for lack of required number of credits at the end of IV semester or VI semester respectively.

Elective Course: A course that can be chosen from a set of courses. An elective can be Professional Elective and/or Open Elective.

Evaluation: Evaluation is the process of judging the academic performance of the student in her/his courses. It is done through a combination of continuous internal examinations and semester end examinations.

Grade: It is an index of the performance of the students in a said course. Grades are indicated by alphabets.

Grade Point: It is a numerical weight allotted to each letter grade on a 10 - point scale.

Institute: Represents Sri Venkateswara College of Engineering, Tirupati unless indicated otherwise by the context.

Massive Open Online Courses (MOOC): MOOCs inculcate the habit of self-learning. MOOCs would be additional choices in all the elective group courses.

Minor: Minor are coherent sequences of courses which may be taken in addition to the courses required for the B.Tech. degree.

Pre-requisite: A specific course or subject, the knowledge of which is required to complete before student register another course at the next grade level.

Professional Elective: It indicates a course that is discipline centric. An appropriate choice of minimum number of such electives as specified in the programme will lead to a degree with specialization.

Programme: Denotes UG degree programme: Bachelor of Technology (B.Tech.).

Project work: It is a design or research-based work to be taken up by a student during his / her VIII semester to achieve a particular aim. It is a credit-based course and is to be planned carefully by the student.

Registration: Process of enrolling into a set of courses in a semester of a programme.

Regulations: The regulations, common to all B.Tech. programmes offered by Institute, are designated as "SVCE – R23" and are binding on all the stakeholders.

Semester: It is a period of study consisting of 90 working days. Odd semester commences usually in July and even semester in December of every year.

Semester End Examinations: It is an examination conducted for all courses offered in a semester at the end of the semester.

University: Represents Jawaharlal Nehru Technological University Anantapur (JNTUA), Ananthapuramu.

Table of Contents

PRELIMINARY DEFINITIONS AND NOMENCLATURE 8
1. About the College 11
1.1 Applicability 11
1.2 Extent 11
2. Vision and Mission 11
3. Programmes Offered 11
4. Award of the Degree 12
5. Admissions 12
6. Program related terms 12
7. Semester / Credits 13
8. Structure of the Undergraduate Programme 13
9. Course Classification 13
10. Programme Pattern 14
11. Evaluation Process 15
11.1 Theory Courses 15
(a) Continuous Internal/Evaluation 15
(b) End Examinaion Evaluation 16
11.2 Practical Courses 16
12. Skill Oriented Courses 18
13. Massive Open online courses (MOOCs) 19
14. Credit Transfer Policy 19
15. Academic Bank of Credits (ABC) 20
16. Mandatory Internships 20
16.1 Summer Internships. 20
16.2 Full Semester Internship and Project Work. 20
17. Guidelines for Offering Minor 21
18. Guidelines for Offering Honors 21
19. Enrolment into Honors 22
20. Registration for Honors 22
21. Attendance Requirements 22
22. Promotion Rules 23
23. Grading 23
24. Award of Class 24
25. Recounting / Revaluation 24
26. Supplementary Examinations 25
27. Withhoding of Results 25
28. Re-Registration for Improvement of Internal Marks 25
29. Multiple Entry / Exit Option 25
30. Gap Year Concept 26
31. Transitory Regulations 26
32. Minimum Intruction days for a Semester 26
33. Medium of Instructions 26
34. Student Transfers 26
35. General Instructions 26
36. Amendment to Regulations 27
37. Rules for Disciplinary Action for Malpractices 27
38. Academic Regulations (R23), for B.Tech (Lateral Entry Scheme) 31

1. About the College

Sri Venkateswara College of Engineering (SVCE) is a part of **SV Colleges** group established in the year 2007 with a vision to become a leader in providing quality educational services.

College is affiliated to JNTUA & approved by AICTE, recognized under **section 2 (f)** & **12 (B)** of UGC act 1956. Accredited by NAAC with A grade. Six B.Tech. Programmes CSE, ECE, EEE, IT, ME & CE are accredited by NBA New Delhi. The Campus is equipped with state of art laboratories of centre of excellence through advanced tools and technologies.

Learning at **Sri Venkateswara College of Engineering** has a pragmatic approach with a clear focus, valuing individual vision, intellectual discipline, and a sense of teamwork. We aim at developing our students to their full potential, preparing them to take the next step towards career success.

Sri Venkateswara College of Engineering is committed to its role in creating leaders through its innovative programmes, outstanding faculty and effective leadership. **Sri Venkateswara College of Engineering** nurtures global leaders who can speak their minds and work well with others in a wide range of cultural contexts. It will develop their ability to manage a career successfully in the global economy.

Our teaching modes and methods of assessment vary between courses to ensure that you gain the most benefit from the interactive course content, faculty members, fellow students, and invited guests. Lectures comprise only a portion of course delivery, with the remaining taken up by discussions, seminars, case analysis, simulation, individual and group projects, and presentations.

1.1 Applicability

All the rules specified herein, approved by the Academic Council, shall be in force and applicable to students admitted from the academic year 2023 – 24 onwards. Any reference to "College" in these rules and regulations stands for Sri Venkateswara College of Engineering.

1.2 Extent

All the rules and regulations, specified hereinafter shall be read as a whole for the purpose of interpretation and as and when a doubt arises, the interpretation of the Chairman, Academic Council is final. It shall be ratified by the Academic Council in the forthcoming meeting. As per the requirements of statutory bodies, Principal, **Sri Venkateswara College of Engineering** shall be the Chairman, Academic Council.

2. Vision& Mission

VISION
To be a centre of excellence focusing on high quality technical education, research and technical services with global leadership competence to succeed in employment and higher education with ethical, social, entrepreneurial aspects updating to the real time requirements.

MISSION
To impart high quality technical education by providing the state-of-the art infrastructure, core instruction. Advanced research and technical consultancy services are carried with qualified and senior faculty to prepare the students professionally deft and intellectually adept possessing excellent skill, knowledge and behaviour with global competence.

3. Programmes Offered

Following programmes are offered in various branches at **Sri Venkateswara College of Engineering** leading to the award of B.Tech. Degree

S. No.	Branch
1	Civil Engineering
2	Computer Science and Engineering
3	Computer Science and Engineering (Artificial Intelligence and Machine Learning)
4	Computer Science and Engineering (Cyber Security)
5	Computer Science and Engineering (Data Science)
6	Electronics and Communication Engineering
7	Electrical and Electronics Engineering
8	Information Technology
9	Mechanical Engineering

4. Award of the Degree

a) Award of the B.Tech. Degree / B.Tech. Degree with a Minor if he/she fulfils the following:
   (i) Pursues a course of study for not less than four academic years and not more than eight academic years. However, for the students availing Gap year facility this period shall be extended by two years at the most and these two years would in addition to the maximum period permitted for graduation (Eight years).
   (ii) Registers for 160 credits and secures all 160 credits.

b) Award of B.Tech. degree with Honors if he/she fulfils the following:
   (i) Student secures additional 15 credits fulfilling all the requisites of a B.Tech. program i.e., 160 credits.
   (ii) Registering for Honors is optional.
   (iii) Honors is to be completed simultaneously with B.Tech. programme.

c) Students, who fail to fulfill all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech. course and their admission stands cancelled. This clause shall be read along with **clause 4 a) i)**.

5. Admissions

Admission to the B. Tech Program shall be made subject to the eligibility, qualifications and specialization prescribed by the A.P. State Government/University from time to time. Admissions shall be made either based on the merit rank obtained by the student in the common entrance examination conducted by the A.P. Government/University or any other order of merit approved by the A.P. Government/University, subject to reservations as prescribed by the Government/University from time to time.

6. Program related terms

Credit: A unit by which the course work is measured. It determines the number of hours of instruction required per week. One credit is equivalent to one hour of teaching (Lecture/Tutorial) or two hours of practical work/field work per week.

Credit Definition:

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
1 Hr. Practical (P) per week	0.5 credit
2 Hrs. Practical (Lab) per week	1 credit

a) Academic Year: Two consecutive (one odd + one even) semesters constitute one academic year.
b) Choice Based Credit System (CBCS): The CBCS provides a choice for students to select from the prescribed courses.

7. Semester/Credits

i. A semester comprises 90 working days and an academic year is divided into two semesters.
ii. The summer term is for eight weeks during summer vacation. Internship/ apprenticeship / work-based vocational education and training can be carried out during the summer term, especially by students who wish to exit after two semesters or four semesters of study.
iii. Regular courses may also be completed well in advance through MOOCs satisfying prerequisites.

8. Structure of the Undergraduate Programme

All courses offered for the undergraduate program (B. Tech.) are broadly classified as follows:

S.No	Category	Breakup of Credits (Total 160)	Percentage of Total Credits	AICTE Recommendations
1	Humanities and Social Science including Management (HS)	13	8%	8-9%
2	Basic Sciences (BS)	20	13%	12-16%
3	Engineering Sciences (ES)	23.5	14%	10-18%
4	Professional Core (PC)	54.5	34%	30-36%
5	Electives – Professional (PE) & Open (OE); Domain Specific Skill Enhancement Courses (SEC)	33	21%	19-23%
6	Internships & Project work (PR)	16	10%	8-11%
7	Mandatory Courses (MC)	Non-Credit	Non-Credit	-

9. Course Classification

All subjects/ courses offered for the undergraduate programme in Engineering & Technology (B.Tech. degree programmes) are broadly Classified as follows:

S. No.	Broad Course Classification	Course Category	Description
1	Foundation Course	Foundation courses	Includes Mathematics, Physics and Chemistry; fundamental engineering courses; humanities, social sciences and management courses
2	Core Courses	Professional Core Courses (PC)	Includes subjects related to the parent discipline/ department/ branch of Engineering
3	Elective Courses	Professional Elective Courses (PE)	Includes elective subjects related to the parent discipline/department/ branch of Engineering
		Open Elective Courses (OE)	Elective subjects which include interdisciplinary subjects or subjects in an area outside the parent discipline/ department/ branch of Engineering
		Domain specific skill enhancement courses (SEC)	interdisciplinary/job-oriented/domain courses which are relevant to the industry
4	Project & Internships	Internships	Summer Internships – Community based and Industry Internships; Industry
5	Audit Courses	Mandatory non-credit courses	Covering subjects of developing desired attitude among the learners

10. Programme Pattern

i. Total duration of the of B. Tech (Regular) Programme is four academic years.
ii. Each academic year of study is divided into two semesters.
iii. Minimum number of instruction days in each semester is 90 days.
iv. There shall be mandatory student induction program for fresher's, with a three-week duration before the commencement of first semester. Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, visits to local Areas, Familiarization to Dept./Branch & Innovations etc., are included as per the guidelines issued by AICTE.
v. Health/wellness/yoga/sports and NSS /NSS /Scouts & Guides / Community service activities are made mandatory as credit courses for all the under graduate students.
vi. Courses like Environmental Sciences, Indian Constitution, Technical Paper Writing & IPR are offered as non-credit mandatory courses for all the undergraduate students.
vii. Design Thinking for Innovation & Tinkering Labs are made mandatory as credit courses for all the undergraduate students.
viii. Increased flexibility for students through an increase in the elective component of the curriculum, with 05 Professional Elective courses and 04 Open Elective courses.
ix. Professional Elective Courses, include the elective courses relevant to the chosen specialization/branch. Proper choice of professional elective courses can lead to students specializing in emerging areas within the chosen field of study.

x. A total of 04 Open Electives are offered in the curriculum. A student can complete the requirement for B.Tech. Degree with a Minor within the 160 credits by opting for the courses offered through various verticals/tracks under Open Electives.
xi. While choosing the electives, students shall ensure that they do not opt for the courses with syllabus contents similar to courses already pursued.
xii. A pool of interdisciplinary/job-oriented/domain skill courses which are relevant to the industry are integrated into the curriculum of all disciplines. There shall be 05 skill-oriented courses offered during III to VII semesters. Among the five skill courses, four courses shall focus on the basic and advanced skills related to the domain/interdisciplinary courses and the other shall be a soft skills course.
xiii. Students shall undergo mandatory summer internships, for a minimum of eight weeks' duration at the end of second and third year of the programme. The internship at the end of second year shall be community oriented and industry internship at the end of third year.
xiv. There shall also be mandatory full internship in the final semester of the programme along with the project work.
xv. Undergraduate degree with Honors is introduced by the college for the students having good academic record.
xvi. Each college shall take measures to implement Virtual Labs (https://www.vlab.co.in) which provide remote access to labs in various disciplines of Engineering and will help student in learning basic and advanced concept through remote experimentation. Student shall be made to work on virtual lab experiments during the regular labs.
xvii. Each college shall assign a faculty advisor/mentor after admission to a group of students from same department to provide guidance in courses registration/career growth/placements/opportunities for higher studies/GATE/other competitive exams etc.
xviii. Preferably 25% of course work for the theory courses in every semester shall be conducted in the blended mode of learning.

11. Evaluation Process

i. The performance of a student in each semester shall be evaluated subject wise with a maximum of 100 marks for theory and 100 marks for practical subject. Summer Internships shall be evaluated for 50 marks, Full Internship & Project work in final semester shall be evaluated for 200 marks, mandatory courses with no credits shall be evaluated for 30 mid semester marks.
ii. A student has to secure not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the mid semester and end examination marks taken together for the theory, practical, design, drawing subject or project etc. In case of a mandatory course, he/she should secure 40% of the total marks.

11.1 Theory Courses

Assessment Method	**Marks**
Continuous Internal Assessment	30
Semester End Examination	70
Total	**100**

i. For theory subject, the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.

ii. For practical subject, the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End- Examination.
iii. If any course contains two different branch subjects, the syllabus shall be written in two parts with 3 units each (Part-A and Part-B) and external examination question paper shall be set with two parts each for 35 marks.

a) Continuous Internal Evaluation

i. For theory subjects, during the semester, there shall be two midterm examinations. Each midterm examination shall be evaluated for 30 marks of which 10 marks for objective paper (20 minutes duration), 15 marks for subjective paper (90 minutes duration) and 5 marks for assignment.
ii. Objective paper shall contain for 05 short answer questions with 2 marks each or maximum of 20 bits for 10 marks. Subjective paper shall contain 3 either or type questions (totally six questions from 1 to 6) of which student has to answer one from each either-or type of questions. Each question carries 10 marks. The marks obtained in the subjective paper are condensed to 15 marks.
iii. The internal evaluation for the course on **"Design Thinking and Innovation"** shall be activity based, in the form of presentations / reports as per the curriculum and shall be evaluated for 15 marks by the concerned teacher and 15 marks for internal tests. There shall be two internal tests. The internal test shall be of 20 marks for subjective paper and 10 marks for objective paper, total shall be condensed to 15 marks.

Note:

i. The objective paper shall be prepared in line with the quality of competitive examinations questions.
ii. The subjective paper shall contain 3 either or type questions of equal weight age of 10 marks. Any fraction shall be rounded off to the next higher mark.
iii. The objective paper shall be conducted by the respective institution on the day of subjective paper test.
iv. Assignments shall be in the form of problems, mini projects, design problems, slip tests, quizzes etc., depending on the course content. It should be continuous assessment throughout the semester and the average marks shall be considered.
v. If the student is absent for the mid semester examination, no re-exam shall be conducted and mid semester marks for that examination shall be considered as zero.
vi. First midterm examination shall be conducted for I, II units of syllabus with one either or type question from each unit and third either or type question from both the units. The second midterm examination shall be conducted for III, IV and V units with one either or type question from each unit.
vii. Final mid semester marks shall be arrived at by considering the marks secured by the student in both the mid examinations with 80% weight age given to the better mid exam and 20% to the other.

For Example:

Marks obtained in first mid: 25
Marks obtained in second mid: 20
Final mid semester Marks: (25x0.8) + (20x0.2) = 24

If the student is absent for any one midterm examination, the final mid semester marks shall be arrived at by considering 80% weight age to the marks secured by the student in the appeared examination and zero to the other. For Example:

Marks obtained in first mid: Absent
Marks obtained in second mid: 25
Final mid semester Marks: (25x0.8) + (0x0.2) =20

b) End Examination Evaluation

End examination of theory subjects shall have the following pattern:

i. There shall be 6 questions and all questions are compulsory.
ii. Question I shall contain 10 compulsory short answer questions for a total of 20marks such that each question carries 2 marks.
iii. There shall be 2 short answer questions from each unit. In each of the questions from 2 to 6, there shall be either/or type questions of 10 marks each. Student shall answer any one of them.
iv. The questions from 2 to 6 shall be set by covering one unit of the syllabus for each question.
v. End examination of theory subjects consisting of two parts of different subjects, for Example: Basic Electrical & Electronics Engineering shall have the following pattern:
    a. Question paper shall be in two parts viz., Part A and Part B with equal weight age of 35 marks each.
    b. In each part, question 1 shall contain 5 compulsory short answer questions for a total of 5 marks such that each question carries 1mark.
    c. In each part, questions from 2 to 4, there shall be either/or type questions of 10 marks each. Student shall answer any one of them.
    d. The questions from 2 to 4 shall be set by covering one unit of the syllabus for each question.

11.2 Practical Courses

Assessment Method	Marks
Continuous Internal Assessment	30
Semester End Examination	70
Total	100

i. For practical courses, there shall be a continuous evaluation during the semester for 30 sessional marks and end examination shall be for 70 marks.
ii. Day-to-day work in the laboratory shall be evaluated for 15 marks by the concerned laboratory teacher based on the record/viva and 15 marks for the internal test.
iii. The end examination shall be evaluated for 70 marks, conducted by the concerned laboratory teacher and a senior expert in the subject from the same department.
    - Procedure: 20 marks
    - Experimental work & Results: 30 marks
    - Viva voce: 20 marks.

    In a practical subject consisting of two parts (Eg: Basic Electrical & Electronics Engineering Lab), the end examination shall be conducted for 70 marks as a single laboratory in 3 hours. Mid semester examination shall be evaluated as above for 30 marks in each part and final mid semester marks shall be arrived by considering the average of marks obtained in two parts.
iv. For the subject having design and/or drawing, such as Engineering Drawing, the distribution of marks shall be 30 for mid semester evaluation and 70 for end examination.

    Day-to-day work shall be evaluated for 15 marks by the concerned subject teacher based on the reports/submissions prepared in the class. And there shall be two midterm examinations in a semester for duration of 2 hours each for 15 marks with weight age of 80% to better mid marks and 20% for the other. The subjective paper shall contain 3 either or type questions of equal weight age of 5 marks. There shall be no objective paper in mid semester examination. The sum of day- to-day evaluation and the mid semester marks will be the final sessional marks for the subject.

The end examination pattern for Engineering Graphics, shall consists of 5 questions, either/or type, of 14 marks each. There shall be no objective type questions in the end examination. However, the end examination pattern for other subjects related to design/drawing, multiple branches, etc is mentioned along with the syllabus.

v. There shall be no external examination for mandatory courses with zero credits. However, attendance shall be considered while calculating aggregate attendance and student shall be declared to have passed the mandatory course only when he/she secures 40% or more in the internal examinations. In case, the student fails, a re-examination shall be conducted for failed candidates for 30 marks satisfying the conditions mentioned in item 1 & 2 of the regulations.

vi. The laboratory records and mid semester test papers shall be preserved for a minimum of 3 years in the respective institutions as per the University norms and shall be produced to the Committees of the University as and when the same are asked for.

vii. Evaluation Guidelines for the courses like HEALTH AND WELLNESS, YOGA & SPORTS AND NSS/NCC/SCOUT & GUIDES/ COMMUNITY SERVICE is
   - Evaluated for a total of 100 marks.
   - A Student can select 6 activities of his/her choice with a minimum of 1 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totally to 90 marks.
   - The student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject.

12. Skill Oriented Courses

i. There shall be five skill-oriented courses offered during III to VII semesters.

ii. Out of the five skill courses two shall be skill-oriented courses from the same domain. Of the remaining three skill courses, one shall be a soft skill course and the remaining two shall be skill-advanced courses from the same domain/Interdisciplinary/Job oriented.

iii. The course shall carry 100 marks and shall be evaluated through continuous assessments during the semester for 30 sessional marks and end examination shall be for 70 marks. Day-to-day work in the class / laboratory shall be evaluated for 30 marks by the concerned teacher based on the regularity/assignments/viva/mid semester test. The end examination similar to practical examination pattern shall be conducted by the concerned teacher and an expert in the subject nominated by the principal.

iv. The Head of the Department shall identify a faculty member as coordinator for the course. A committee consisting of the Head of the Department, coordinator and a senior Faculty member nominated by the Head of the Department shall monitor the evaluation process. The marks/grades shall be assigned to the students by the above committee based on their performance.

v. The student shall be given an option to choose either the skill courses being offered by the college or to choose a certificate course being offered by industries/Professional bodies or any other accredited bodies. If a student chooses to take a Certificate Course offered by external agencies, the credits shall be awarded to the student upon producing the Course Completion Certificate from the agency. A committee shall be formed at the level of the college to evaluate the grades/marks given for a course by external agencies and convert to the equivalent marks/grades.

vi. The recommended courses offered by external agencies, conversions and appropriate grades/marks are to be approved by the College at the beginning of the semester.

vii. If a student prefers to take a certificate course offered by external agency, the department shall mark attendance of the student for the remaining courses in that semester excluding the skill course in all the calculations of mandatory attendance requirements upon producing a valid certificate as approved by the College.

13. Massive Open Online Courses (MOOCs)

A Student has to pursue and complete one course compulsorily through MOOCs approved by the College. A student can pursue courses other than core through MOOCs and it is mandatory to complete one course successfully through MOOCs for awarding the degree. A student is not permitted to register and pursue core courses through MOOCs.

A student shall register for the course (Minimum of either 8 weeks or 12 weeks) offered through MOOCs with the approval of Head of the Department. The Head of the Department shall appoint one mentor to monitor the student's progression. The student needs to earn a certificate by passing the exam. The student shall be awarded the credits assigned in the curriculum only by submission of the certificate. Examination fee, if any, will be borne by the student.

Students who have qualified in the proctored examinations conducted through MOOCs platform can apply for credit transfer as specified and are exempted from appearing internal as well as external examination (for the specified equivalent credit course only) conducted by the College.

Necessary amendments in rules and regulations regarding adoption of MOOC courses would be proposed from time to time.

14. Credit Transfer Policy

Adoption of MOOCs is mandatory, to enable Blended model of teaching-learning as also envisaged in the NEP 2020. As per University Grants Commission (Credit Framework for Online Learning Courses through SWAYAM) Regulation, 2016, the College shall allow up to a maximum of 20% of the total courses being offered in a particular programme i.e., maximum of **32** credits through MOOCs platform.

i. The College shall offer credit mobility for MOOCs and give the equivalent credit weight age to the students for the credits earned through online learning courses.
ii. Student registration for the MOOCs shall be only through the respective department of the institution, it is mandatory for the student to share necessary information with the department.
iii. Credit transfer policy will be applicable to the Professional & Open Elective courses only.
iv. The concerned department shall identify the courses permitted for credit transfer.
v. The College/institution shall notify at the beginning of semester the list of the online learning courses eligible for credit transfer.
vi. The institution shall designate a faculty member as a Mentor for each course to guide the students from registration till completion of the credit course.
vii. The College shall ensure no overlap of MOOC exams with that of the College examination schedule. In case of delay in results, the College will re-issue the marks sheet for such students.
viii. Student pursuing courses under MOOCs shall acquire the required credits only after successful completion of the course and submitting a certificate issued by the competent authority along with the percentage of marks and grades.
ix. The departments shall submit the following to the examination section of the College:
    a) List of students who have passed MOOC courses in the current semester along with the certificate of completion.
    b) Undertaking form filled by the students for credit transfer.
x. The College shall resolve any issues that may arise in the implementation of this policy from time to time and shall review its credit transfer policy in the light of periodic changes brought by UGC, SWAYAM, NPTEL and state government.

Note: Students shall be permitted to register for MOOCs offered through online platforms approved by the College from time to time.

15. Academic Bank of Credits (ABC)

The College has implemented Academic Bank of Credits (ABC) to promote flexibility in curriculum as per NEP 2020 to

i. Provide option of mobility for learners across the universities of their choice.
ii. Provide option to gain the credits through MOOCs from approved digital platforms.
iii. Facilitate award of certificate/diploma/degree in line with the accumulated credits in ABC.
iv. Execute Multiple Entry and Exit system with credit count, credit transfer and credit acceptance from students' account.

16. Mandatory Internships

16.1 Summer Internships

Two summer internships either onsite or virtual each with a minimum of 08 weeks' duration, done at the end of second and third years, respectively are mandatory. It shall be completed in collaboration with local industries, Govt. Organizations, construction agencies, Power projects, software MNCs or any industries in the areas of concerned specialization of the Undergraduate program. One of the two summer internships at the end of second year (Community Service Project) shall be society oriented and shall be completed in collaboration with government organizations/NGOs & others. The other internship at the end of third year is Industry Internship and shall be completed in collaboration with Industries. The student shall register for the internship as per course structure after commencement of academic year. The guidelines issued by the APSCHE / College shall be followed for carrying out and evaluation of Community Service Project and Industry Internship. Evaluation of the summer internships shall be through the departmental committee. A student will be required to submit a summer internship report to the concerned department and appear for an oral presentation before the departmental committee comprising of Head of the Department, supervisor of the internship and a senior faculty member of the department. A Certificate of successful completion from industry shall be included in the report. The report and the oral presentation shall carry 50% weight age each. It shall be evaluated for 50 external marks. There shall be no internal marks for Summer Internship. A student shall secure minimum 40% of marks for successful completion. In case, if a student fails, he/she shall reappear as and when semester supplementary examinations are conducted by the College.

16.2 Full Semester Internship and Project work

In the final semester, the student should mandatorily register and undergo internship (onsite/virtual) and in parallel he/she should work on a project with well-defined objectives. At the end of the semester the candidate shall submit an internship completion certificate and a project report. A student shall also be permitted to submit project report on the work carried out during the internship.

The project report shall be evaluated with an external examiner. The total marks for project work 200 marks and distribution shall be 60 marks for internal and 140 marks for external evaluation. The supervisor assesses the student for 30 marks (Report: 15 marks, Seminar: 15 marks). At the end of the semester, all projects shall be showcased at the department for the benefit of all students and staff and the same is to be evaluated by the departmental Project Review Committee consisting of supervisor, a senior faculty and HOD for 30 marks. The external evaluation of Project Work is a Viva-Voce Examination conducted in the presence of internal examiner and external examiner appointed by the College and is evaluated for 140 marks.

The college shall facilitate and monitor the student internship programs. Completion of internships is mandatory, if any student fails to complete internship, he/she will not be eligible for the award of degree. In such cases, the student shall repeat and complete the internship.

17. Guidelines for offering a Minor

To promote interdisciplinary knowledge among the students, the students admitted into B.Tech. in a major stream/branch are eligible to obtain degree in Minor in another stream.

The Minor program requires the completion of 18 credits in Minor stream chosen. 05 theory courses of 3 credits each, 2 practical courses of 1.5 credits each or a Project for 3 credits, for Minor Program.

Specialization tracks are available for Minor Program.

18. Guidelines for offering Honors

The objective of introducing B.Tech. (Hons.) is to facilitate the students to choose additionally the specialized courses of their choice and build their competence in a specialized area in the UG level. The programme is a best choice for academically excellent students having good academic record and interest towards higher studies and research.

i. Honors is introduced in the curriculum of all B. Tech. programs offering a major degree and is applicable to all B. Tech (Regular and Lateral Entry) students admitted in Engineering & Technology.
ii. A student shall earn additional 18 credits for award of B.Tech. (Honors) degree from same branch/department/discipline registered for major degree. This is in addition to the credits essential for obtaining the Undergraduate degree in Major Discipline (i.e., 160 credits).
    05 theory courses of 3 credits each, 2 practical courses of 1.5 credits each or a Project for 3 credits, for Honors Program.
    Specialization tracks are available for Honors Program.
iii. A student is permitted to register for Honors in IV semester after the results of III Semester are declared and students may be allowed to take maximum two subjects per semester pertaining to the Honors from V Semester onwards.
iv. The concerned Principal of the college shall arrange separate class work and timetable of the courses offered under Honors program.
v. Courses that are used to fulfil the student's primary major may not be double counted towards the Honors. Courses with content substantially equivalent to courses in the student's primary Major may not be counted towards the Honors.
vi. Students can complete the courses offered under Honors either in the college or in online platforms like SWAYAM with a minimum duration of 12 weeks for a 3-credit course and 8 weeks' duration for a 2-credit course satisfying the criteria for credit mobility. If the courses under Honors are offered in conventional mode, then the teaching and evaluation procedure shall be similar to regular B. Tech courses.
vii. The attendance for the registered courses under Honors and regular courses offered for Major degree in a semester are to be considered separately.
viii. A student shall maintain an attendance of 75% in all registered courses under Honors to be eligible for attending semester end examinations.
ix. A student registered for Honors shall pass in all subjects that constitute the requirement for the Honors degree program. No class/division (i.e., second class, first class and distinction, etc.) shall be awarded for Honors degree programme.
x. If a student drops or is terminated from the Honors program, the additional credits so far earned cannot be converted into open or core electives; they will remain extra. However, such students will receive a separate grade sheet mentioning the additional courses completed by them.

xi. The Honors will be mentioned in the degree certificate as Bachelor of Technology (Honors) in XYZ. For example, B.Tech. (Honors) in Mechanical Engineering.

19. Enrolment into Honors

i. Students of a Department/Discipline are eligible to opt for Honors program offered by the same Department/Discipline.
ii. The enrolment of student into Honors is based on the CGPA obtained in the major degree program. CGPA shall be taken up to III semester in case of regular entry students and only III semester in case of lateral entry students. Students having 7 CGPA without any backlog subjects will be permitted to register for Honors.
iii. If a student is detained due to lack of attendance either in Major or in Honors, registration shall be cancelled.
iv. Transfer of credits from Honors to regular B. Tech degree and vice-versa shall not be permitted.
v. Honors are to be completed simultaneously with a Major degree program.

20. Registration for Honors

i. The eligible and interested students shall apply through the HOD of his/her parent department. The whole process should be completed within one week before the start of every semester. Selected students shall be permitted to register the courses under Honors.
ii. The selected students shall submit their willingness to the principal through his/her parent department offering Honors. The parent department shall maintain the record of student pursuing the Honors.
iii. The students enrolled in the Honors courses will be monitored continuously. An advisor/mentor from parent department shall be assigned to a group of students to monitor the progress.
iv. There is no fee for registration of subjects for Honors program offered in offline at the respective institutions.

21. Attendance Requirements

i. A student shall be eligible to appear for the College external examinations if he/she acquires a minimum of 40% attendance in each subject and 75% of attendance in aggregate of all the subjects. b) Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee.
ii. Shortage of Attendance below 65% in aggregate shall in NO CASE be condoned.
iii. A stipulated fee shall be payable towards Condonation of shortage of attendance to the College.
iv. Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that class and their registration shall stand cancelled.
v. A student will not be promoted to the next semester unless he satisfies the attendance requirements of the present semester. They may seek readmission for that semester from the date of commencement of class work.
vi. If any candidate fulfils the attendance requirement in the present semester, he shall not be eligible for readmission into the same class.
vii. If the learning is carried out in blended mode (both offline & online), then the total attendance of the student shall be calculated considering the offline and online attendance of the student.
viii. For induction programme attendance shall be maintained as per AICTE norms.

22. Promotion Rules

The following academic requirements must be satisfied in addition to the attendance requirements mentioned in **section 18**.

i. A student shall be promoted from first year to second year if he/she fulfils the minimum attendance requirement as per College norms.
ii. A student will be promoted from II to III year if he/she fulfils the academic requirement of securing 40% of the credits (any ***decimal*** fraction should be ***rounded off*** to ***lower*** digit) up to in the subjects that have been studied up to III semester
iii. A student shall be promoted from III year to IV year if he/she fulfils the academic requirements of securing 40% of the credits (any ***decimal*** fraction should be ***rounded off*** to ***lower*** digit) in the subjects that have been studied up to V semester. And in case a student is detained for want of credits for a particular academic year by ii) & iii) above, the student may make up the credits through supplementary examinations and only after securing the required credits he/she shall be permitted to join in the V semester or VII semester respectively as the case may be.
iv. When a student is detained due to lack of credits/shortage of attendance he/she may be re-admitted when the semester is offered after fulfillment of academic regulations. In such case, he/she shall be in the academic regulations into which he/she is readmitted.

23. Grading

As a measure of the student's performance, a 10-point Absolute Grading System using the following Letter Grades and corresponding percentage of marks shall be followed:

After each course is evaluated for 100 marks, the marks obtained in each course will be converted to a corresponding letter grade as given below, depending on the range in which the marks obtained by the student fall.

Structure of Grading of Academic Performance

Range in which the marks in the subject fall	Grade	Grade points Assigned
90 & above	S(Superior)	10
80 – 89	A(Excellent)	9
70 – 79	B(Very Good)	8
60 – 69	C (Good)	7
50 – 59	D (Average)	6
40 – 49	E (Pass)	5
< 40	F (Fail)	0
Absent	Ab (Absent)	0

A student obtaining Grade 'F' or Grade 'Ab' in a subject shall be considered failed and will be required to reappear for that subject when it is offered the next supplementary examination.

For non-credit audit courses, "Satisfactory" or "Unsatisfactory" shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA/Percentage.

Computation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA)

The Semester Grade Point Average (SGPA) is the ratio of sum of the product of the number of credits with the grade point scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.,

$$SGPA = \sum_{i=1}^{n}(C_i \times G_i) \Big/ \sum_{i=1}^{n} C_i$$

Where, C_i is the number of credits of the ith subject, G_i is the grade point scored by the student in the ith course and n is the no. of subjects. The Cumulative Grade Point Average (CGPA) will be computed in the same manner taking into account all the courses undergone by a student over all the semesters of aprogramme, i.e.

$$CGPA = \sum_{i=1}^{n}(C_i \times S_i) \Big/ \sum_{i=1}^{n} C_i$$

Where S_i is the SGPA of the ith semester, C_i is the total number of credits in that semester and n is the no. of semesters. Both SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts. While computing the SGPA the subjects in which the student is awarded Zero grade points will also be included. Grade Point: It is a numerical weight allotted to each letter grade on a 10- point scale. Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by the letters S, A, B, C, D, E and F.

24. Award of Class

After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree, he/she shall be placed in one of the following four classes:

Class Awarded	CGPA Secured
First Class with Distinction	≥ 7.5
First Class	≥ 6.5 < 7.5
Second Class	≥ 5.5 < 6.5
Pass Class	≥ 5.0 < 5.5

CGPA to Percentage Conversion Formula – (CGPA – 0.5) x 10

25. Recounting / Revaluation

Students shall be permitted to apply for Recounting /Revaluation of the end examination answer scripts within a stipulated period after payment of the prescribed fee. After completion of the process of Recounting /Revaluation, the records are updated with changes if any, and the student shall be issued a revised grade sheet. If there are no changes, the student shall be intimated the same through a notice.

The Revaluation shall be carried out by an expert not less than Associate Professor cadre, as per the scheme of evaluation supplied by the examination branch in the presence of Principal/Controller of Examinations. Neither the students nor his parents shall be permitted to the present during the valuation.

26. Supplementary Examinations

In addition to the regular end examinations conducted, the college may also schedule and conduct supplementary examinations for all the subjects of other semesters when feasible for the benefit of students. Such candidates writing supplementary examinations may have to write more than one examination per day. For eighth semester advanced supplementary examinations will be conducted.

27. Withholding of Results

In case of indiscipline or malpractice is pending against the candidate, the result of the candidate shall be withheld and he/she shall not be allowed/promoted to the next higher semester.

28. Re-Registration for Improvement of Internal Marks

Following are the conditions to avail the benefit of improvement of internal marks.

i. The candidate should have completed the 4 years of B.Tech. course work and obtained examinations results from I semester to VIII semester.
ii. He/she should have passed all the subjects for which the internal evaluation marks secured are more than 50%
iii. Out of the subjects the candidate has failed in the examinations due to internal evaluation marks secured being less than 50%, the candidate shall be given a chance for Theory subjects and for a maximum of **three** theory subjects for improvement of internal evaluation marks.
iv. This provision is only for Theory courses. The candidate has to re-register for the chosen courses and fulfil the academic requirements (i.e., a student has to attend the classes regularly and appear for the mid-examinations and satisfy the attendance requirements to become eligible for appearing at the semester-end examinations).
v. For each subject, the candidate has to pay a prescribed fee. In the event of availing the provision of Improvement of Internal evaluation marks, the internal evaluation marks as well as the Semester-end Examinations marks secured in the previous attempt(s) for the re-registered courses shall stand cancelled.

29. Multiple Entry / Exit Option

(a) Exit Policy

The students can choose to exit the four-year programme at the end of first/second/third year.

UG Certificate in (Field of study/discipline) - Programme duration: First year (first two semesters) of the undergraduate programme, 40 credits followed by an additional exit 10-credit bridge / Skill oriented course(s) lasting two months, including at least 6- credit job-specific internship/ apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.

UG Diploma (in Field of study/discipline) - Programme duration: First two years (first four semesters) of the undergraduate programme, 80 credits followed by an additional exit 10-credit bridge / Project oriented course(s) lasting two months, including at least 6- credit job-specific internship/ apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.

Bachelor of Science (in Field of study/discipline) i.e., **B.Sc. Engineering in (Field of study/discipline)**- Programme duration: First three years (first six semesters) of the undergraduate programme, 120 credits.

(b) Entry Policy

Modalities on multiple entry by the student into the B.Tech. programme will be provided in due course of time.
Note: The Universities shall resolve any issues that may arise in the implementation of Multiple Entry and Exit policies from time to time and shall review the policies in the light of periodic changes brought by UGC, AICTE and State government.

30. Gap Year Concept

Gap year concept for Student Entrepreneur in Residence is introduced and outstanding students who wish to pursue entrepreneurship / become entrepreneur are allowed to take a break of one year at any time after II year to pursue full-time entrepreneurship programme/to establish start-ups. This period may be extended to two years at the most and these two years would not be counted for the time for the maximum time for graduation. The principal of the respective college shall forward such proposals submitted by the students to the College. An evaluation committee constituted by the College shall evaluate the proposal submitted by the student and the committee shall decide whether to permit the student(s) to avail the Gap Year or not.

31. Transitory Regulations

Discontinued, detained, or failed candidates are eligible for readmission as and when the semester is offered after fulfillment of academic regulations. Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone the course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered, subject to **section 4. (c)** and they will follow the academic regulations into which they are readmitted.

Candidates who are permitted to avail Gap Year shall be eligible for re-joining into the succeeding year of their B.Tech. from the date of commencement of class work, subject to **section 4. (c)** and they will follow the academic regulations into which they are readmitted.

32. Minimum Instruction Days for a Semester

The minimum instruction days including exams for each semester shall be 90 days.

33. Medium of Instruction

The medium of instruction of the entire B. Tech undergraduate programme in Engineering & Technology (including examinations and project reports) will be in English only.

34. Student Transfers

Student transfers shall be as per the guidelines issued by the Government of Andhra Pradesh and the Universities from time to time.

35. General Instructions

The academic regulations should be read as a whole for purpose of any interpretation.

i. Malpractices **rules-nature** and punishments are appended.
ii. Where the words "he", "him", "his", occur in the regulations, they also include "she", "her", "hers", respectively.

iii. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Head of the institution is final.
iv. The College may change or amend the academic regulations or syllabi at any time and the changes or amendments shall be made applicable to all the students on rolls with effect from the dates notified by the College.
v. In the case of any doubt or ambiguity in the interpretation of the guidelines given, the decision of the Head of the institution is final.

36. Amendments to Regulations

The Academic Council of **Sri Venkateswara College of Engineering (Autonomous)** reserves the right to revise, amend, or change the Regulations, Scheme of Examinations, and / or Syllabi or any other policy relevant to the needs of the society or industrial requirements etc., with the recommendations of the concerned Board(s) of Studies.

NOTE: FAILURE TO READ AND UNDERSTAND THE RULES & REGULATIONS IS NOT AN EXCUSE

37. Rules for Disciplinary Action for Malpractices / Improper Conduct in Examinations

S No	Nature of Malpractices/ Improper conduct	Punishment
	If the candidate	
1. (a)	Possesses or keeps accessible in Examination Hall, any paper, note book, programmable calculators, Cell phones, Pager, Palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he/she is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination).	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the Exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he/she will be handed over to the police and a case is registered against him/her.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the notice of Principal.

S No	Nature of Malpractices/ Improper conduct	Punishment
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred for four consecutive semesters from class work and all End examinations. The continuation of the course by the candidate is subject to the Academic regulations in connection with forfeiture of seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practical's and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for four consecutive semesters from class work and all end examinations, if his/her involvement is established. Otherwise, the candidate is debarred for two consecutive semesters from class work and all End examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him/her.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all End examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in Cancellation of the performance in that subject only. The answer paper or in letters to the examiners or writes to the examiner requesting him/her to award pass marks.	Cancellation of the performance in that subject only.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant - Superintendent / any Officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already

S No	Nature of Malpractices/ Improper conduct	Punishment
	organizes a walk out or instigates others to walk out, or threatens the officer-In charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-In-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. If the candidate physically assaults the invigilator/ officer-In-charge of the Examinations, then the candidate is also debarred and forfeits his/her seat. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in **clause 6** to **8**.	Student of the college's expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person (s) who do not belong to the College will be handed over to police and, a police case will be registered against them .

S No	Nature of Malpractices/ Improper conduct	Punishment
10	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as during valuation or during special scrutiny.	Cancellation of the performance in that subject only or in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester / year examinations, depending on the recommendation of the committee.
12.	If any malpractice is detected which is not covered in the above **clauses 1** to **11** shall be reported to the Principal for further action and suitable punishment.	

Note: Whenever the performance of a student is cancelled in any subject/subjects due to malpractice, he has to register for End Examinations in that subject/subjects consequently and has to fulfill all the norms required for the award of Degree.

ACADEMIC REGULATIONS (R23)
FOR B.TECH. (LATERAL ENTRY SCHEME)

(Effective for the students admitted into II year through Lateral Entry Scheme from the Academic Year **2024-25** onwards)

1. Award of the Degree

(a) Award of the B.Tech. Degree / B.Tech. Degree with a Minor if he/she fulfils the following:

i. Pursues a course of study for not less than three academic years and not more than six academic years. However, for the students availing Gap year facility this period shall be extended by two years at the most and these two years would in addition to the maximum period permitted for graduation (Six years).
ii. Registers for 120 credits and secures all 120 credits.

(b) Award of B.Tech. Degree with Honors if he/she fulfils the following:

i. Student secures additional 15 credits fulfilling all the requisites of a B.Tech. program i.e., 120 credits.
ii. Registering for Honors is optional.
iii. Honors is to be completed simultaneously with B.Tech. programme.

2. Students, who fail to fulfil the requirement for the award of the degree within six consecutive academic years from the year of admission, shall forfeit their seat.

3. Minimum Academic Requirements:

The following academic requirements have to be satisfied in addition to the requirements mentioned in item no.**2**

i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, practical, design, drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the mid semester evaluation and end examination taken together.
ii. A student shall be promoted from III year to IV year if he/she fulfils the academic requirements of securing 40% of the credits (any decimal fraction should be rounded off to lower digit) in the subjects that have been studied up to V semester. And in case if student is already detained for want of credits for particular academic year, the student may make up the credits through supplementary exams of the above exams before the commencement of IV year I semester class work of next year.

4. Course Pattern:

i. The entire course of study is three academic years on semester pattern.
ii. A student eligible to appear for the end examination in a subject but absent at it or has failed in the end examination may appear for that subject at the next supplementary examination offered.
iii. When a student is detained due to lack of credits/shortage of attendance the student may be re-admitted when the semester is offered after fulfillment of academic regulations, the student shall be in the academic regulations into which he/she is readmitted.

5. All other regulations as applicable for B. Tech. Four-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme).

COURSE STRUCTURE

B.Tech. – I Year I Semester

S. No	Course Code	Course Name	Category	Contact Periods per Week				Credits	Scheme of Examination Max. Marks		
				L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
1	EE23AES101	Basic Electrical & ElectronicsEngineering	ES	3	0	0	3	3	30	70	100
2	CH23ABS101	Chemistry	BS	3	0	0	3	3	30	70	100
3	EG23AHS101	Communicative English	HS	2	0	0	2	2	30	70	100
4	CS23AES101	Introduction to Programming	ES	3	0	0	3	3	30	70	100
5	MA23ABS101	Linear Algebra & Calculus	BS	3	0	0	3	3	30	70	100
6	CH23ABS102	Chemistry lab	BS	0	0	2	2	1	30	70	100
7	EG23AHS102	Communicative English Lab	HS	0	0	2	2	1	30	70	100
8	CS23AES102	Computer Programming Lab	ES	0	0	3	3	1.5	30	70	100
9	EE23AES102	Electrical & Electronics Engineering Workshop	ES	0	0	3	3	1.5	30	70	100
10	CH23ABS106	NSS/NCC/Scouts & Guides/Community Service	BS	0	0	1	1	0.5	100	--	100
Total				**14**	**0**	**11**	**25**	**19.5**	**370**	**630**	**1000**

B.Tech. – I Year II Semester

S. No	Course Code	Course Name	Category	Contact Periods per Week				Credits	Scheme of Examination Max. Marks		
				L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
1	ME23AES101	Basic Civil and Mechanical Engineering	ES	3	0	0	3	3	30	70	100
2	MA23ABS201	Differential Equations & Vector Calculus	BS	3	0	0	2	3	30	70	100
3	ME23AES102	Engineering Graphics	ES	1	0	4	3	3	30	70	100
4	PH23ABS101	Engineering Physics	BS	3	0	0	3	3	30	70	100
5	EC23APC201	Network Analysis	PC	3	0	0	3	3	30	70	100
6	PH23ABS102	Engineering Physics Lab	BS	0	0	2	2	1	30	70	100
7	ME23AES103	Engineering Workshop	ES	0	0	3	3	1.5	30	70	100
8	CS23AES103	IT Workshop	ES	0	0	2	2	1	30	70	100
9	EC23APC202	Network Analysis and Simulation Laboratory	PC	0	0	3	3	1.5	30	70	100
10	CH23ABS105	Health and wellness, Yoga and Sports	BS	0	0	1	1	0.5	100	--	100
Total				**13**	**0**	**15**	**25**	**20.5**	**370**	**630**	**1000**

B.Tech. – II Year I Semester

S. No	Course Code	Course Name	Category	Contact Periods per Week				Credits	Scheme of Examination Max. Marks		
				L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
1	MA23ABS305	Probability and Complex Variables	BS	3	0	0	3	3	30	70	100
2	BA23AHS302	Universal Human Values	HS	2	1	0	3	3	30	70	100
3	EC23APC301	Digital Circuits Design	PC	3	0	0	3	3	30	70	100
4	EC23APC302	Electronic Devices and Circuits	PC	3	0	0	3	3	30	70	100
5	EC23APC303	Signals, Systems and Stochastic Processes	PC	3	0	0	3	3	30	70	100
6	EC23APC304	Digital Circuits and Signal Simulation Lab	PC	0	0	3	3	1.5	30	70	100
7	EC23APC305	Electronic Devices and Circuits Lab	PC	0	0	3	3	1.5	30	70	100
8	CS23ASC302	Python Programming	SC	0	1	2	3	2	30	70	100
9	CH23AMC301	Environmental Science	MC	2	0	0	2	0	30	--	30
Total				**16**	**2**	**8**	**26**	**20**	**270**	**560**	**830**

B.Tech. – II Year II Semester

S. No	Course Code	Course Name	Category	Contact Periods per Week				Credits	Scheme of Examination Max. Marks		
				L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
1	EE23AES401	Linear Control Systems	ES	3	0	0	3	3	30	70	100
2	BA23AHS403	Managerial Economics and Financial Analysis	HS	2	0	0	2	2	30	70	100
3	EC23APC401	Analog and Digital Communications	PC	3	0	0	3	3	30	70	100
4	EC23APC402	Electronic Circuit Analysis	PC	3	0	0	3	3	30	70	100
5	EC23APC403	EM Waves and Transmission Lines	PC	3	0	0	3	3	30	70	100
6	CS23AES301	Design Thinking and Innovation	ES	1	0	2	3	2	30	70	100
7	EC23APC404	Analog and Digital Communications Lab	PC	0	0	3	3	1.5	30	70	100
8	EC23APC405	Electronic Circuit Analysis Lab	PC	0	0	3	3	1.5	30	70	100
9	EG23ASC401	Soft Skills	SC	0	1	2	3	2	30	70	100
Total				**15**	**1**	**10**	**26**	**21**	**270**	**630**	**900**
Mandatory Community Service Project Internship of 08 Weeks Duration during Summer Vacation											

I Year B.Tech. ECE – I Semester

L	T	P	C
3	0	0	3

(EE23AES101) BASIC ELECTRICAL & ELECTRONICS ENGINEERING

PART A: BASIC ELECTRICAL ENGINEERING

COURSE OBJECTIVES:

The objective of this course are to:

- To gain the knowledge about various laws, simplification techniques and principles associated with electrical circuits.
- To acquire basic knowledge about the Electric machines, their principle of operation and the concept of measuring instruments.
- To understand the concept of Power Generation, Electricity Bill and Safety Measures.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Apply the knowledge of theorems/laws to analyze the simple AC and DC circuits.
CO 2: Illustrate the operating principles of various electrical machines and electrical measuring equipment's.
CO 3: Understand the basic concepts of electrical power generation, Electricity Bill and Safety Measures.

UNIT I: (8 Periods)

DC Circuits: Electrical circuit elements (R, L and C), Ohm's Law and its limitations, KCL & KVL, series, parallel, series-parallel circuits, Super Position theorem, Simple numerical problems.

AC Circuits: A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor, Voltage and current relationship with phasor diagrams in R, L, and C circuits, Concept of Impedance, Active power, reactive power and apparent power, Concept of power factor (Simple Numerical problems).

UNIT II: (7 Periods)

Machines: Construction, principle and operation of (i) DC Motor, (ii) DC Generator, (iii) Single Phase Transformer, (iv) Three Phase Induction Motor and (v) Alternator, Applications of electrical machines.

Measuring Instruments: Construction and working principle of Permanent Magnet Moving Coil (PMMC), Moving Iron (MI) Instruments and Wheat Stone Bridge.

UNIT III: (7 Periods)

Energy Resources, Electricity Bill & Safety Measures Energy Resources: Conventional and non-conventional energy resources; Layout and operation of various Power Generation systems: Hydel, Nuclear, Solar & Wind power generation.

Electricity Bill: Power rating of household appliances including air conditioners, PCs, Laptops, Printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers.

TEXT BOOKS:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition.
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013.
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition.

REFERENCES:

1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Mc Graw Hill, 2019, Fourth Edition.
2. Principles of Power Systems, V.K. Mehtha, S.Chand Technical Publishers,2020.
3. Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press, 2017.
4. Basic Electrical and Electronics Engineering, S.K.Bhatacharya, Person Publications, 2018, Second Edition.

PART B: BASIC ELECTRONICS ENGINEERING

COURSE OBJECTIVES:

The objective of this course are to:

- To understand the working principle of various electronic devices.
- To acquire knowledge on the operating conditions of a DC power supply system, amplifiers and general electronic instrumentation system.
- To learn basic techniques in the design of a logic circuit.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Apply the concept of science and mathematics to understand the working principles of electronic devices.
CO 2: Analyze the working principle of a DC power supply system and Amplifiers.
CO 3: Solve digital logic circuits and implement using different logic gates.

UNIT I: (7 Periods)

Semiconductor Devices: Introduction - Evolution of electronics - Characteristics of PN Junction Diode - Zener Effect- Zener Diode and its Characteristics. Bipolar Junction Transistor - CB, CE, CC Configurations and Characteristics - Elementary Treatment of Small Signal CE Amplifier.

UNIT II: (8 Periods)

Basic Electronic Circuits and Instrumentation: Rectifiers and power supplies: Block diagram description of a dc power supply, working of a full wave bridge rectifier, capacitor filter (no analysis), working of simple Zener voltage regulator. Amplifiers: Block diagram of Public Address system, Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response. Electronic Instrumentation: Block diagram of an electronic instrumentation system.

UNIT III: (8 Periods)

Digital Electronics: Overview of Number Systems, Logic gates including Universal Gates, BCD codes, Excess-3 code, Gray code, Hamming code. Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR. Simple combinational circuits–Half and Full Adder, Introduction to sequential circuits, Flip flops, Registers and counters (Elementary Treatment only).

Total Periods: 45

TEXT BOOKS:

1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill,2009

REFERENCES:

1. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S. Chand &Co, 2010.
2. SantiramKal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India, 2002.
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education,2009.

I Year B.Tech. ECE – I Semester

L	T	P	C
3	0	0	3

(CH23ABS101) CHEMISTRY

COURSE OBJECTIVES:
The objective of this course are to:
- To familiarize engineering chemistry and its applications.
- To train the students on the principles and applications of electrochemistry and polymers.
- To introduce instrumental methods

COURSE OUTCOMES:
At the end of the course, the students will be able to:
- **CO 1:** Understand Schrodinger Wave equation, MOT, energy level diagrams Apply the knowledge of linear differential equations related to various engineering fields.
- **CO 2:** Apply the principle of Band diagrams in the application of conductors and semiconductors.
- **CO 3:** Compare the materials for construction of a battery and electrochemical sensors.
- **CO 4:** Explain the preparation, properties, and applications of thermoplastics & thermosetting & elastomers conducting polymers.
- **CO 5:** Explain the principles of spectrometry and separation of solid and liquid mixtures by chromatography

UNIT I: (8 Periods)
Structure and Bonding Models: Fundamentals of Quantum Mechanics-Plank's quantum theory, de-Broglie's hypothesis, Heisenberg uncertainty principle, Schrodinger Wave equation, significance of Ψ and Ψ2, molecular orbital theory – bonding in homo- and hetero nuclear diatomic molecules – energy level diagrams of O2 and CO, etc. π-molecular orbitals of butadiene and benzene, calculation of bond order.

UNIT II: (10 Periods)
Modern Engineering materials: Crystal field theory, d- orbital's splitting in tetra hedral and octa hedral complexes, Semiconductors – Introduction, doping concept, application, Super Conductors- Introduction basic concept, applications. Super capacitors-: Introduction, Basic Concept-Classification – applications. Nano materials: Introduction, classification, properties and applications of Fullerenes, carbon Nano tubes and Graphenes

UNIT III: (10 Periods)
Electrochemistry and Applications: Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, potentiometry- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations).
Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples Primary cells – Zinc-air battery, Secondary cells –lithium-ion batteries- working of the batteries including cell reactions; Fuel cells, hydrogen-oxygen fuel cell– working of the cells. Polymer Electrolyte Membrane Fuel cells (PEMFC).

UNIT IV: (8 Periods)
Polymer Chemistry: Introduction to polymers, functionality of monomers, Tactility, chain growth and step growth polymerization, co- polymerization, with specific examples and mechanisms of polymer formation.
Plastics–Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6, 6.
Elastomers–Processing and vulcanization of natural rubber, Buna-S, Buna-N– preparation, properties and applications.
Conducting polymers – poly acetylene, poly aniline, – mechanism of conduction and applications. Bio-Degradable polymer - Poly Glycolic Acid (PGA).

UNIT V: **(9 Periods)**

Instrumental Methods and Applications: Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. UV- Visible Spectroscopy- electronic transition, Instrumentation and applications, IR spectroscopy- principle, Instrumentation and applications. Chromato graphy-Basic Principle, Classification-HPLC: Principle, Instrumentation and Applications.

Total Periods: 45

TEXT BOOKS:

1. Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical.Chemistry,10/e, Oxford University Press, 2010.
3. Vogel's quantitative chemical analysis, 6th edition-2009.

REFERENCES:

1. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson,2007.
2. J.D. Lee, Concise Inorganic Chemistry, 5th Edition, Wiley Publications, Feb.2008
3. Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition
4. Chemistry Mc GrawHill, K.N.Jayaveera, G.V. Subba Reddy and C. Rama Chandraiah

I Year B.Tech. ECE – I Semester

L	T	P	C
2	0	0	2

(EG23AHS101) COMMUNICATIVE ENGLISH

COURSE OBJECTIVES:
The objective of this course are to:

- To facilitate effective listening, Reading, Speaking and Writing skills among the students.
- It enhances the same in their comprehending abilities, oral presentations, reporting useful information and providing knowledge of grammatical structures and vocabulary.
- This course helps the students to make them effective in speaking and writing skills and to make them industry ready.

COURSE OUTCOMES:
After successful completion of the course, students will be able to:

CO 1: Understand the context, topic, and pieces of specific information from socialor Transactional dialogues.
CO 2: Apply grammatical structures to formulate and correct word forms.
CO 3: Analyze discourse markers to speak clearly on a specific topic in informal discussions.
CO 4: Evaluate reading/listening texts and write summaries based on global comprehension of these texts.
CO 5: Create a coherent paragraph, essay, and resume.

UNIT I: **(6 Periods)**
Lesson: HUMAN VALUES: The Gift of the Magi (Short Story)
Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.
Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.
Reading: Skimming to get the main idea of a text; scanning to look for specific pieces of information. Writing: Mechanics of Writing-Capitalization, Spellings, Punctuation-Parts of Sentences.
Grammar: Parts of Speech, Basic Sentence Structures-forming questions.
Writing: Synonyms, Antonyms, Affixes (Prefixes/Suffixes), Root words.

UNIT II: **(7 Periods)**
Lesson: NATURE: The Brook by Alfred Tennyson (Poem)
Listening: Answering a series of questions about main ideas and supporting ideas after listening to audio texts.
Speaking: Discussion in pairs/small groups on specific topics followed by short structure talks.
Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.
Writing: Structure of a paragraph - Paragraph writing (specific topics)
Grammar: Cohesive devices - linkers, use of articles and zero article; prepositions.
Vocabulary: Homonyms, Homophones, Homographs.

UNIT III: **(6 Periods)**
Lesson: BIOGRAPHY: Elon Musk
Listening: Listening for global comprehension and summarizing what is listened to.
Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed.

Reading: Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension.

Writing: Summarizing, Note-making, paraphrasing.
Grammar: Verbs - tenses; subject-verb agreement; Compound words, Collocations.
Vocabulary: Compound words, Collocation.

UNIT IV: **(5 Periods)**
Lesson: INSPIRATION: The Toys of Peace by Saki
Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.
Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.
Reading: Studying the use of graphic elements in texts to convey information, reveal trends / patterns / relationships, communicate processes or display complicated data.
Writing: Letter Writing: Official Letters, Resumes
Grammar: Reporting verbs, Direct & Indirect speech, Active & Passive Voice.
Vocabulary: Words often confused, Jargons.

UNIT V: **(6 Periods)**
Lesson: MOTIVATION: The Power of Intrapersonal Communication (An Essay)
Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension.
Speaking: Formal oral presentations on topics from academic contexts
Reading: Reading comprehension.
Grammar: Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement).
Vocabulary: Technical Jargons

Total Periods: 30

TEXT BOOKS:

1. Pathfinder: Communicative English for Undergraduate Students, 1st Edition, Orient Black Swan, 2023 (Units 1,2 & 3).
2. Empowering with Language by Cengage Publications, 2023 (Units 4 & 5).

REFERENCES:

1. Dubey, Sham Ji & Co. English for Engineers, Vikas Publishers, 2020
2. Bailey, Stephen. Academic writing: A Handbook for International Students. Routledge, 2014.
3. Murphy, Raymond. English Grammar in Use, Fourth Edition, Cambridge University Press, 2019.
4. Lewis, Norman. Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary. Anchor, 2014.

ONLINE RESOURCES:
Grammar:

1. www.bbc.co.uk/learningenglish
2. https://dictionary.cambridge.org/grammar/british-grammar/
3. www.eslpod.com/index.html
4. https://www.learngrammar.net/
5. https://english4today.com/english-grammar-online-with-quizzes/
6. https://www.talkenglish.com/grammar/grammar.aspx

Vocabulary:

1. https://www.youtube.com/c/DailyVideoVocabulary/videos
2. https://www.youtube.com/channel/UC4cmBAit8i_NJZE8qK8sfpA

I Year B.Tech. ECE – I Semester

L	T	P	C
3	0	0	3

(CS23AES101) INTRODUCTION TO PROGRAMMING

COURSE OBJECTIVES:
The objective of this course are to:
- To learn how to solve a given problem.
- To illustrate the basic concepts of C programming language.
- To discuss the concepts of Functions, Arrays, Pointers and Structures.
- To familiar with Dynamic memory allocation concepts.
- To apply concepts of structures and files to solve real word problems.

COURSE OUTCOMES:
After successful completion of the course, students will be able to:
- **CO 1:** Solve computational problems.
- **CO 2:** Select the features of C language appropriate for solving a problem.
- **CO 3:** Design computer programs for real world problems.
- **CO 4:** Organize the data which is more appropriated for solving a problem.
- **CO 5:** Understanding the basic concept of structures and file handling.

UNIT I: (10 Periods)
Introduction to Problem Solving: Problem Solving Aspect, Problem Identification, Problem Understanding, Algorithm Development, Solution Planning, characteristics of algorithm, Top-down approach, Bottom-up approach, Time and space complexities of algorithms, Flowchart.
Overview of C: History of C, C Language Elements, Basic Structure of C Program, C Tokens-Variables and Data Types, Operators, Expressions and Type Conversions.

UNIT II: (8 Periods)
Control Statements: Selection Statements- if and switch statements.
Iterative Statements: for, while and do-while statements.
Jump Statements: break, continue, go to statements.

UNIT III: (8 Periods)
Arrays: Declaration, accessing array elements, Storing values, Operations on arrays, multi-dimensional arrays.
Functions: Introduction, Using Functions, Function declaration, Function definition and Function call, Parameter passing, Passing arrays to functions, Recursion, Storage classes.

UNIT IV: (10 Periods)
Pointers: Declaration and Initialization of pointer variables, Pointer arithmetic, Pointers and arrays, Pointer to pointer, Array of pointers, Pointers and functions, Dynamic Memory Allocation.
Strings: Introduction to Strings, String handling functions, Preprocessor Directives.

UNIT V: (9 Periods)
Structures: Introduction, Nested Structures, Array of Structures, Structures and Functions, Unions.
Files in C: Using Files in C, read data from Files, Writing data to Files, Random access to files, Command-line Arguments

Total Periods: 45

TEXT BOOKS:
1. B. A. Forouzan and R. F. Gilberg, Computer Science: A Structured Programming Approach Using C, 3/e, Cengage Learning, 2007.

2. Problem solving with C, M.T.Somashekara, PHI

REFERENCES:

1. Jeri R. Hanly, Ellot B. Koffman, Problem Solving and Program Design in C, 5/e, Pearson
2. Brian W Kernighan and Dennis M Ritchie, The C Programming Language, Second Edition, Prentice Hall Publication.
3. Reema Thareja, Programming in C, Oxford University Press, AICTE Edition, 2018.
4. R.G. Dromey, "How to Solve it by Computer". 2014, Pearson.

I Year B.Tech. ECE – I Semester

L	T	P	C
3	0	0	3

(MA23ABS101) LINEAR ALGEBRA & CALCULUS

COURSE OBJECTIVES:
The objective of this course are to:

- This course will illuminate the students in the concepts of calculus and linear algebra.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

COURSE OUTCOMES:
After successful completion of the course, students will be able to:

CO 1: Understanding the concepts of matrix algebra techniques to solve the system of linear equations.
CO 2: Develop the use of matrix algebra techniques that is needed by engineers for practical applications.
CO 3: Apply mean value theorems to solve real life problems in engineering.
CO 4: Make use of partial differentiation to solve optimization problems.
CO 5: Familiarize with double and triple integrals of functions of several variables in two dimensions using Cartesian and polar coordinates and in three dimensions using cylindrical and spherical coordinates.

UNIT I: (8 Periods)
Matrices: Rank of a matrix by echelon form, normal form, Cauchy–Binet formulae (without proof). Inverse of Non- singular matrices by Gauss-Jordan method, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Jacobi and Gauss Seidel Iteration Methods.

UNIT II: (10 Periods)
Eigenvalues, Eigenvectors and Orthogonal Transformation: Eigenvalues, Eigenvectors and their properties, Diagonalization of a matrix, Cayley- Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley- Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT III: (7 Periods)
Calculus: Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem with their geometrical interpretation, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof), Problems and applications on the above theorems.

UNIT IV: (10 Periods)
Partial differentiation and Applications (Multi variable calculus): Functions of several variables: Continuity and Differentiability, Partial derivatives, total derivatives, chain rule, Taylor's and Maclaurin's series expansion of functions of two variables. Jacobians, Functional dependence, maxima and minima of functions of two variables, method of Lagrange multipliers.

UNIT V: (10 Periods)
Multiple Integrals (Multi variable Calculus): Double integrals, triple integrals, change of order of integration, change of variables to polar, cylindrical and spherical coordinates. Finding areas (by double integrals) and volumes (by double integrals and triple integrals).

Total Periods: 45

TEXT BOOKS:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers,2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.

REFERENCES:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
3. GlynJames, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 2011.
4. B. V. Ramana, Higher Engineering Mathematics, McGraw Hill Education
5. H. k Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand.
6. N. Bali, M. Goyal, C. Watkins, Advanced Engineering Mathematics, Infinity Science Press.

I Year B.Tech. ECE – I Semester

L	T	P	C
0	0	2	1

(CH23ABS102) CHEMISTRY LAB

COURSE OBJECTIVES:
The objective of this course are to:
- Verify the fundamental concepts with experiments.

COURSE OUTCOMES:
At the end of the course, the students will be able to:
CO 1: To verify Beer Lambert's law
CO 2: To analyse the IR and NMR spectra of some organic compounds
CO 3: To apply electro analytical techniques foe sample analysis.
CO 4: To measure the strength of an acid present in the samples.
CO 5: To prepare advanced polymer materials.

List of Experiments:
1. Measurement of 10Dq by spectrophotometric method
2. Conductometric titration of strong acid vs. strong base
3. Conductometric titration of weak acid vs. strong base
4. Determination of cell constant and conductance of solutions
5. Potentiometry - determination of redox potentials and emfs
6. Determination of Strength of an acid in Pb-Acid battery
7. Preparation of Bakelite
8. Verify Lambert-Beer's law
9. Wavelength measurement of sample through UV-Visible Spectroscopy
10. Identification of simple organic compounds by IR
11. Preparation of nanomaterials by precipitation method
12. Estimation of Ferrous Iron by Dichrometry

REFERENCES:
1. "Vogel's Quantitative Chemical Analysis 6th Edition 6th Edition" Pearson Publications by J. Mendham, R.C. Denney, J.D. Barnes and B. Sivasankar.

I Year B.Tech. ECE – I Semester

L	T	P	C
0	0	2	1

(EG23AHS102) COMMUNICATIVE ENGLISH LAB

COURSE OBJECTIVES:

The objective of this course are to:

- To expose the students to a variety of self-instructional, learner friendly modes of language learning.
- The students will get trained in basic communication skills and also make them ready to face job interviews.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Understand the different aspects of the English language proficiency with an emphasis on LSRW skills.
CO 2: Apply communication skills through various language learning activities.
CO 3: Analyze the English speech sounds, stress, rhythm, intonation, and syllable division for better listening and speaking comprehension.
CO 4: Evaluate and exhibit professionalism in participating in debates and group discussions.
CO 5: Create effective Course Objectives.

List of Topics:

1. Vowels & Consonants
2. Neutralization/Accent Rules
3. Communication Skills & JAM
4. Role Play or Conversational Practice
5. E-mail Writing
6. Resume Writing, Cover letter, SOP
7. Group Discussions-methods & practice
8. Debates - Methods & Practice
9. PPT Presentations/ Poster Presentation
10. Interviews Skills

Suggested Software:

- Walden InfoTech
- Young India Films

REFERENCES:

1. Raman Meenakshi, Sangeeta-Sharma. Technical Communication Oxford Press.2018.
2. Taylor Grant: English Conversation Practice, Tata McGraw-Hill Education India, 2016.
3. Hewing's, Martin. Cambridge Academic English (B2). CUP, 2012.
4. J. Sethi & P.V. Dhamija. A Course in Phonetics and Spoken English, (2nd Ed), Kindle, 2013

ONLINE RESOURCES:

Spoken English:

1. www.esl-lab.com
2. www.englishmedialab.com
3. www.englishinteractive.net
4. https://www.britishcouncil.in/english/online
5. http://www.letstalkpodcast.com/
6. https://www.youtube.com/c/mmmEnglish_Emma/featured
7. https://www.youtube.com/c/ArnelsEverydayEnglish/featured
8. https://www.youtube.com/c/engvidAdam/featured

9. https://www.youtube.com/c/EnglishClass101/featured
10. https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists
11. https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw

VOICE AND ACCENT:

1. https://www.youtube.com/user/letstalkaccent/videos
2. https://www.youtube.com/c/EngLanguageClub/featured
3. https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc
4. https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_IA

I Year B.Tech. ECE – I Semester

L	T	P	C
0	0	3	1.5

(CS23AES102) COMPUTER PROGRAMMING LAB

COURSE OBJECTIVES:
The objective of this course are to:

- To use basic data types, operators, expressions and expression evaluation mechanisms using C Programming Language.
- To implement control flows, construct in C Programming Language and understand the syntax, semantics and usability contexts of these different constructs.
- To develop composite data types in C and constructs available to develop their datatypes, utilize them to model things and dealing with data from and to external files.
- To design programs with different variations of the constructs available for practicing modular programming and understand the pros and cons of using different variants and apply optimization.

COURSE OUTCOMES:
After successful completion of the course, students will be able to:

CO 1: Read, understand and trace the execution of programs written in C language.
CO 2: Select the right control structure for solving the problem.
CO 3: Develop C programs which utilize the memory efficiently using programming constructs like pointers.
CO 4: Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.

WEEK 1:
Objective: Getting familiar with the programming environment on the computer and writing the first program.
Activities:
Tutorial 1: Problem-solving using Computers.
Lab1: Familiarization with programming environment

- Basic Linux environment and its editors like Vi, Vim & Emacs etc.
- Exposure to Turbo C, gcc.
- Writing simple programs using printf (), scanf ()

WEEK 2:
Objective: Getting familiar with how to formally describe a solution to a problem in a series of finite steps both using textual notation and graphic notation.
Activities:
Tutorial 2: Problem-solving using Algorithms and Flow charts.
Lab 1: Converting algorithms/flow charts into C Source code. Developing the algorithms/flowcharts for the following sample programs

- Sum and average of 3 numbers
- Conversion of Fahrenheit to Celsius and vice versa
- Simple interest calculation

WEEK 3:
Objective: Learn how to define variables with the desired data-type, initialize them with appropriate values and how arithmetic operators can be used with variables and constants.
Activities:
Tutorial 3: Variable types and type conversions:
Lab 2: Simple computational problems using arithmetic expressions.

- Finding the square root of a given number
- Finding compound interest

- Area of a triangle using heron's formulae
- Distance travelled by an object

WEEK 4:
Objective: Explore the full scope of expressions, type-compatibility of variables & constants and operators used in the expression and how operator precedence works.
Activities:
Tutorial 4: Operators and the precedence and as associativity:
Lab 3: Simple computational problems using the operator precedence and associativity

i) Evaluate the following expressions.
   a. A+B*C+(D*E) + F*G
   b. A/B*C-B+A*D/3
   c. A+++B---A
   d. J= (i++) + (++i)

ii) Find the maximum of three numbers using conditional operator.
iii) Take marks of 5 subjects in integers, and find the total, average in float

WEEK 5:
Objective: Explore the full scope of different variants of "if construct" namely if- else, null-else, if-else if*-else, switch and nested-if including in what scenario each one of them can be used and how to use them. Explore all relational and logical operators while writing conditionals for "if construct".
Suggested Experiments/Activities:
Tutorial 5: Branching and logical expressions:
Lab 4: Problems involving if-then-else structures.

i. Write a C program to find the max and min of four numbers using if-else.
ii. Write a C program to generate electricity bill.
iii. Find the roots of the quadratic equation.
iv. Write a C program to simulate a calculator using switch case.
v. Write a C program to find the given year is a leap year or not.

WEEK 6:
Objective: Explore the full scope of iterative constructs namely while loop, do- while loop and for loop in addition to structured jump constructs like break and continue including when each of these statements is more appropriate to use.
Activities:
Tutorial 6: Loops, while and for loops
Lab 5: Iterative problems e.g., the sum of series

i. Find the factorial of given number using any loop.
ii. Find the given numberis a prime or not.
iii. Compute sine and cos series.
iv. Checking a number palindrome.
v. Construct a pyramid of numbers.

WEEK 7:
Objective: Explore the full scope of Arrays construct namely defining and initializing 1-D and 2-D and more generically n-D arrays and referencing individual array elements from the defined array. Using integer 1-D arrays, explore search solution linear search.
Activities:
Tutorial 7: 1 D Arrays: searching.
Lab 6:1D Array manipulation, linear search

i. Find the min and max of a 1-D integer array.
ii. Perform linear search on1Darray.
iii. The reverse of a 1D integer array
iv. Find 2's complement of the given binary number.
v. Eliminate duplicate elements in an array.

WEEK 8:
Objective: Explore the difference between other arrays and character arrays that can be used as Strings by using null character and get comfortable with string by doing experiments that will reverse a string and concatenate two strings. Explore sorting solution bubble sort using integer arrays.
Activities:
Tutorial 8: 2 D arrays, sorting and Strings.
Lab 7: Matrix problems, String operations, Bubble sort

i. Addition of twomatrices
ii. Multiplication two matrices
iii. Sort array elements using bubble sort
iv. Concatenate two strings without built-in functions
v. Reverse a string using built-in and without built-in string functions

WEEK 9:
Objective: Explore the Functions, sub-routines, scope and extent of variables, doing some experiments by parameter passing using call by value. Basic methods of numerical integration
Activities:
Tutorial 9: Functions, call by value, scope and extent,
Lab 8: Simple functions using call by value, solving differential equations using Eulers theorem

i. Write a C function to calculate NCR value
ii. Write a C function to find the length of a string
iii. Write a C function to transpose of a matrix
iv. Write a C function to demonstrate numerical integration of differential equations using Euler's method

WEEK 10:
Objective: Explore how recursive solutions can be programmed by writing recursive functions that can be invoked from the main by programming at-least five distinct problems that have naturally recursive solutions.
Activities:
Tutorial 10: Recursion, the structure of recursive calls
Lab 9: Recursive functions

i. Write a recursive function to generate Fibonacci series
ii. Write a recursive function to find the lcm of two numbers
iii. Write arecursive function to find the factorial of a number
iv. Write a C Program to implement Ackermann function using recursion
v. Write a recursive function to find the sum of series.

WEEK 11:
Objective: Explore the basic difference between normal and pointer variables, Arithmetic operations using pointers and passing variables to functions using pointers
Activities:
Tutorial 11: Call by reference, dangling pointers
Lab 10: Simple functions using Call by reference, Dangling pointers

i. Write a C program to swap two numbers using call by reference
ii. Demonstrate Dangling pointer problem using a C program
iii. Write a C program to copy one string into another using pointer
iv. Write a C program to find no of lowercase, uppercase, digits and other characters using pointers.

WEEK 12:
Objective: Explore pointers to manage a dynamic array of integers, including memory allocation & value initialization, resizing changing and reordering the contents of an array and memory de-allocation using malloc (), calloc (), realloc () and free () functions. Gain experience processing command-line arguments received by C.

Suggested Experiments/Activities:
Tutorial 12: Pointers, structures and dynamic memory allocation
Lab 11: Pointers and structures, memory dereference.

i. Write a C program to find the sum of a 1D array using malloc()
ii. Write a C program to find the total, average of n students using structures
iii. Enter n students data using calloc() and display failed students list
iv. Read student name and marks from the command line and display the student details along with the total.
v. Write a C program to implement realloc()

WEEK 13:
Objective: Experiment with C Structures, Unions, bit fields and nested structures
Activities:
Tutorial 13: Bit fields, Self-Referential Structures, Linked lists
Lab 12: Bit fields, linked lists Read and print a date using dd/mm/yyyy format using bit-fields and differentiate the same without using bit- fields

i. Demonstrate the differences between structures and unions using a C program
ii. Write a C program to shift/rotate using bitfields.
iii. Write a C program to copy one structure variable to another structure of the same type.

WEEK14:
Objective: To understand data files and file handling with various file I/O functions. Explore the differences between text and binary files.
Activities:
Tutorial 14: File handling
Lab 13: File operations

i. Write a C program to write and read text into a file.
ii. Write a C program to write and read text into a binary file using fread() and fwrite().
iii. Copy the contents of one file to another file.
iv. Write a C program to merge two files into the third file using command-line arguments.
v. Find no. of lines, words and characters in a file
vi. Write a C program to print last n characters of a given file.

TEXT BOOKS:

1. Ajay Mittal, Programming in C: A practical approach, Pearson.
2. Byron Gottfried, Schaum' s Outline of Programming with C, McGraw Hill.

REFERENCES:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice- Hall of India.
2. C Programming, A Problem-Solving Approach, Forouzan, Gilberg, Prasad, Cengage.

I Year B.Tech. ECE – I Semester

L	T	P	C
0	0	3	1.5

(EE23AES102) ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP

PART A: ELECTRICAL ENGINEERING LAB

COURSE OBJECTIVES:

The objective of this course are to:

- To gain the practical knowledge about various laws/theorems for the given circuit.
- To acquire knowledge about various electrical measuring instruments and safety measures.
- To obtain the performance characteristics of DC generator.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Understand the concept of KCL, KVL and Theorems practically for the given circuit.
CO 2: Evaluate the resistance, power and power factor of circuit elements by using measuring instruments.
CO 3: Obtain the Magnetization Characteristics of DC shunt Generator

List of Experiments:

1. Verification of KCL and KVL
2. Verification of Superposition theorem
3. Measurement of Resistance using Wheat stone bridge
4. Magnetization Characteristics of DC shunt Generator
5. Measurement of Power and Power factor using Single-phase wattmeter
6. Measurement of Earth Resistance using Megger
7. Calculation of Electrical Energy for Domestic Premises

REFERENCES:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition.
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013.
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition.

Note: Minimum Six Experiments to be performed.

PART B: ELECTRONICS ENGINEERING LAB

COURSE OBJECTIVES:

The objective of this course are to:

- To gain hands on experience in testing various electronic components.
- To acquire knowledge related to the use of electronic measuring instruments for different applications.
- To design and simulate a RC coupled amplifier.
- To verify the operating conditions of combinational and sequential circuits.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Identify & Test various electronic components.
CO 2: Employ various electronic measuring instruments for different applications.
CO 3: Evaluate the biasing conditions of various diodes and BJTs.
CO 4: Examine the operating conditions of a digital circuit

List of Experiments:

1. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
2. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.
3. Implementation of half wave and full wave rectifiers
4. Plot Input & Output characteristics of BJT in CE and CB configurations
5. Frequency response of CE amplifier.
6. Simulation of RC coupled amplifier with the design supplied
   i. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
7. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs. Tools / Equipment Required: DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices.

REFERENCES:

1. R. L. Boylestad& Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education, 2009.

Note: Minimum Six Experiments to be performed. All the experiments shall be implemented using both Hardware and Software.

I Year B.Tech. ECE – I Semester

L	T	P	C
0	0	1	0.5

(CH23ABS106) NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVICE

COURSE OBJECTIVES:

The objective of this course are to:

- The objective of introducing this course is to impart discipline, character, fraternity, teamwork, social consciousness among the students and engaging them in selfless service.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Understand the importance of discipline, character and service motto.
CO 2: Solve some societal issues by applying acquired knowledge, facts, and techniques.
CO 3: Explore human relationships by analyzing social problems.
CO 4: Determine to extend their help for the fellow beings and downtrodden people.
CO 5: Develop leadership skills and civic responsibilities

UNIT I:

Orientation: General Orientation on NSS/NCC/ Scouts & Guides/Community Service activities, career guidance.

Activities:

i) Conducting –ice breaking sessions-expectations from the course- knowing personal talents and skills
ii) Conducting orientations programs for the students –future plans- activities-releasing road map etc.
iii) Displaying success stories-motivational biopics- award winning movies on societal issues etc.
iv) Conducting talent show in singing patriotic songs-paintings-any other contribution.

UNIT II:

Nature & Care

Activities:

i) Best out of waste competition.
ii) Poster and signs making competition to spread environmental awareness.
iii) Recycling and environmental pollution article writing competition.
iv) Organising Zero-waste day.
v) Digital Environmental awareness activity via various social media platforms.
vi) Virtual demonstration of different eco-friendly approaches for sustainable living.
vii) Write a summary on any book related to environmental issues.

UNIT III:

Community Service

Activities:

i) Conducting One Day Special Camp in a village contacting village-area leaders-Survey in the village, identification of problems- helping them to solve via media-authorities experts-etc.
ii) Conducting awareness programs on Health-related issues such as General Health, Mental health, Spiritual Health, HIV/AIDS,
iii) Conducting consumer Awareness. Explaining various legal provisions etc.
iv) Women Empowerment Programmes- Sexual Abuse, Adolescent Health and Population Education.
v) Any other programmes in collaboration with local charities, NGOs etc.

REFERENCES:

1. Nirmalya Kumar Sinha & Surajit Majumder, A Text Book of National Service Scheme Vol;.I, Vidya Kutir Publication, 2021 (ISBN 978-81- 952368-8-6)
2. Red Book - National Cadet Corps – Standing Instructions Vol I & II, Directorate General of NCC, Ministry of Defence, New Delhi
3. Davis M. L. and Cornwell D. A., "Introduction to Environmental Engineering", McGraw Hill, New York 4/e 2008
4. Masters G. M., Joseph K. and Nagendran R. "Introduction to Environmental Engineering and Science", Pearson Education, New Delhi. 2/e 2007 5. Ram Ahuja. Social Problems in India, Rawat Publications, New Delhi.

I Year B.Tech. ECE – II Semester

L	T	P	C
3	0	0	3

(ME23AES101) BASIC CIVIL & MECHANICAL ENGINEERING

PART A: BASIC CIVIL ENGINEERING

COURSE OBJECTIVES:

The objective of this course are to:

- Get familiarized with basic Construction Materials; the scope and importance of Civil Engineering specializations.
- Introduce the preliminary concepts of Structural and Geotechnical Engineering.
- Acquire preliminary knowledge on Surveying and Transportation Engineering.
- Get familiarized with the importance of Water Resources and Environmental Engineering.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society and the basic characteristics of Construction Materials.

CO 2: Gain knowledge regarding Structural and Geotechnical Engineering.

CO 3: Explain the concepts of surveying and Transportation Engineering, Water Resources and Environmental Engineering.

UNIT I: (8 Periods)

Basics of Civil Engineering: Role of Civil Engineers in Society- Various Disciplines of Civil Engineering- Structural Engineering- Geo-Technical Engineering- Transportation Engineering - Hydraulics and Water Resources Engineering - Environmental Engineering- Scope of each discipline.

Construction Materials - Cement – Sand - Aggregate - Bricks- Cement concrete – Steel - Timber.

UNIT II: (7 Periods)

Structural Engineering: Importance- Types of Structures and structural Members- Building Components –Building Planning principles.

Geotechnical Engineering: Types of Foundations-Functions and Requirement of a good foundation

UNIT III: (8 Periods)

Surveying & Transportation Engineering: Objectives and Principles of Surveying- Instruments used in Surveying-Importance of Transportation in Nation's economic development- Modes of Transportation- Types of Highway Pavements- Flexible Pavements and Rigid Pavements -Traffic signals and signs.

Water Resources and Environmental Engineering: Introduction to Hydrology– hydrological cycle- Sources of water- Quality of water- Specifications- Rainwater Harvesting- Water Storage and Conveyance Structures- Dams and Reservoirs-types and components.

TEXT BOOKS:

1. Basic Civil Engineering, M.S. Palanisamy, Tata Mc Graw Hill publications (India) Pvt., Ltd., Fourth Edition.
2. Introduction to Civil Engineering, S.S. Bhavikatti, New Age International Publishers, 2022, First Edition.
3. Basic Civil Engineering, Satheesh Gopi, Pearson Publications, 2009, First Edition.

REFERENCES:

1. Surveying, Vol – I and Vol - II, S.K.Duggal, Tata McGraw Hill Publishers2019, Fifth Edition.

2. Hydrology and Water Resources Engineering, Santosh Kumar Garg, Khanna Publishers, Delhi, 2016.
3. Irrigation Engineering and Hydraulic Structures –Santosh Kumar Garg, Khanna Publishers, Delhi 2023, 38thEdition.
4. Highway Engineering, S.K.Khanna, C.E.G.Justoand Veeraraghavan, Nemchandand Brothers Publications2019. 10thEdition.
5. Indian Standard DRINKING WATER — SPECIFICATIONIS 10500-2012.

PART B: BASIC MECHANICAL ENGINEERING

COURSE OBJECTIVES:

The objective of this course are to:

- Get familiarized with the scope and importance of Mechanical Engineering in different sectors and industries.
- Understand and familiarize the different engineering materials and different manufacturing processes.
- Get an overview of different thermal and mechanical transmission systems and introduce basics of robotics and its applications.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Understand the different manufacturing processes.
CO 2: Explain the basics of thermal engineering and its applications.
CO 3: Describe the working of different mechanical power transmission systems and power plants and describe the basics of robotics and its applications.

UNIT I: (7 Periods)

Introduction to Mechanical Engineering: Role of Mechanical Engineering in Industries and Society- Technologies in Different Sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine Sectors.

Engineering Materials: Metals-Ferrous and Non-Ferrous, Ceramics, Composites, Smart Materials.

UNIT II: (8 Periods)

Manufacturing Processes: Principles of Casting, Forming, Joining Processes, Machining, Introduction to CNC Machines, 3D Printing, and Smart Manufacturing.

Thermal Engineering – Working Principle of Boilers, Otto Cycle, Diesel Cycle, Refrigeration and Air-Conditioning Cycles, IC Engines, 2-Stroke and 4-Stroke Engines, SI/CI Engines, Components of Electric and Hybrid Vehicles.

UNIT III: (7 Periods)

Power Plants – Working Principle of Steam, Diesel, Hydro, Nuclear Power Plants.

Mechanical Power Transmission - Belt Drives, Chain, Rope drives, Gear Drives and their applications.

Introduction to Robotics - Joints & Links, Configurations and Applications of Robotics.

Total Periods: 45

TEXT BOOKS:

1. Internal Combustion Engines by V.Ganesan, By Tata McGraw Hill publications (India) Pvt. Ltd.
2. A Tear book of Theory of Machines by S.S. Rattan, Tata McGraw Hill Publications, (India) Pvt. Ltd.
3. An introduction to Mechanical Engg by Jonathan Wicker and Kemper Lewis, Cengage learning India Pvt. Ltd.

REFERENCES:

1. Appuu Kuttan KK, Robotics, I.K. International Publishing House Pvt. Ltd. Volume-I
2. 3D printing & Additive Manufacturing Technology- L. Jyothish Kumar, Pulak M Pandey, Springer publications
3. Thermal Engineering by Mahesh M Rathore Tata McGraw Hill publications (India) Pvt. Ltd.
4. G. Shanmugam and M.S.Palanisamy, Basic Civil and the Mechanical Engineering, Tata McGraw Hill publications (India) Pvt. Ltd.

I Year B.Tech. ECE – II Semester

L	T	P	C
3	0	0	3

(MA23ABS201) DIFFERENTIAL EQUATIONS & VECTOR CALCULUS

COURSE OBJECTIVES:

The objective of this course are to:

- To enlighten the learners in the concept of differential equations and multivariable calculus.
- To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real world applications.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Familiarize to solve the first and higher order differential equations.
CO 2: Apply the knowledge of linear differential equations related to various engineering fields.
CO 3: Identify solution methods for partial differential equations that model physical processes.
CO 4: Interpret the physical meaning of different operators such as gradient, curl and divergence.
CO 5: Evaluate the work done by force field, circulation and transformation between single, double and triple integrals using vector calculus.

UNIT I: (8 Periods)

Differential Equations: Linear differential equations – Bernoulli's equations- Exact equations and equations reducible to exact form. Applications: Newton's Law of cooling – Law of natural growth and decay, Electrical circuits.

UNIT II: (10 Periods)

Linear Differential Equations of Higher Order: Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskian, Method of variation of parameters. Simultaneous linear equations, Applications to L-C-R Circuit problems and Simple Harmonic motion.

UNIT III: (10 Periods)

Partial Differential Equations: Introduction, Formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order linear equations using Lagrange's method. Homogenous linear Partial Differential equations with constant coefficients.

UNIT IV: (8 Periods)

Vector Differentiation: Scalar and vector point functions, vector operator Del, Del applies to scalar point functions, Gradient, Directional derivative, del applied to vector point functions- Divergence and Curl, vector identities.

UNIT V: (9 Periods)

Vector Integration: Line integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and related problems.

Total Periods: 45

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, 44/e, Khanna publishers, 2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.

REFERENCES:

1. Dennis G. Zill and Warren S. Wright, Advanced Engineering Mathematics, Jones andBartlett,2011.
2. Michael Greenberg, Advanced Engineering Mathematics, 2/e, Pearson, 2018.
3. George B.Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
4. R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
5. B. V. Ramana, Higher Engineering Mathematics, McGraw Hill Education.
6. H. K Dass, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand.
7. N. Bali, M.Goyal, C. Watkins, Advanced Engineering Mathematics, Infinity Science Press.

I Year B.Tech. ECE – II Semester

L	T	P	C
1	0	4	3

(ME23AES102) ENGINEERING GRAPHICS

COURSE OBJECTIVES:
The objective of this course are to:
- Enable with various concepts like dimensioning, conventions and standards related to engineering drawing.
- Impart knowledge on the projection of points, lines and plane surfaces.
- Improve the visualization skills for better understanding of projection of solids.
- Develop the imaginative skills required to understand section of solids and developments of surfaces.
- Draw the viewing perception of a solid object in isometric and orthographic projections.

COURSE OUTCOMES:
After successful completion of the course, students will be able to:
CO 1: Draw various engineering curves, scales.
CO 2: Draw and Interpret orthographic projections of points, lines, planes.
CO 3: Draw the projection of solids in various positions.
CO 4: Draw and Explore the sections of solids and development of surfaces.
CO 5: Draw an isometric and orthographic views of simple solids.

UNIT I: (2 Periods and 8 Practical's)
Introduction to Engineering Drawing: Lines, Lettering and Dimensioning, Geometrical Constructions and Constructing Regular Polygons by General Methods.
Curves: Construction of Ellipse, Parabola and Hyperbola by General Method, Cycloids, Involutes, Normal and Tangent to Curves.
Scales: Plain Scales, Diagonal Scales and Vernier Scales.

UNIT II: (3 Periods and 12 Practical's)
Orthographic Projections: Reference Plane, Importance of Reference Lines or Plane, Projections of a Point Situated in any One of the Four Quadrants.
Projections of Straight Lines: Projections of Straight Lines Parallel to both Reference Planes, Perpendicular to One Reference Plane and Parallel to other Reference Plane, Inclined to one Reference Plane and Parallel to the other Reference Plane. Projections of Straight Line Inclined to both the Reference Planes.
Projections of Planes: Regular Planes Perpendicular to both Reference Planes, Parallel to One Reference Plane and Inclined to the other Reference Plane; Plane Inclined to both the Reference Planes.

UNIT III: (3 Periods and 12 Practical's)
Projections of Solids: Types of Solids: Polyhedra and Solids of Revolution. Projections of Solids in Simple Positions: Axis Perpendicular to Horizontal Plane, Axis Perpendicular to Vertical Plane and Axis Parallel to both the Reference Planes, Projection of Solids with Axis Inclined to One Reference Plane and Parallel to another Plane, Projection of Solids Inclined to both the Reference Planes.

UNIT IV: (3 Periods and 12 Practical's)
Sections of Solids: Perpendicular and Inclined Section Planes, Sectional Views and True Shape of Section, Sections of Solids in Simple Position only.
Development of Surfaces: Methods of Development: Parallel Line Development and Radial Line Development. Development of a Cube, Prism, Cylinder, Pyramid and Cone.

UNIT V: (4 Periods and 16 Practical's)

Conversion of Views: Conversion of Isometric Views to Orthographic Views of Simple Solids; Conversion of Orthographic Views to Isometric views of Simple Solids.

Computer Graphics: Creating 2D&3D Drawings of Objects Including Domain Specific Engineering Applications using Auto CAD (Not for end examination).

Total Periods: 15 Periods and 60 Practical's

TEXT BOOKS:

1. Engineering Drawing, K.L. Narayana and P. Kannaiah, Tata McGraw Hill, 2013.
2. N. D. Bhatt, Engineering Drawing, Charotar Publishing House, 54th Edition, 2023.

REFERENCES:

1. Engineering Drawing, M.B.Shah and B.C. Rana, Pearson Education Inc,2009.
2. Engineering Drawing with an Introduction to AutoCAD, Dhananjay Jolhe, Tata McGraw-Hill, 2017.
3. Engineering Drawing and Graphics by K. Venugopal, 4/e, New Age Publishers, 2004.
4. Engineering Drawing by Basant Agarwal & C.M. Agarwal, 2/e, Tata McGraw-Hill, 2013

I Year B.Tech. ECE – II Semester

L	T	P	C
3	0	0	3

(PH23ABS101) ENGINEERING PHYSICS

COURSE OBJECTIVES:
The objective of this course are to:

- To bridge the gap between the Physics in school at 10+2 level and UG level engineering courses by identifying the importance of the optical phenomenon like interference, diffraction etc, enlightening the periodic arrangement of atoms in crystalline solids and concepts of quantum mechanics, introduce novel concepts of dielectric and magnetic materials, physics of semiconductors.

COURSE OUTCOMES:
After successful completion of the course, students will be able to:

CO 1: Understand the intensity variation of light due to interference, diffraction and polarization.
CO 2: Apply the basic concepts of crystal structures and X-ray diffraction to study the behavior of materials for engineering applications.
CO 3: Summarize the fundamental properties of dielectric and magnetic materials for engineering applications.
CO 4: Analyze the properties of quantum particles to interpret the energy band formation and classification of solids
CO 5: Assess the current flow mechanism to understand the transport phenomenon of charge carriers in semiconductors.

UNIT I: (10 Periods)
Wave Optics Interference: Introduction - Principle of superposition –Interference of light Interference in thin films (Reflection Geometry) & applications - Colours in thin films- Newton's Rings, Determination of wavelength and refractive index. Diffraction: Introduction - Fresnel and Fraunhofer diffractions - Fraunhofer diffraction due to single slit, double slit & N-slits (Qualitative) – Diffraction Grating - Dispersive power and resolving power of Grating (Qualitative).
Polarization: Introduction -Types of polarization - Polarization by reflection, refraction and Double refraction - Nicol's Prism -Half wave and Quarter wave plates.

UNIT II: (8 Periods)
Crystallography: Space lattice, Basis, Unit Cell and lattice parameters – Bravais Lattices – crystal systems (3D) – coordination number - packing fraction of SC, BCC & FCC - Miller indices – separation between successive (hkl) planes.
X- ray diffraction: Bragg's law - X-ray Diffractometer – crystal structure determination by Laue's and powder methods.

UNIT III: (10 Periods)
Dielectric Materials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility, Dielectric constant and Displacement Vector – Relation between the electric vectors - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative)
- Lorentz internal field - Clausius- Mossotti equation – Frequency dependence of polarization – dielectric loss.
Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization- Magnetic susceptibility and permeability – Atomic origin of magnetism - Classification of magnetic materials: Dia, para, Ferro, anti-ferro &Ferri magnetic materials - Domain concept for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials- Applications of magnetic materials.

UNIT IV: **(9 Periods)**

Quantum Mechanics: Dual nature of matter – Heisenberg's Uncertainty Principle – Significance and properties of wave function – Schrodinger's time independent and dependent wave equations– Particle in a one-dimensional infinite potential well.

Free Electron Theory: Classical free electron theory (Qualitative with discussion of merits and demerits) – Quantum free electron theory – electrical conductivity based on quantum free electron theory - Fermi-Dirac distribution
- Density of states - Fermi energy

UNIT V: **(8 Periods)**

Semiconductors: Formation of energy bands – classification of solids - Intrinsic semiconductors: Density of charge carriers – Electrical conductivity – Fermi level – Extrinsic semiconductors: density of charge carriers (Qualitative) – dependence of Fermi energy on carrier concentration and temperature - Drift and diffusion currents – Einstein's equation – Hall effect and its applications - Direct and indirect bandgap semiconductors and its applications.

Total Periods: 45

TEXT BOOKS:

1. A Text book of Engineering Physics, M. N. Avadhanulu, P.G.Kshirsagar& TVS Arun Murthy, S. Chand Publications, 11th Edition 2019.
2. Engineering Physics - D.K.Bhattacharya and Poonam Tandon, Oxford press (2015).

REFERENCES:

1. Engineering Physics - B.K. Pandey and S. Chaturvedi, CengageLearning 2021.
2. Engineering Physics - Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018.
3. Engineering Physics" - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press.2010
4. Engineering Physics - M.R. Srinivasan, New Age internationalpublishers (2009).

ONLINE RESOURCES:

1. https://www.loc.gov/rr/scitech/selected-ternet/physics.html

I Year B.Tech. ECE – II Semester

L	T	P	C
3	0	0	3

(EC23APC201) NETWORK ANALYSIS

COURSE OBJECTIVES:
The objective of this course are to:
- To introduce basic laws, mesh & nodal analysis techniques for solving electrical circuits.
- To impart knowledge on applying appropriate theorem for electrical circuitanalysis.
- To explain transient and steady state behavior of different circuits
- To analyze the concepts of resonance and Magnetic circuits
- To understand open circuit, short circuit, transmission, hybrid parameters and their interrelationship.

Course Outcomes:
After successful completion of the course, students will be able to:
- **CO 1:** Apply the basic electrical concepts to different circuits along with network simplification Techniques
- **CO 2:** Determine the transient response of R-L, R-C, R-L-C circuits for D.C. and A.C excitations
- **CO 3:** Analyze steady state response for various Circuits for AC excitation.
- **CO 4:** Apply the concept of Resonance & Magnetic principles for different circuits.
- **CO 5:** Evaluate network parameters for different two port networks.

UNIT I:
Types of circuit components, Types of Sources and Source Transformations, Mesh analysis and Nodal analysis, problem solving with resistances only including dependent sources also. Principal of Duality with examples.
Network Theorems: Thevenin's, Norton's, Milliman's, Reciprocity, Compensation, Substitution, Superposition, Max Power Transfer, Tellegens - problem solving using dependent sources also.

UNIT II:
Transients: First order differential equations, Definition of time constants, R-L circuit, R-C circuit with DC excitation, evaluating initial conditions procedure, second order differential equations, homogeneous, non- homogenous, problem-solving using R-L-C elements with DC excitation and AC excitation, Response as related to s-plane rotation of roots.
Laplace Transform: Introduction, basic theorems, problem solving using Laplace Transform.

UNIT III:
Steady State Analysis of A.C Circuits: Impedance concept, phase angle, series R-L, R-C, R-L- C circuits problem solving. Complex impedance and phasor notation for R-L, R-C, R-L-C problem solving using mesh and nodal analysis, Star-Delta conversion, problem solving using Laplace transforms also.

UNIT IV:
Resonance: Introduction, Definition of Q, Series resonance, Bandwidth of series resonance, Parallel resonance, general case-resistance present in both branches, anti-resonance at all frequencies.
Coupled Circuits: Coupled Circuits: Self-inductance, Mutual inductance, Coefficient of coupling, analysis of coupled circuits, Natural current, Dot ruleof coupled circuits, conductively coupled equivalent circuits- problem solving.

UNIT V:
Two-port Networks: Relationship of two port networks, Z-parameters, Y- parameters, Transmission line parameters, h- parameters, Relationships Between Parameter Sets,

Parallel & series connection of two port networks, cascading of two port networks, problem solving using dependent sources also.

TEXT BOOKS:

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, revised 3rd Edition, 2019.
2. Engineering Circuit Analysis by William H. Hayt, Jack Kemmerly, Jamie Phillips, Steven M. Durbin, 9th Edition 2020.
3. Network lines and Fields by John. D. Ryder 2nd Edition, PHI.

REFERENCES:

1. D. Roy Choudhury, Networks and Systems, New Age International Publications,2013.
2. Joseph Edminister and Mahmood Nahvi, Electric Circuits, Schaum's Outline Series, 7th Edition, Tata McGraw Hill Publishing Company, NewDelhi, 2017.
3. Fundamentals of Electric Circuits by Charles K. Alexander and Matthew N.O. Sadiku, McGraw-Hill Education.

I Year B.Tech. ECE – II Semester

L	T	P	C
0	0	2	1

(PH23ABS102) ENGINEERING PHYSICS LAB

COURSE OBJECTIVES:

The objective of this course are to:

- To study the concepts of optical phenomenon like interference, diffraction etc., recognize the importance of energy gap in the study of conductivity, Hall effect in semiconductors, study the parameters and applications of dielectric and magnetic materials by conducting experiments.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Compare the wavelengths of different colours using diffraction grating.
CO 2: Utilize optical instruments like travelling microscope and spectrometer.
CO 3: Analyze the intensity of the magnetic field of circular coil carrying current with distance.
CO 4: Evaluate dielectric constant for a dielectric material.
CO 5: Estimate the band gap of a given semiconductor and the type of semiconductor using Hall effect.

List of Experiments:

1. Determination of radius of curvature of a given Plano-convex lens by Newton's rings.
2. Determination of wavelengths of different spectral lines in mercury spectrum using diffraction grating in normal incidence configuration.
3. Determination of dielectric constant using charging and discharging method.
4. Study the variation of B versus H by magnetizing the magnetic material (B- H curve).
5. Determination of wavelength of Laser light using diffraction grating.
6. Estimation of Planck's constant using photoelectric effect.
7. Determination of the resistivity of semiconductors by four probe methods.
8. Determination of energy gap of a semiconductor using p-n junction diode.
9. Magnetic field along the axis of a current carrying circular coil by Stewart Gee's Method.
10. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall effect.
11. Determination of temperature coefficients of a thermistor.
12. Sonometer: Verification of laws of stretched string.

Note: Any TEN of the listed experiments are to be conducted. Out of which any TWO experiments may be conducted in virtual mode.

REFERENCES:

1. A Textbook of Practical Physics - S. Balasubramanian, M.N. Srinivasan, S. Chand Publishers, 2017.

ONLINE RESOURCES:

1. www.vlab.co.inhttps://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype

I Year B.Tech. ECE – II Semester

L	T	P	C
0	0	3	1.5

(ME23AES103) ENGINEERING WORKSHOP

COURSE OBJECTIVES:

The objective of this course are to:

- Identify and explain safety practices and precautions relevant to workshop activities.
- Recognize and differentiate various types of woods and tools used in woodwork.
- Demonstrate the ability to create different wood joints, including half-lap, mortise and tenon, and dovetail joints.
- Familiarize students with sheet metal working tools and techniques.
- Enable students to develop sheet metal projects such as tapered trays, conical funnels, elbow pipes and brazing.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Fabricate sheet metal components manually.
CO 2: Construct wood joints such as half-lap, mortise, and tenon.
CO 3: Assemble the components to create joints like a V-fit.
CO 4: Demonstrate the plumbing, welding, foundry, and fitting jobs to form the components.
CO 5: Connect & check the basic house wiring circuit connections for various applications.

1. **Demonstration**: Safety Practices and Precautions to be Observed in the Workshop.
2. **Wood Working:** Familiarity with Different Types of Woods and Tools used in Wood Working and Making Following Joints.
   b) Half – Lap Joint
   c) Mortise and Tenon Joint
   d) Corner Dovetail Joint or Bridle Joint
3. **Sheet Metal Working**: Familiarity with Different Types of Tools used in Sheet Metal Working, Developments of Following Sheet Metal Job from GI Sheets.
   b) Tapered Tray
   c) Conical Funnel
   d) Elbow Pipe
   e) Brazing
4. **Fitting:** Familiarity with Different Types of Tools used in Fitting and do the Following Fitting Exercises.
   b) V-Fit
   c) Dovetail Fit
   d) Semi-Circular Fit
   e) Bicycle Tire Puncture and Change of Two-Wheeler Tyre
5. **Electrical Wiring**: Familiarity with Different Types of Basic Electrical Circuits and make the Following Connections.
   a) Parallel and Series
   b) Two-Way Switch
   c) Godown Lighting
   d) Tube Light
   e) Three Phase Motor
   f) Soldering of Wires
6. **Foundry Trade:** Demonstration and Practice on Moulding Tools and Processes, Preparation of Green Sand Moulds for Given Patterns.
7. **Welding Shop:** Demonstration and Practice on Arc Welding and Gas Welding. Preparation of Lap Joint and Butt Joint.

8. **Plumbing:** Demonstration and Practice of Plumbing Tools, Preparation of Pipe Joints with Coupling for Same Diameter and with Reducer for Different Diameters.

TEXT BOOKS:

1. Basic Workshop Technology: Manufacturing Process, Felix W.; Independently Published,2019. Workshop Processes, Practices and Materials; Bruce J. Black, Routledge Publishers, 5th Edn. 2015.
2. A Course in Workshop Technology Vol I. & II, B.S. Raghuwanshi, Dhanpath Rai & Co., 2015 & 2017.

REFERENCES:

1. Elements of Workshop Technology, Vol. I by S. K. Hajra Choudhury & Others, Media Promoters and Publishers, Mumbai, 2007, 14th edition.
2. Workshop Practice by H. S. Bawa, Tata-McGraw Hill, 2004.
3. Wiring Estimating, Costing and Contracting; Soni P.M. & Upadhyay P.A.; Atul Prakashan, 2021-22.

I Year B.Tech. ECE – II Semester

L	T	P	C
0	0	2	1

(CS23AES103) IT WORKSHOP

COURSE OBJECTIVES:
The objective of this course are to:
- To introduce the internal parts of a computer, peripherals, I/O ports, connecting cables.
- To teach basic command line interface commands on Linux.
- To teach the usage of Internet for productivity and self-paced life-long learning
- To introduce Compression, Multimedia and Antivirus tools and Office Tools such as Word processors, Spread sheets and Presentation tools.

COURSE OUTCOMES:
After successful completion of the course, students will be able to:
CO 1: Perform Hardware troubleshooting.
CO 2: Understand Hardware components and inter dependencies.
CO 3: Safeguard computer systems from viruses/worms.
CO 4: Document/ Presentation preparation.
CO 5: Perform calculations using spreadsheets

Hardware:
Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheraland submit to your instructor.
Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.
Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.
Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Internet & World Wide Web:
Task1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.
Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.
Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.
Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block activey downloads to avoid viruses and/or worms.

LaTeX and WORD:
Task 1: Word Orientation: The mentor needs to give an overview of La TeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of La TeX and MS office or equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using La TeXand word– Accessing, overview of toolbars, saving

files, Using help and resources, rulers, format painter in word.
Task 2: Using La TeX and Word to create a project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both La TeX and Word.
Task 3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.
Task 4: Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Excel:
Excel Orientation: The mentor needs to tell the importance of MS office or equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.
Task 1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text
Task 2: Calculating GPA - Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function,
LOOKUP/VLOOKUP
Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean andlogical operators, Conditional formatting

Power Point:
Task 1: Students will be working on basic power point utilities and toolswhich help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrowsin PowerPoint.
Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art,Audio, Video, Objects, Tables and Charts.
Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

AI Tools – ChatGPT:
Task 1: Prompt Engineering: Experiment with different types of prompts to see how the model responds. Try asking questions, starting conversations, or even providing incomplete sentences
to see how the model completes them.
Ex: Prompt: "You are a knowledgeable AI. Please answer the following question: What is the capital of France?"
Task 2: Creative Writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstorm creative ideas
Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this newreality."
Task 3: Code Generation: Test the model's ability to generate code by giving it partial code snippets and asking it to complete them. You can also ask the model to explain programming concepts or help you debug code.
Ex: Prompt: "Complete the following Python code to swap the values of two variables:\npython\na = 5\nb = 10\ntemp = a\na = b\nb = temp\n"
Task 4: Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it intoanother language. Compare the output to see how accurate and fluent the translations are.
Ex: Prompt: "Translate the following English sentence to French: 'Hello, how are you doing today?'".

Task 5: Summarization: Provide a long piece of text, such as an article or a blog post, and ask the model to summarize it. Compare the model's summary with the original text to assess its ability to condense information effectively.
Ex: Prompt: "Summarize the article titled 'Ramayanam' in 3-4 sentences."
Task 6: Futuristic Predictions: Have fun by asking the model to predict future technological advancements, societal changes, or even hypothetical scenarios. Compare its responses with your own ideas.
Ex: Prompt: "Predict how artificial intelligence will transform everyday life in the next 20 years."
Task 7: Technical Explanations: Challenge the model with technical questions from different domains. Ask it to explain scientific concepts, mathematical theorems, or complex algorithms in simple terms.
Ex: Prompt: "Explain the concept of neural networks in machine learning, including their layers and the process of backpropagation."

REFERENCES:

1. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dream tech
2. The Complete Computer upgrade and repair book, 3rd edition Cheryl A chmidt, WILEY Dream tech
3. Introduction to Information Technology, ITL EducationSolutions limited, Pearson Education.
4. PC Hardware - A Handbook – Kate J. Chase PHI (Microsoft)
5. LaTeX Companion – Leslie Lamport, PHI/Pearson.
6. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfins on and Ken Quamme. – CISCO Press, Pearson Education.
7. IT Essentials PC Hardware and Software Labs and Study Guide Third Edition by Patrick Regan– CISCO Press, Pearson Education.

I Year B.Tech. ECE – II Semester

L	T	P	C
0	0	3	1.5

(EC23APC202) NETWORK ANALYSIS AND SIMULATIONLABORATORY

COURSE OBJECTIVES:
The objectives of this course are to:

- To Gain Hands on Experience in Verifying Kirchhoff's Laws and network Theorems
- To analyze transient and steady state behavior of circuits
- To study resonance characteristics
- To determine two-port network Parameters

COURSE OUTCOMES:
After successful completion of the course, students will be able to:

- **CO 1:** Verify Kirchhoff's Laws and network Theorems
- **CO 2:** Analyze time domain and frequency response of RL & RC circuits
- **CO 3:** Analyze behavior of RLC circuit for different excitations
- **CO 4:** Design resonant circuit for given Specifications
- **CO 5:** Characterize and model the network in terms of all network Parameters

The following experiments need to be performed using both Hardware and simulation Software. The experiments need to be simulated using software and the same need to be verified using the hardware.

1. Study of components of a circuit and Verification of KCL and KVL.
2. Verification of mesh and nodal analysis for AC circuits.
3. Verification of Superposition, Thevenin's & Norton theorems for AC circuits.
4. Verification of maximum power transfer theorem for AC circuits.
5. Verification of Tellegen's theorem for two networks of the same topology.
6. Study of DC transients in RL, RC and RLC circuits.
7. To study frequency response of various 1st order RL & RC networks.
8. To study the transient and steady state response of a 2nd order circuit by varying its various parameters and studying their effects on responses.
9. Find the Q Factor and Bandwidth of a Series and Parallel Resonance circuit.
10. Determination of open circuit (Z) and short circuit (Y) parameters.
11. Determination of hybrid (H) and transmission (ABCD) parameters.
12. To measure two port parameters of a twin-T network and study its frequency response.

Hardware Requirements:
Regulated Power supplies, Analog/Digital Function Generators, Digital Multimeters, Decade Resistance Boxes/Rheostats, Decade Capacitance Boxes, Ammeters (Analog or Digital), Voltmeters (Analog or Digital), Active & Passive Electronic Components.

Software requirements:
Multisim/ Pspice/Equivalent simulation software tool, Computer Systems withrequired specifications

REFERENCES:

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, revised 3rd Edition, 2019.
2. Engineering Circuit Analysis by William H. Hayt, Jack Kemmerly, JamiePhillips, Steven M. Durbin, 9th Edition 2020.

I Year B.Tech. ECE – II Semester

L	T	P	C
0	0	1	0.5

(CH23ABS105) HEALTH AND WELLNESS, YOGA AND SPORTS

COURSE OBJECTIVES:
The objective of this course is:

- To make the students maintain their mental and physical wellness by balancing emotions in their life. It mainly enhances the essential traits required for the development of the personality.

COURSE OUTCOMES:
After successful completion of the course, students will be able to:

CO 1: Understand the importance of yoga and sports for Physical fitness and sound health.
CO 2: Demonstrate an understanding of health-related fitness components.
CO 3: Compare and contrast various activities that help enhance their health.
CO 4: Assess current personal fitness levels.
CO 5: Develop Positive Personality.

UNIT I:
Concept of health and fitness, Nutrition and Balanced diet, basic concept of immunity Relationship between diet and fitness, Globalization and its impact on health, Body Mass Index (BMI) of all age groups.
Activities:

i) Organizing health awareness programmes in community.
ii) Preparation of health profile.
iii) Preparation of chart for balance diet for all age groups.

UNIT II:
Concept of yoga, need for and importance of yoga, origin and history of yoga in Indian context, classification of yoga, Physiological effects of Asanas-Pranayama and meditation, stress management and yoga, Mental health and yoga practice.
Activities:
Yoga practices – Asana, Kriya, Mudra, Bandha, Dhyana, Surya Namaskar

UNIT III:
Concept of Sports and fitness, importance, fitness components, history of sports, Ancient and Modern Olympics, Asian games and Commonwealth games.
Activities:

i) Participation in one major game and one individual sport viz., Athletics, Volleyball, Basketball, Handball, Football, Badminton, Kabaddi, Kho-kho,Table tennis, Cricket etc. Practicing general and specific warm up, aerobics
ii) Practicing cardiorespiratory fitness, treadmill, run test, 9 min walk, skipping and running.

REFERENCES:

1. Gordon Edlin, Eric Golanty. Health and Wellness, 14th Edn. Jones &Bartlett Learning, 2022
2. T. K. V. Desikachar. The Heart of Yoga: Developing a Personal Practice
3. Archie J.Bahm. Yoga Sutras of Patanjali, Jain Publishing Company, 1993
4. Wiseman, John Lofty, SAS Survival Handbook: The Ultimate Guide to Surviving Anywhere Third Edition, William Morrow Paperbacks, 2014
5. The Sports Rules Book/ Human Kinetics with Thomas Hanlon. -- 3rd ed. Human Kinetics, Inc.2014 General

II Year B.Tech. ECE – I Semester

L	T	P	C
3	0	0	3

(MA23ABS305) PROBABILITY AND COMPLEX VARIABLES

COURSE OBJECTIVES:

The objective of this course are to:

- To describe continuity/differentiability/analyticity of a function and find the derivative of a function.
- To classify and explain complex power series, singularities, calculus of residues and its applications in the evaluation of integrals.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

- **CO 1:** Understand the concepts of Probability, Random Variables and their characteristics.
- **CO 2:** Learn how to deal with multiple random variables, conditional probability, joint distribution and statistical independence.
- **CO 3:** Formulate and solve engineering problems involving random variables.
- **CO 4:** Analyze the behavior of a complex function and understand Cauchy-Riemann equation in testing the analytic functions.
- **CO 5:** Apply Cauchy integral theorem, formula and residue theorem to evaluating the complex integrals.

UNIT I: (10 periods)

Probability & Random Variable: Probability through Sets and Relative Frequency: Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Joint Probability, Conditional Probability, Total Probability, Baye's Theorem, Independent Events. Random variables (discrete and continuous), mathematical expectation, Distribution and Density functions, Properties, Binomial, Poisson, Gaussian, Uniform, Exponential and Rayleigh distributions**.**

UNIT II: (10 Periods)

Operations on Random variable: Moments-moments about the origin, Central moments, Variance and Skew, Chebyshev's inequality, moment generating function, characteristic function.

Multiple Random Variables: Vector Random Variables, Joint Distribution Function, Properties of Joint Distribution, Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning, Interval conditioning, Statistical Independence.

UNIT III: (09 Periods)

Operations on Multiple Random variables: Operations on Multiple Random Variables: Expected Value of a Function of Random Variables, Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables: Two Random Variables case, N Random Variable case, Properties of Gaussian random variables.

UNIT IV: (08 Periods)

Complex Variable–Differentiation: Introduction to functions of complex variable-concept of Limit & continuity - Differentiation, Cauchy-Riemann equations, analytic functions harmonic functions, finding harmonic conjugate-construction of analytic function by Milne Thomson method.

UNIT V: (08 Periods)

Complex Variable–Integration: Line integral-Contour integration, Cauchy's integral theorem (without proof), Cauchy Integral formula, Power series expansions: Taylor's series and Maclaurin's series, zeros of analytic functions, singularities, Laurent's series, Residues, Cauchy Residue theorem (without proof). Evaluation of definite Integral involving sine and cosine.

Total Periods: 45

TEXT BOOKS:

1. Peyton Z. Peebles, "Probability, Random Variables & Random Signal Principles", 4th Edition, TMH, 2002.
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 2017, 44th Edition.

REFERENCES:

1. Athanasios Papoulis and S. Unnikrishna Pillai, "Probability, Random Variables and Stochastic Processes", 4th Edition, PHI, 2002.
2. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley India.
3. Henry Starkand John W. Woods, "Probability and Random Processes with Application to Signal Processing," 3rd Edition, Pearson Education, 2002.
4. B.V.Ramana, Higher Engineering Mathematics, McGraw Hill publishers.

ONLINE RESOURCES:

1. https://onlinecourses.nptel.ac.in/noc20_ma50/preview
2. https://onlinecourses.nptel.ac.in/noc21_ma66/preview#:~:text=This%20course%20provides%20random%20variable,and%20simple%20Markovian%20queueing%20models.

II Year B.Tech. ECE – I Semester

L	T	P	C
2	1	0	3

(BA23AHS302) UNIVERSAL HUMAN VALUES

COURSE OBJECTIVES:

The objective of this course is:

- To help the students appreciate the essential complementary between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Define the terms like Natural Acceptance, Happiness and Prosperity
CO 2: Identify one's self, and one's surroundings (family, society nature).
CO 3: Apply what they have learnt to their own self in different day-to-day settings in real life.
CO 4: Relate human values with human relationship and human society.
CO 5: Justify the need for universal human values and harmonious existence.
CO 6: Develop as socially and ecologically responsible engineers

UNIT I: **(7 Periods)**

Introduction to Value Education: Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education) – Understanding Value Education; Practice Session - Sharing about Oneself; Self-Exploration as the Process for Value Education - Continuous Happiness and Prosperity - the Basic Human Aspirations; Practice Session - Exploring Human Consciousness; Happiness and Prosperity – Current Scenario - Method to Fulfill the Basic Human Aspirations; Practice Session - Exploring Natural Acceptance.

UNIT II: **(6 Periods)**

Harmony in the Human Being: Understanding Human Being as the Co-existence of the Self and the Body - Distinguishing between the Needs of the Self and the Body; Practice Session - Exploring the difference of Needs of self and body; The Body as an Instrument of the Self - Understanding Harmony in the Self; Practice Session - Exploring Sources of Imagination in the Self; Harmony of the Self with the Body - Programme to ensure Self-regulation and Health; Practice Session - Exploring Harmony of Self with the Body.

UNIT III: **(6 Periods)**

Harmony in the Family and Society: Harmony in the Family – The Basic Unit of Human Interaction - 'Trust' – The Foundational Value in Relationship; Practice Session - Exploring the Feeling of Trust; 'Respect' – as the Right Evaluation; Practice Session - Exploring the Feeling of Respect; Other Feelings, Justice in Human-to-Human Relationship - Understanding Harmony in the Society - Vision for the Universal Human Order; Practice Session; Exploring Systems to fulfill Human Goal.

UNIT IV: (5 Periods)

Harmony in the Nature / Existence: Understanding Harmony in the Nature - Interconnectedness, Self-regulation and Mutual fulfillment among the Four Orders of Nature; Practice Session - Exploring the Four Orders of Nature; Realizing Existence as Co-existence at All Levels - The Holistic Perception of Harmony in Existence; Practice Session - Exploring Co-existence in Existence**.**

UNIT V: (6 Periods)

Implications of the Holistic Understanding – a Look at Professional Ethics: Natural Acceptance of Human Values - Definitiveness of (Ethical) Human Conduct; Practice Session - Exploring Ethical Human Conduct; A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order - Competence in Professional Ethics; Practice Session - Exploring Humanistic Models in Education; Holistic Technologies, Production Systems and Management Models-Typical Case Studies - Strategies for Transition towards Value-based Life and Profession; Practice Session - Exploring Steps of Transition towards Universal Human Order.

Total Periods: 30

TEXT BOOKS:

1. R R Gaur, R Asthana, G P Bagaria, A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
2. R R Gaur, R Asthana, G P Bagaria,Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

REFERENCES:

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. A.N. Tripathy, 2003, Human Values, New Age International Publishers. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi.
3. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
4. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.
5. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow, Reprinted 2008.

ONLINE RESOURCES:

1. https://www.studocu.com/in/document/kiet-group-of-institutions/universal-human-values/chapter-5-holistic-understanding-of-harmony-on-professional ethics/62490385
2. https://onlinecourses.swayam2.ac.in/aic22_ge23/preview

II Year B.Tech. ECE – I Semester

L	T	P	C
3	0	0	3

(EC23APC301) DIGITAL CIRCUITS DESIGN

COURSE OBJECTIVES:

The objective of this course are to:

- Understand the properties of Boolean algebra, logic operations, and minimization of Boolean functions.
- Analyze combinational and analyze sequential logic circuits.
- Understand the concepts of FSM and compare various Programmable logic devices.
- Model combinational and sequential circuits using HDLs.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

- **CO 1:** Understand the properties of Boolean algebra, logic operations and apply techniques for minimization of Boolean functions
- **CO 2:** Analyze and Design Combinational Circuits
- **CO 3:** Design and Model combinational circuits using HDLs
- **CO 4:** Design and Model Sequential circuits using HDLs
- **CO 5:** Design of FSM and Compare various Programmable logic devices.

UNIT I: (10 Periods)

Boolean algebra, logic operations, and minimization of Boolean functions: Review of Number Systems and Codes, Representation of unsigned and signed integers, Laws of Boolean Algebra, Theorems of Boolean Algebra, Realization of functions using logic gates, Canonical forms of Boolean Functions, Minimization of Functions using Karnaugh Maps.

UNIT II: (9 Periods)

Combinational Logic Circuits: Combinational circuits, Design with basic logic gates, design procedure, adders, subtractors, 4-bit binary adder/ subtractor circuit, BCD adder, carry look- a-head adder, binary multiplier, magnitude comparator, priority encoders, decoders, multiplexers, demultiplexers.

UNIT III: (8 Periods)

Hardware Description Language: Introduction to Verilog - structural specification of logic circuits, behavioral specification of logic circuits, hierarchical Verilog Code, Verilog for combinational circuits - conditional operator, if-else statement, case statement, for loop using sequential circuits with CAD tools.

UNIT IV: (8 Periods)

Sequential Logic Circuits: Basic architectural distinction between combinational and sequential circuits, Design procedure, latches, flip-flops, truth tables and excitation tables, conversion of flip- flops, design of counters, ripple counters, synchronous counters, ring counter, Johnson counter, registers, shift registers, universal shift register. Verilog constructs for sequential circuits, flip-flop with clear capability, using Verilog constructs for registers and counters.

UNIT V: (10 Periods)

Finite State Machines and Programmable Logic Devices: Types of FSM, capabilities and limitations of FSM, state assignment, realization of FSM using flip-flops, Mealy to Moore conversion and vice-versa, reduction of state tables using partition technique, Design of sequence detector. Types of PLD's: PROM, PAL, PLA, basic structure of CPLD and FPGA, advantages of FPGAs.

Total Periods: 45

TEXT BOOKS:

1. M. Morris Mano, "Digital Design", 3rd edition, PHI.
2. Stephen Brown and ZvonkoVranesic, "Fundamentals of Digital Logic with Verilog Design", 3rd edition, McGraw-Hill.

REFERENCES:

1. Charles H. Roth, Jr, "Fundamentals of Logic Design", 4th edition, Jaico Publishers.
2. ZviKohavi and NirajK.Jha, "Switching and Finite Automata Theory, 3rd edition, Cambridge University Press, 2010.
3. Samir Palnitkar, "Verilog HDL: A Guide to Digital Design and Synthesis", 2nd edition Prentice Hall PTR.
4. D.P. Leach, A.P. Malvino, "Digital Principles and Applications", TMH, 7th edition.

L	T	P	C
3	0	0	3

(EC23APC302) ELECTRONIC DEVICES AND CIRCUITS

COURSE OBJECTIVES:

The objective of this course are to:

- Understand the basic principles of all semiconductor devices.
- Analyze diode circuits, various biasing and small signal equivalent circuitsof amplifiers, compare the performance of BJTs and MOSFETs
- Design rectifier circuits and various amplifier circuits using BJTs andMOSFETs.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Design a Bridge rectifier using C-filter.
CO 2: Compare the performance of various BJT biasing circuits.
CO 3: Evaluate the various important specifications of three amplifier configurations.
CO 4: Analyze a MOSFET biasing circuit.
CO 5: Design a practical amplifier circuits using MOSFETS and discrete components.

UNIT I: (10 Periods)

PN junction diode: Review, diode current equation, Diode resistance, Transition and Diffusion Capacitance, effect of temperature on PN junction diode, Quantitative analysis of center-tap Full-wave and Bridge Rectifiers with C-filter**,** Ripple Factor and Regulation Characteristics, Clipping and Clamping circuits, Illustrative problems.
Special Diodes: Construction, operation and VI characteristics of Tunnel Diode, VaractorDiode, LED, LCD, Photo Diode, SCR and UJT.

UNIT II: (8 Periods)

Review of Bipolar Junction Transistors, Limits of Operation, BJT Specifications.
Biasing and Stabilization: Operating Point, DC and AC Load Lines, Importance of Biasing,Fixed Bias, Collector to Base Bias, Self-Bias, Bias Stability, Thermal Runaway, Thermal Stability, Illustrative problems.

UNIT III: (8 Periods)

BJT Small Signal Operation and Models: The transconductance, input resistance at the base, input resistance at the emitter, Voltage gain, separating the Signal and the DC Quantities, The Hybrid π Model, the T Model.
Single Stage BJT Amplifiers - Common-Emitter (CE) amplifier without and with emitterresistance, Common-Base (CB) amplifier, Common- Collector (CC) amplifier or EmitterFollower, Problem solving.

UNIT IV: (9 Periods)

Junction Field Effect Transistor (FET): Construction, Principle of Operation, V–I Characteristics, Comparison of BJT and FET, FET as Voltage Variable Resistor.
MOS Field Effect Transistors: Introduction, Device Structure and Physical Operation, CMOS, V - I Characteristics, MOSFET Circuits at DC, MOSFET as an Amplifier andas a Switch. Biasing in MOS Amplifier circuits - biasing by fixing VGS with and without source resistance, biasing using drain to gate feedback resistor, biasing using constant current source, body effect, Problem solving.

UNIT V: (10 Periods)

MOSFET Small Signal Operation Models: The dc bias, separating the DC analysis and the signal analysis, Small signal equivalent circuit models, the trans-conductance, the T-equivalent circuit model, Single stage MOS Amplifiers – common source (CS) amplifier without and with source resistance, common gate (CG) amplifier, source follower, Problem Solving.

Total Periods: 45

TEXT BOOKS:

1. Adel S. Sedra and Kenneth C. Smith, "Microelectronic Circuits – Theory andApplications", 6th edition, Oxford Press, 2013.
2. J. Milliman and C Halkias, "Integrated electronics", 2nd edition, Tata McGraw Hill,1991.

REFERENCES:

1. Donald A Neamen, "Electronic Circuits – analysis and design", 3rd edition, McGraw Hill (India), 2019.
2. Behzad Razavi, "Microelectronics", 2nd edition, Wiley, 2013.
3. R.L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuits," 9th edition, Pearson, 2006.
4. Jimmie J Cathey, "Electronic Devices and Circuits," Schaum's outlines series, 3rd edition, McGraw-Hill (India), 2010.

L	T	P	C
3	0	0	3

(EC23APC303) SIGNALS, SYSTEMS AND STOCHASTIC PROCESSES

COURSE OBJECTIVES:

The objective of this course are to:

- Understand the basics of signals and systems required for ECE courses.
- Learn concepts of signals and systems and its analysis using different transform techniques.
- Understand random processes which are essential for the random signals and systems encountered in communications and signal processing areas.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

- **CO 1:** Classify Signals and Systems (Continuous and Discrete) in time domain and apply Fourier series to represent signals in frequency domain.
- **CO 2:** Apply Continuous time Fourier Transform to Continuous time Signals and convert Continuous time signals to discrete time Signals using Sampling Theorem.
- **CO 3:** Analyze Signal Transmission to LTI Systems
- **CO 4:** Analyze Temporal Characteristics and its Properties.
- **CO 5:** Analyze Spectral Characteristics and its Properties.

UNIT I: (9 Periods)

Signals & Systems: Basic definitions and classification of Signals and Systems (Continuous time and discrete time), operations on signals, Concepts of Convolution and Correlation of signals, Analogy between vectors and signals-Orthogonality, mean square error.

Fourier series: Trigonometric & Exponential forms of Fourier series, Properties, Concept of discrete spectrum, Illustrative Problems.

UNIT II: (9 Periods)

Fourier Transform: Definition, Computation and properties of Fourier transform for different types of signals and systems, Inverse Fourier transform. Sampling: Sampling theorem – Statement and Proof of sampling theorem of low pass signals Illustrative Problems.

Laplace Transform: Definition, ROC, Properties, Inverse Laplace transforms, the s-plane and BIBO stability, Transfer functions, System Response to standard signals, Solution of differential equations with initial conditions, Illustrative Problems.

UNIT III: (10 Periods)

Signal Transmission through Linear Systems: Linear system, impulse response, Response of a linear system for different input signals, linear time-invariant (LTI) system, linear time variant (LTV) system, Transfer function of a LTI system. Filter characteristicsof linear systems. Distortion less transmission through a system, Signal bandwidth, System bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Paley-Wiener criterion for physical realization, Relationship between bandwidth and rise time, Energy and Power spectral densities, Illustrative Problems.

UNIT IV: (9 Periods)

Random Processes – Temporal Characteristics: The Random Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, concept of Stationarity and Statistical Independence. First -Order Stationary Processes, Second- Order and Wide-Sense Stationarity, (N-Order) and Strict Sense Stationarity, Time Averages and Ergodicity, Autocorrelation Function and Its Properties, Cross-Correlation Function and Its Properties, Covariance Functions, Gaussian Random Processes, Poisson Random Process.

UNIT V: **(8 Periods)**

Random Processes – Spectral Characteristics: The Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, The Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Spectrum and Cross correlation Function.

Total Periods: 45

TEXTBOOKS:

1. Peyton Z. Peebles, "Probability, Random Variables & Random Signal Principles" 4th edition,TMH, 2002.
2. A.V. Oppenheim, A.S. Willsky and S.H. Nawab, "Signals and Systems", 2nd edition, PHI, 2009.

REFERENCES:

1. Signals, Systems & Communications - B.P. Lathi, 2013, BSP.
2. Athanasios Papoulis and S. Unnikrishna Pillai, "Probability, Random Variables and Stochastic Processes", 4th edition, PHI, 2002
3. Simon Haykin and Van Veen, "Signals & Systems", 2nd edition, Wiley, 2005.
4. Matthew Sadiku and Warsame H. Ali, "Signals and Systems A primer with MATLAB", CRC Press, 2016.
5. Hwei Hsu, "Schaum's Outline of Signals and Systems", 4th edition, TMH, 2019.

II Year B.Tech. ECE – I Semester

L	T	P	C
0	0	3	1.5

(EC23APC304) DIGITAL CIRCUITS AND SIGNAL SIMULATION LAB

COURSE OBJECTIVES:

The objective of this course are to:

- Verify the truth tables of various logic circuits.
- Design sequential/combinational circuit using Hardware Description Language and verify their functionality.
- Simulate various Signals and Systems through MATLAB
- Analyze the output of a system when it is excited by different types of deterministic and random signals.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Verify the truth tables of various logic circuits.
CO 2: Understand how to simulate different types of signals and system response.
CO 3: Design sequential and combinational logic circuits and verify their functionality.
CO 4: Analyze the response of different systems when they are excited by different signals and plot power spectral density of signals.
CO 5: Generate different random signals for the given specifications.

List of Experiments:

PART A

1. Design a simple combinational circuit with four variables and obtain minimal SOP expression and verify the truth table using Digital Trainer Kit.
2. Verification of functional table of 3 to 8-line Decoder /De-multiplexer
3. 4 variable logic function verification using 8 to1 multiplexer.
4. Design full adder circuit and verify its functional table.
5. Design a four-bit ring counter using D Flip–Flops/JK Flip Flop and verify output.
6. Design a four-bit Johnson's counter using D Flip-Flops/JK Flip Flops and verify output
7. Verify the operation of 4-bit Universal Shift Register for different Modes ofoperation.
8. Draw the circuit diagram of MOD-8 ripple counter and construct a circuit using T-Flip- Flops and Test It with a low frequency clock and sketch the output waveforms.
9. Design MOD–8 synchronous counter using T Flip-Flop and verify the result and sketch the output waveforms.
10. (a) Draw the circuit diagram of a single bit comparator and test the output
    (b) Construct 7 Segment Display Circuit Using Decoder and7 Segment LED and test it.

Note:

1. Design and verify combinational and sequential circuits using Hardware Description Language
2. Verify the design with test bench for at least one experiment.

REFERENCES:

1. M. Morris Mano, "Digital Design", 3rd edition, PHI

PART B

1. Write a program to generate various Signals and Sequences: Periodic and Aperiodic, Unit Impulse, Unit Step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sinc function.
2. Perform operations on Signals and Sequences: Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.

3. Write a program to find the trigonometric & exponential Fourier series coefficients of a rectangular periodic signal. Reconstruct the signal by combining the Fourier series coefficients with appropriate weightings- Plot the discrete spectrum of the signal.
4. Write a program to find Fourier transform of a given signal. Plot its amplitude and phase spectrum.
5. Write a program to convolve two discrete time sequences. Plot all the sequences.
6. Write a program to find autocorrelation and cross correlation of given sequences.
7. Write a program to verify Linearity and Time Invariance properties of a given Continuous System.
8. Write a program to generate discrete time sequence by sampling a continuous time signal. Show that with sampling rates less than Nyquist rate, aliasing occurs while reconstructing the signal.
9. Write a program to find magnitude and phase response of first order low pass and high pass filter. Plot the responses in logarithmic scale.
10. Write a program to generate Complex Gaussian noise and find its mean, variance, Probability Density Function (PDF) and Power Spectral Density (PSD).
11. Generate a Random data (with bipolar) for a given data rate (say 10kbps). Plot the same for a time period of 0.2 sec.
12. To plot pole-zero diagram in S-plane of given signal/sequence and verify itsstability.

Note: Any 10 experiments. All the experiments are to be simulated using MATLAB or equivalent software.

REFERENCES:

1. Stephen J. Chapman, "MATLAB Programming for Engineers", Cengage, November 2012.

II Year B.Tech. ECE – I Semester

L	T	P	C
0	0	3	1.5

(EC23APC305) ELECTRONIC DEVICES AND CIRCUITS LAB

Course Objectives:
The objective of this course are to:
- Verify the theoretical concepts practically from all the experiments.
- Analyze the characteristics of Diodes, BJT, MOSFET, and UJT.
- Design the amplifier circuits from the given specifications.
- Model the electronic circuits using tools such as PSPICE/Multisim.

Course Outcomes:
After successful completion of the course, students will be able to:
- **CO 1:** Understand the basic characteristics and applications of basic electronic devices.
- **CO 2:** Observe the characteristics of electronic devices by plotting graphs.
- **CO 3:** Analyze the V-I characteristics of various diodes, BJT, JFET and MOSFET.
- **CO 4:** Design MOSFET / BJT based amplifiers for the given specifications.
- **CO 5:** Simulate all circuits in PSPICE / Multisim.

LIST OF EXPERIMENTS: (**Implement** / **Execute any 10 experiments**).
1. Verify various clipping and clamper circuits using PN junction diode and draw the suitable graphs.
2. Study and draw the Volt Ampere characteristics of UJT and determine η, IP, Iv, VP,& Vv from the experiment.
3. Verification of the input and output characteristics of BJT in Common Emitter configuration experimentally and find required parameters from the graphs.
4. Study and draw the input and output characteristics of BJT in Common Base configuration experimentally and determine required parameters from the graphs.
5. Verification of the input and output characteristics of BJT in Common Collector configuration experimentally and find required parameters from the graphs. Study and draw the V- I characteristics of JFET experimentally.
6. Study and draw the ***output*** and ***transfer*** characteristics of MOSFET (Enhance mode) in Common Source Configuration experimentally. Find ***Threshold voltage (VT), gm, & K*** from the graphs.
7. Study and draw the ***output*** and ***transfer*** characteristics of MOSFET (Depletion mode) or JFET in Common Source Configuration experimentally. Find ***IDSS, gm, & VP*** from the graphs.
8. Design and analysis of voltage- divider bias/self-bias circuit using BJT.
9. Design and analysis of self-bias circuit using MOSFET.
10. Design a suitable circuit for switch using MOSFET/BJT.
11. Design a small signal amplifier using MOSFET (common source) for the given specifications. Draw the frequency response and find the bandwidth.
12. Design a small signal amplifier using BJT (common emitter) for the given specifications. Draw the frequency response and find the bandwidth.

Tools / Equipment Required:
Software Toollike Multisim/ Pspice or Equivalent, DC Power supplies, Multi meters DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices.

II Year B.Tech. ECE – I Semester

L	T	P	C
0	1	2	2

(CS23ASC302) PYTHON PROGRAMMING

COURSE OBJECTIVES:
The objectives of this course are to:
- Introduce core programming concepts of Python programming language.
- Demonstrate about Python data structures like Lists, Tuples, Sets and dictionaries.
- Implement Functions, Modules and Regular Expressions in PythonProgramming and to create practical and contemporary applications using these

COURSE OUTCOMES:
After successful completion of the course, students will be able to:
- **CO 1:** Classify data structures of Python.
- **CO 2:** Apply Python programming concepts to solve a variety of computational problems.
- **CO 3:** Understand the principles of object-oriented programming (OOP) in Python, including classes, objects, inheritance, polymorphism, and encapsulation, and apply them to design and implement Python programs.
- **CO 4:** Become proficient in using commonly used Python libraries and frameworks such as JSON, XML, NumPy, pandas.
- **CO 5:** Exhibit competence in implementing and manipulating fundamental data structures such as lists, tuples, sets, dictionaries.
- **CO 6:** Propose new solutions to computational problems

UNIT I
History of Python Programming Language, Thrust Areas of Python, Installing Anaconda Python Distribution, Installing and Using Jupiter Notebook.
Parts of Python Programming Language: Identifiers, Keywords, Statements and Expressions, Variables, Operators, Precedence and Associativity, Data Types, Indentation, Comments, Reading Input, Print Output, Type Conversions, the type () Function and Is Operator, Dynamic and Strongly Typed Language.
Control Flow Statements: if statement, if-else statement, if.eif else, Nested if statement, while Loop, for Loop, continue and break Statements, Catching Exceptions Using try and except Statement.

Sample Experiments:
1. Write a program to find the largest element among three Numbers.
2. Write a Program to display all prime numbers within an interval
3. Write a program to swap two numbers without using a temporary variable.
4. Demonstrate the following Operators in Python with suitable examples.
    - Arithmetic Operators
    - Relational Operators
    - Assignment Operators
    - Logical Operators
    - Bit wise Operators Ternary Operator
    - Membership Operators Identity Operators
5. Write a program to print multiplication table of a given number.

UNIT II
Functions: Built-In Functions, Commonly Used Modules, Function Definition and Calling the function, return Statement and void Function, Scope and Lifetime of Variables, Default Parameters, Keyword Arguments, *args and **kwargs, Command Line Arguments.
Strings: Creating and Storing Strings, Basic String Operations, Accessing Characters in String by Index Number, String Slicing and Joining, String Methods, Formatting Strings.

Lists: Creating Lists, Basic List Operations, Indexing and Slicing in Lists.

Sample Experiments:

1. Write a program to define a function with multiple return values.
2. Write a program to define a function using default arguments.
3. Write a program to find the length of the string without using any library functions.
4. Write a program to check if the substring is present in a given string or not.
5. Write a program to perform the given operations on a list:
   i. Addition ii. Insertion iii. slicing
6. Write a program to perform any 5 built-in functions by taking any list

UNIT III

Dictionaries: Creating Dictionary, Accessing and Modifying key: value Pairs in Dictionaries, Built-In Functions Used on Dictionaries, Dictionary Methods, del Statement.

Tuples and Sets: Creating Tuples, Basic Tuple Operations, tuple() Function, Indexing and Slicing in Tuples, Built-In Functions Used on Tuples, Relation between Tuples and Lists, Relation between Tuples and Dictionaries.

Sample Experiments:

1. Write a program to create tuples (name, age, address, college) for at least two members and concatenate the tuples and print the concatenated tuples.
2. Write a program to count the number of vowels in a string (No control flow allowed).
3. Write a program to sum all the items in a given dictionary.

UNIT IV

Files: Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Python os and os.path Modules.

Object-Oriented Programming: Classes and Objects, Creating Classes in Python, Creating Objects in Python, Constructor Method, method overloading, constructor overloading, classes with Multiple Objects, Inheritance, Polymorphism.

Sample Experiments:

1. Write a program to create Classes and Objects in Python
2. Write a program to implement inheritance concept
3. Write a Python program to implement method overloading, constructor overloading

UNIT V

Introduction to Data Science: NumPy, Pandas, Matplotlib libraries.

Sample Experiments:

1. Python Program to demonstrate NumPy arrays creation using array () function.
2. Python program to demonstrate use of ndim, shape, size, dtype.
3. Python programs to demonstrate different ways to create Pandas Dataframe
4. Python programs to demonstrate various plots in matplotlib.

REAL TIME PROJECT:

Dice Rolling Simulator in Python

REFERENCES:

1. Gowrishankar S, Veena A., Introduction to Python Programming, CRC Press 1st Edition, 2018
2. Python Programming, S Sridhar, J Indumathi, V M Hariharan, 2nd Edition, Pearson, 2024
3. Introduction to Programming Using Python, Y. Daniel Liang, Pearson 1stEdition 2017.

ONLINE RESOURCES:

1. https://www.coursera.org/learn/python-for-applied-data-science-ai
2. https://www.coursera.org/learn/python?specialization=python#syllabus

II Year B.Tech. ECE – I Semester

L	T	P	C
2	0	0	0

(CH23AMC301) ENVIRONMENTAL SCIENCE

COURSE OBJECTIVES:

The objective of this course is:

- To make the students to get awareness on environment.
- To understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life.
- To save earth from the inventions by the engineers.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

- **CO 1:** Exploring different types of renewable and non-renewable energy sources.
- **CO 2:** Students will learn about the structure and function of different ecosystems.
- **CO 3:** Students will learn about different types of pollution and their sources, effects and control measures.
- **CO 4:** Exploring the science behind climate change, its evidence, and its impacts on ecosystems and human societies.
- **CO 5:** Understanding demographic factors and their environmental implications.

UNIT I: (6 Periods)

Multidisciplinary Nature of Environmental Studies: Definition, Scope and Importance – Need for Public Awareness.

Natural Resources: Energy Resources**-** Renewable and Non-Renewable Resources – Natural Resources and Associated Problems – Forest Resources – Use and Over – Exploitation, Deforestation, Case Studies – Timber Extraction – Mining, Dams and other effects on Forest and Tribal People Water Resources – Use and Over Utilization of Surface and Ground Water – Floods, Drought, conflicts over Water, Dams – Benefits and Problems – Mineral Resources: Use and Exploitation, Environmental Effects of extracting and using Mineral Resources, Case Studies – Food Resources, World Food Problems, changes caused by Agriculture and Overgrazing, Effects of Modern Agriculture, Fertilizer-Pesticide Problems, Water Logging, Salinity, Case Studies.

UNIT II: (7 Periods)

Ecosystems: Concept of an Ecosystem. – Structure and Function of an Ecosystem – Producers, Consumers and Decomposers – Energy flow in the Ecosystem – Ecological Succession – Food Chains, Food Webs and Ecological Pyramids – Introduction, Types, Characteristic Features, Structure and Function of the following Ecosystems:

a) Forest Ecosystem.
b) Grassland Ecosystem
c) Desert Ecosystem.
d) Aquatic Ecosystems (Freshwater - Ponds, Streams, Lakes, Rivers, Marine Ecosystem- Oceans, Estuaries)

Biodiversity and its Conservation : Introduction, Definition: Genetic, Species and Ecosystem Diversity – Bio-Geographical Classification of India – Value of Biodiversity: Consumptive use, Productive use, Social, Ethical, Aesthetic and Option Values – Biodiversity at Global, National and Local levels – India as a Mega-Diversity Nation – Hot-Spots of Biodiversity – Threats to Biodiversity: Habitat Loss, Poaching of Wildlife, Man-Wildlife Conflicts – Endangered and Endemic Species of India – Conservation of Biodiversity: In-situ and Ex-situ Conservation of Biodiversity. Specific Case Studies.

UNIT III: **(6 Periods)**

Environmental Pollution: Definition, Cause, Effects, and Control measures of: Air Pollution, Water Pollution, Soil Pollution, Marine Pollution, Noise Pollution, Thermal Pollution, Nuclear Hazards - Pollution Case Studies - Role of an Individual in the Prevention of Pollution - Solid Waste Management- Causes, Effects and Control Measures of Urban and Industrial Wastes - Disaster Management-Floods, Earthquakes, Cyclones and Landslides.

UNIT IV: **(5 Periods)**

Social Issues and the Environment: Sustainable Development Goals, From Unsustainable to Sustainable Development–Urban Problems related to Energy – Water Conservation, Rainwater Harvesting, Watershed Management –Resettlement and Rehabilitation of People; Its Problems and Concerns. Case Studies – Environmental Ethics: Issues and Possible Solutions – Climate Change, Global Warming, Acid Rain, Ozone Layer Depletion, Nuclear Accidents and Holocaust. Case Studies – Wasteland Reclamation. – Consumerism and Waste Products - Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and Control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in Enforcement of Environmental Legislation – Public Awareness.

UNIT V: **(6 Periods)**

Human Population and the Environment: Population Growth, Variation among Nations. Population Explosion – Family Welfare Programmes. – Environment and Human Health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of Information Technology in Environment and Human Health – Case Studies.

Field Work: Visit a Local Area to Document Environmental Assets River / Forest Grassland / Hill / Mountain – Polluted Site – Urban / Rural / Industrial / Agricultural - Study of Common Plants, Insects and Birds – River, Hill Slopes.

Total Periods: 30

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses Erach Bharucha for University Grants Commission, Universities Press, Third Edition, 2021.
2. K. Raghavan Nambiar, "Textbook of Environmental Studies for Undergraduate Courses as per UGC model syllabus", Scitech Publications (India), Pvt. Ltd. Second Edition, 2008.
3. Palaniswamy, "Environmental Studies", Pearson Education, Second Edition, 2014.
4. S. Azeem Unnisa, "Environmental Studies" Academic Publishing Company
5. A. Koushik & C. P. Koushik, Perspectives in Environmental Studies, New Age International,Fourth Edition, 2006.

REFERENCES:

1. Deeksha Dave and E. Sai Baba Reddy, "Textbook of Environmental Science", Cengage Publications, Second Edition, 2012.
2. M. Anji Reddy, "Textbook of Environmental Sciences and Technology", BS Publication, Second Edition, 2023.
3. J.P. Sharma, Comprehensive Environmental studies, Laxmi publications, Third Edition, 2009.
4. J. Glynn Henry and Gary W. Heinke, "Environmental Sciences and Engineering", Prentice Hall of India Private Limited, Second Edition, 2004.
5. G.R. Chatwal, "A Text Book of Environmental Studies" Himalaya Publishing House, Fourth Edition, 2014.
6. Gilbert M. Masters and Wendell P. Ela, "Introduction to Environmental Engineering and Science, Prentice Hall of India Private Limited, Third Edition, 2007.

II Year B.Tech. ECE – II Semester

L	T	P	C
3	0	0	3

(EE23AES401) LINEAR CONTROL SYSTEMS

COURSE OBJECTIVES:

The objective of this course is:

- Introduce the basic principles and applications of control systems.
- Learn the time response and steady state response of the systems.
- Know the time domain analysis and solutions to time invariant systems.
- Understand different aspects of stability analysis of systems in frequency domain.
- Understand the concept of state space, controllability and observability.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

- **CO 1:** Analyze and model various control systems transfer functions using differential equations, block diagram reduction techniques and signal flow graphs.
- **CO 2:** Evaluate the transient and steady-state response of control systems and the effects of different controllers.
- **CO 3:** Apply stability criteria and root locus methods to determine and analyze system stability.
- **CO 4:** Analyze frequency response using Bode, Polar, and Nyquist plots to assess system stability and performance.
- **CO 5:** Construct and solve state space models of continuous systems and evaluate their controllability and observability.

UNIT I: (9 periods)

Control Systems Concepts: Open loop and closed loop control systems and their differences- Examples of control systems- Classification of control systems, Feedback characteristics, Effects of positive and negative feedback, Mathematical models – Differential equations of translational and rotational mechanical systems and electrical systems, Analogous Systems, Block diagram reduction methods – Signal flow graphs - Reduction using Mason's gain formula. Controller components, DC Servomotor and AC Servo motor their transfer functions, Synchros.

UNIT II: (9 periods)

Time Response Analysis: Step Response - Impulse Response - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants, Study of effects of P, PI, PD and PID Controllers on second order system.

UNIT III: (9 periods)

Stability Analysis in Time Domain: The concept of stability – Routh's stability criterion – Stability and conditional stability - limitations of Routh's stability. The Root locus concept - construction of root loci-effects of adding poles and zeros to G(s) H(s) on the root loci.

UNIT IV: (9 periods)

Frequency Response Analysis: Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram - Stability Analysis from Bode Plots. Polar Plots- Nyquist Plots- Phase margin and Gain margin-Stability Analysis.

Compensation techniques – Study of Effects of Lag, Lead, Lag-Lead Compensators on a second order system.

UNIT V: **(9 periods)**

State Space Analysis of Continuous Systems: Concepts of state, state variables and state model - differential equations and Transfer function models - Block diagrams. Diagonalization, Transfer function from state model, solving the Time invariant state Equations- State Transition Matrix and its Properties. System response through State Space models. The concepts of controllability and observability.

Total Periods: 45

TEXT BOOKS:

1 Modern Control Engineering by Katsuhiko Ogata, Prentice Hall of India Pvt. Ltd., 5th edition, 2010.
2 Control Systems Engineering by I. J. Nagrath and M. Gopal, New Age International (P) Limited Publishers, 5th edition, 2007.
3 Control Systems by A. Nagoor Kani, RBA Publications, 3rd edition, 2017.

REFERENCES:

1. Control Systems Principles and Design by M.Gopal, 4th Edition, McGraw Hill Education, 2012.
2. Automatic Control Systems by B. C. Kuo and Farid Golnaraghi, John wiley and sons, 8th edition, 2003.
3. Feedback and Control Systems, Joseph J Distefano III, Allen R Stubberud and Ivan J Williams, 2nd Edition, Schaum's outlines, McGraw Hill Education, 2013.
4. Control System Design by Graham C. Goodwin, Stefan F. Graebe and Mario E. Salgado, Pearson, 2000.
5. Feedback Control of Dynamic Systems by Gene F. Franklin, J.D. Powell and Abbas Emami- Naeini, 6th Edition, Pearson, 2010.

II Year B.Tech. ECE – II Semester

L	T	P	C
2	0	0	2

(BA23AHS403) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

COURSE OBJECTIVES:

The objective of this course are to:

- To inculcate the basic knowledge of micro economics and financial accounting.
- To make the students learn how demand is estimated for different products, input-output relationship for optimizing production and cost.
- To Know the Various types of market structure and pricing methods and strategy.
- To give an over view on investment appraisal methods to promote the students to learn how to plan long-term investment decisions.
- To provide fundamental skills on accounting and to explain the process of preparing financial statements.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

- **CO 1:** Define the concepts related to Managerial Economics, financial accounting and management.
- **CO 2:** Understand the fundamentals of Economics viz., Demand, Production, cost, revenue and markets.
- **CO 3:** Apply the Concept of Production cost and revenues for effective Business decision.
- **CO 4:** Analyze how to invest their capital and maximize returns and evaluate the capital budgeting techniques.
- **CO 5:** Develop the accounting statements and evaluate the financial performance of business entity.

UNIT I: (6 Periods)

Managerial Economics: Introduction – Nature, meaning, significance, functions, and advantages. Demand-Concept, Function, Law of Demand- Demand Elasticity- Types– Measurement. Demand Forecasting- Factors governing Forecasting, Methods. Managerial Economics and Financial Accounting and Management.

UNIT II: (6 Periods)

Production and Cost Analysis: Introduction – Nature, meaning, significance, functions and advantages. Production Function– Least- cost combination– Short run and long run Production Function- Isoquants and Is costs, Cost & Break-Even Analysis - Cost concepts and Cost behaviour- Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems).

UNIT III: (6 Periods)

Business Organizations and Markets: Introduction – Forms of Business Organizations- Sole Proprietary- Partnership - Joint Stock Companies - Public Sector Enterprises. Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition Monopoly- Monopolistic Competition– Oligopoly-Price-Output Determination - Pricing Methods and Strategies

UNIT IV: (6 Periods)

Capital Budgeting: Introduction – Nature, meaning, significance. Types of Working Capital, Components, Sources of Short-term and Long-term Capital, Estimating Working capital requirements.

Capital Budgeting: Features, Proposals, Methods and Evaluation. Projects – Pay Back Method, Accounting Rate of Return (ARR) Net Present Value (NPV) Internal Rate Return (IRR) Method (sample problems)

UNIT V: **(6 Periods)**

Financial Accounting and Analysis: Introduction–Concepts and Conventions- Double-Entry Bookkeeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). Introduction to Financial Analysis -Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability.

Total Periods: 30

TEXT BOOKS:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand.
2. Aryasri: Business Economics and Financial Analysis,4/e, MGH.

REFERENCES:

1. Ahuja Hl Managerial economics Schand.
2. S.A.Siddiqui and A.S.Siddiqui: Managerial Economics and Financial Analysis, New Age International.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage.

ONLINE RESOURCES:

1. https://www.slideshare.net/123ps/managerial-economics-ppt
2. https://www.slideshare.net/rossanz/production-and-cost-45827016
3. https://www.slideshare.net/darkyla/business-organizations-19917607
4. https://www.slideshare.net/balarajbl/market-and-classification-of-market
5. https://www.slideshare.net/ruchi101/capital-budgeting-ppt-59565396
6. https://www.slideshare.net/ashu1983/financial-accounting

II Year B.Tech. ECE – II Semester

L	T	P	C
3	0	0	3

(EC23APC401) ANALOG AND DIGITAL COMMUNICATIONS

COURSE OBJECTIVES:

The objective of this course are to:

- Introduce various modulation and demodulation techniques of analog and digital communication systems.
- Analyze different parameters of analog and digital communication techniques.
- Understand function of various stages of AM, FM transmitters and Know characteristics of AM &FM receivers.
- Analyze the performance of various digital modulation techniques in the presence of AWGN.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

- **CO 1:** Recognize the basic terminology used in analog and digital communication technique for transmission of information/data.
- **CO 2:** Explain the basic operation of different analog and digital communication systems at Base band and passband level.
- **CO 3:** Compute various parameters of baseband and passband transmission schemes by applying basic engineering knowledge.
- **CO 4:** Analyze the performance of different modulation & demodulation techniques to solve complex problems in the presence of noise.
- **CO 5:** Evaluate the performance of analog and digital modulation techniques to know merits and demerits of each one in terms of bandwidth and power efficiency.

UNIT I: (10 Periods)

Amplitude Modulation: Need for modulation, Amplitude Modulation - Time and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves - Switching modulator, Detection of AM Waves - Envelope detector, DSBSC modulation - time and frequency domain description, Generation of DSBSC Waves - Balanced Modulators, Coherent detection of DSB-SC Modulated waves, COSTAS Loop, SSB modulation - time and frequency domain description, frequency discrimination and Phase discrimination methods for generating SSB, Demodulation of SSB Waves, principle of Vestigial side band modulation.

UNIT II: (9 Periods)

Angle Modulation: Basic concepts of Phase Modulation, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave using Bessel functions, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Signal- Armstrong Method, Detection of FM Signal: Balanced slope detector, Phase locked loop, Comparison of FM and AM., Concept of Pre-emphasis and de-emphasis

UNIT III: (8 Periods)

Transmitters: Classification of Transmitters, AM Transmitters, FM Transmitters Receivers: Radio Receiver - Receiver Types - Tuned radio frequency receiver, Superheterodyne receiver, RF section and Characteristics - Frequency changing and tracking,Intermediate frequency, Image frequency, AGC, Amplitude limiting, FM Receiver,Comparison of AM and FM Receivers.

UNIT IV: (9 Periods)

Introduction to Noise: Types of Noise, Receiver Model, Noise in AM, DSB, SSB, andFM Receivers.

Pulse Modulation: Types of Pulse modulation- PAM, PWM and PPM. Comparison of FDM and TDM. Pulse Code Modulation: PCM Generation and Reconstruction, Quantization Noise, Non-Uniform Quantization and Companding, Delta Modulation, DPCM, Noise in PCM and DM.

UNIT V: (9 Periods)

Digital Modulation Techniques: Coherent Digital Modulation Schemes – ASK, BPSK, BFSK, QPSK, Non-coherent BFSK, DPSK. M-ary Modulation Techniques, Power Spectra, Bandwidth Efficiency.

Baseband Transmission and Optimal Reception of Digital Signal: A Baseband Signal Receiver, Probability of Error, Optimum Receiver, Coherent Reception, ISI, Eye Diagrams.

Total Periods: 45

TEXTBOOKS:

1. Simon Haykin, "Communication Systems", John Wiley & Sons, 4th edition, 2004.
2. Wayne Tomasi - Electronics Communication Systems – Fundamentals through Advanced, 5th edition., PHI, 2009
3. B. P. Lathi, Zhi Ding ", Modern Digital and Analog Communication Systems", Oxfordpress, 2011.

REFERENCES:

1. Sam Shanmugam, "Digital and Analog Communication Systems", John Wiley & Sons,1999.
2. Bernard Sklar, F. J. Harris", Digital Communications: Fundamentals and Applications",Pearson Publications, 2020.
3. Taub and Schilling", Principles of Communication Systems", Tata McGraw Hill, 2007.

II Year B.Tech. ECE – II Semester

L	T	P	C
3	0	0	3

(EC23APC402) ELECTRONIC CIRCUIT ANALYSIS

COURSE OBJECTIVES:

The objective of this course are to:

- Understand the characteristics of Differential amplifiers, feedback and power amplifiers.
- Analyze the response of tuned amplifiers
- Categorize different oscillator circuits based on the application
- Design the electronic circuits for the given specifications and for a given application.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

- **CO 1:** Understand the working principle and characteristics of Multistage amplifiers, differential amplifiers.
- **CO 2:** Analyze the frequency response of multistage and differential amplifier circuits usingBJT & MOSFETs at low and high frequencies.
- **CO 3:** Apply basic principles to solve the problems related to oscillators and feedbackamplifiers.
- **CO 4:** Design different feedback amplifiers and power amplifier circuits based on the application.
- **CO 5:** Evaluate the performance of different tuned amplifiers and multivibrators.

UNIT I: (9 Periods)

Multistage & Differential Amplifiers: Introduction, Classification of Amplifiers, Distortion in amplifiers, Coupling Schemes, RC Coupled Amplifier using BJT, Cascaded RC Coupled BJT Amplifiers, Cascode amplifier, Darlington pair, the MOS Differential Pair, Small-Signal Operation of the MOS Differential Pair, the BJT Differential Pair.

UNIT II: (8 Periods)

Frequency Response: Low-Frequency Response of the CS and CE Amplifiers, Internal Capacitive Effects and the High-Frequency Model of the MOSFET and the BJT, High-Frequency Response of the CE, Emitter follower, CS, CD, f_β,f_T and gain bandwidth product.

UNIT III: (10 Periods)

Feedback Amplifiers: Introduction, The General Feedback Structure, Some Properties of Negative Feedback, The Four Basic Feedback Topologies, Series—Shunt, Series—Series, Shunt—Shunt, Shunt—Series.

Oscillators: General Considerations, Phase Shift Oscillator, Wien-Bridge Oscillator, LC Oscillators, Relaxation Oscillator, Crystal Oscillators, Illustrative Problems.

UNIT IV: (8 Periods)

Power Amplifiers: Introduction, Class A amplifiers (Series fed, Transformer coupled, Push pull), Second Harmonic distortion, Class B amplifiers (Push pull, Complementary symmetry), Crossover distortion and Class AB operation, Class C amplifiers.

UNIT V: (10 Periods)

Tuned Amplifiers: Introduction, single Tuned Amplifiers – Q-factor, frequency response, Double Tuned Amplifiers – Q-factor, frequency response, Concept of stagger tuning.

Multivibrators: Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using Transistors.

Total Periods: 45

TEXT BOOKS:

1. Adel. S. Sedra and Kenneth C. Smith, "Micro Electronic Circuits," 6th edition, Oxford University Press, 2011.
2. J. Millman, H. Taub and Mothiki S. PrakashRao - Pulse, Digital and Switching Waveforms –2nd edition., TMH, 2008.
3. Millman, C Chalkias, "Integrated Electronics", 4th edition, McGraw Hill Education (India) Private Ltd., 2015.

REFERENCES:

1. Behzad Razavi, "Fundamentals of Micro Electronics", Wiley, 2010.
2. Donald A Neamen, "Electronic Circuits – Analysis and Design," 3rd edition, McGraw Hill (India), 2019.
3. Robert L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuits Theory", 9th edition, Pearson/Prentice Hall, 2006.

II Year B.Tech. ECE – II Semester

L	T	P	C
3	0	0	3

(EC23APC403) EM WAVES AND TRANSMISSION LINES

COURSE OBJECTIVES:

The objective of this course are to:

- To understand and analyze different laws and theorems of electrostatic fields.
- To study and analyze different laws and theorems of magneto-static fields.
- Analyzing Maxwell's equations in different forms.
- To learn the concepts of wave theory and its propagation through various mediums.
- To get exposure to the properties of transmission lines.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

- **CO 1:** Learn the concepts of wave theory and its propagation through various mediums.
- **CO 2:** Understand the properties of transmission lines and their applications.
- **CO 3:** Apply the laws & theorems of electrostatic fields to solve the related problems.
- **CO 4:** Gain proficiency in the analysis and applications of magnetostatic laws and theorems.
- **CO 5:** Analyze Maxwell's equations in different forms.

UNIT I: (10 Periods)

Review of Co-ordinate Systems, **Electrostatics:** Coulomb's Law, Electric Field Intensity, Electric Flux Density, Gauss Law and Applications, Electric Potential, Maxwell's Two Equations for Electrostatic Fields, Energy Density, Illustrative Problems. Convection and Conduction Currents, Dielectric Constant, Poisson's and Laplace's Equations; Capacitance – Parallel Plate, Coaxial Capacitors, Illustrative Problems.

UNIT II: (10 Periods)

Magneto-statics: Biot-Savart Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law, Inductances and Magnetic Energy, Illustrative Problems**.**

Maxwell's Equations (Time Varying Fields): Faraday's Law and Transformer EMF, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements, Conditions at a Boundary Surface, Illustrative Problems.

UNIT III: (9 Periods)

EM Wave Characteristics: Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definition, All Relations Between E & H, Sinusoidal Variations, Wave Propagation in Lossy dielectrics, lossless dielectrics, free space, wave propagation in good conductors, skin depth, Polarization & Types, Illustrative Problems.

Reflection and Refraction of Plane Waves – Normal and Oblique Incidences, for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection,Surface Impedance, Poynting Vector and Poynting Theorem, Illustrative Problems.

UNIT IV: (8 Periods)

Transmission Lines - I : Types, Parameters, T & π Equivalent Circuits, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line, Lossless lines, distortion less lines, Illustrative Problems.

UNIT V: **(8 Periods)**

Transmission Lines – II: Input Impedance Relations, Reflection Coefficient, VSWR, Average Power, Shorted Lines, Open Circuited Lines, and Matched Lines, Smith Chart – Construction and Applications, Quarter wave transformer, Single Stub Matching, Illustrative Problems.

Total Periods: 45

TEXT BOOKS:

1. Elements of Electromagnetics, Matthew N.O. Sadiku, 4th edition, Oxford University Press, 2008.
2. Electromagnetic Waves and Radiating Systems, E.C. Jordan and K.G. Balmain, 2nd edition, PHI, 2000

REFERENCES:

1. Electromagnetic Field Theory and Transmission Lines, G. S. N. Raju, 2nd edition, Pearson Education, 2013.
2. Engineering Electromagnetics, William H. Hayt Jr. and John A. Buck, 7th edition, Tata McGraw Hill, 2006.
3. Electromagnetics, John D. Krauss, 3rd edition, McGraw Hill, 1988.
4. Networks, Lines, and Fields, John D. Ryder,2nd edition, PHI publications, 2012.

II Year B.Tech. ECE – II Semester

L	T	P	C
1	0	2	2

(CS23AES301) DESIGN THINKING AND INNOVATION

COURSE OBJECTIVES:

The objective of this course are to:

- The objective of this course is to familiarize students with design thinking process as a tool for breakthrough innovation.
- It aims to equip students with design thinking skills and ignite their minds to create innovative ideas, develop solutions for real-time problems.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: Define the concepts related to design thinking.
CO 2: Explain the fundamentals of Design Thinking and innovation.
CO 3: Apply the design thinking techniques for solving problems in various sectors.
CO 4: Analyze to work in a multidisciplinary environment.
CO 5: Evaluate the value of creativity.
CO 6: Formulate specific problem statements of real-time issues.

UNIT I: **(2 Periods)**

Introduction to Design Thinking Introduction to elements and principles of Design, basics of design - dot, line, shape, form as fundamental design components. Principles of design. Introduction to design thinking, history of Design Thinking, new materials in Industry.

UNIT II: **(2 Periods)**

Design Thinking Process Design thinking process (empathize, analyze, idea & prototype), implementing the process in driving inventions, design thinking in social innovations. Tools of design thinking - person, customer, journey map, brainstorming, product development.

Activity: Every student presents their idea in three minutes. Every student can present the design process in the form of a flow diagram or flow chart, etc. Every student should explain about product development.

UNIT III: **(4 Periods)**

Innovation Art of innovation, difference between innovation and creativity, role of creativity and innovation in organizations - Creativity to Innovation - Teams for innovation - Measuring the impact and value of creativity.

Activity: Debate on innovation and creativity, flow and planning from idea to innovation, debate on value-based innovation.

UNIT IV: **(3 Periods)**

Product Design Problem formation, introduction to product design, product strategies, product value, product planning, product specifications - Innovation towards product design - Case studies.

Activity: Importance of modeling, how to set specifications, explaining their own product design.

UNIT V: **(4 Periods)**

Design Thinking in Business Processes Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business - Business challenges: Growth, Predictability, Change, Maintaining Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs - Design thinking for Startups - Defining and testing Business Models and Business Cases - Developing & testing prototypes.

Activity: How to market our own product, about maintenance, reliability and plan for startup.

Total Periods: 15

TEXT BOOKS:

1. Tim Brown, Change by Design, Harper Collins (2009)
2. Idris Mootee, Design Thinking for Strategic Innovation, 2013, John Wiley & Sons.

REFERENCES:

1. David Lee, Design Thinking in the Classroom, Ulysses Press
2. Shrutin N Shetty, Design the Future, Norton Press
3. William Lidwell, Universal Principles of Design - Kritinaholden, Jill Butter.
4. Chesbrough H, The Era of Open Innovation – 2013

ONLINE RESOURCES:

1. https://nptel.ac.in/courses/110/106/110106124/
2. https://nptel.ac.in/courses/109/104/109104109/
3. https://swayam.gov.in/nd1_noc19_mg60/preview

II Year B.Tech. ECE – II Semester

L	T	P	C
0	0	3	1.5

(EC23APC404) ANALOG AND DIGITAL COMMUNICATIONS LAB

COURSE OBJECTIVES:
The objectives of this course are to:
- Understand the basics of analog and digital modulation techniques.
- Integrate theory with experiments so that the students appreciate the knowledge gained from the theory course.
- Design and implement different modulation and demodulation techniques and their applications.
- Develop cognitive and behavioral skills for performance analysis of various modulation techniques.

COURSE OUTCOMES:
After successful completion of the course, students will be able to:
- **CO 1:** Know about the usage of equipment/components/software tools used to conduct experiments in analog and digital modulation techniques.
- **CO 2:** Conduct the experiment based on the knowledge acquired in the theory about modulation and demodulation schemes to find the important metrics of the communication system experimentally.
- **CO 3:** Analyze the performance of a given modulation scheme to find the important metrics of the system theoretically.
- **CO 4:** Compare the experimental results with that of theoretical ones and infer the conclusions.

List of Experiments:
Design the circuits and verify the following experiments taking minimum of six fromeach section shown below.

Section-A
1. AM Modulation and Demodulation
2. DSB-SC Modulation and Demodulation
3. Frequency Division Multiplexing
4. FM Modulation and Demodulation
5. Radio receiver measurements
6. PAM Modulation and Demodulation
7. PWM Modulation and Demodulation
8. PPM Modulation and Demodulation

Section-B
1. Sampling Theorem.
2. Time Division Multiplexing
3. Delta Modulation and Demodulation
4. PCM Modulation and Demodulation
5. BPSK Modulation and Demodulation
6. BFSK Modulation and Demodulation
7. QPSK Modulation and Demodulation
8. DPSK Modulation and Demodulation

Note: Faculty members (who are handling the laboratory) are requested to instruct the students not to use readymade kits for conducting the experiments. They are advised to make the students work in the laboratory by constructing the circuits and analyzing them during the lab sessions.

II Year B.Tech. ECE – II Semester

L	T	P	C
0	0	3	1.5

(EC23APC405) ELECTRONIC CIRCUIT ANALYSIS LAB

COURSE OBJECTIVES:

The objective of this course are to:

- Plot the characteristics of Differential amplifiers, feedback and power amplifiers.
- Analyze the response of tuned amplifiers and multivibrators.
- Categorize different oscillator circuits based on the application.
- Design the electronic circuits for the given specifications and for a given application.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

- **CO 1:** Evaluate gain and bandwidth of multistage amplifiers from its frequency response.
- **CO 2:** Analyze the operation of different feedback amplifiers and oscillators.
- **CO 3:** Evaluate the efficiency of power amplifiers.
- **CO 4:** Compute the resonant frequency of tuned amplifiers.
- **CO 5:** Simulate electronic circuits by using appropriate simulation software.

List of Experiments:

1. Design and Analysis of Darlington pair.
2. Frequency response of CE – CC multistage AmplifieR.
3. Design and Analysis of Cascode Amplifier.
4. Frequency Response of Differential Amplifier
5. Design and Analysis of any two topologies of feedback amplifies and find the frequency response of it.
6. Design and Analysis of Class A power amplifier.
7. Design and Analysis of Class AB amplifier.
8. Design and Analysis of RC phase shift oscillator.
9. Design and Analysis of LC Oscillator
10. Frequency Response of Single Tuned amplifier
11. Design a Bistable Multivibrator and analyze the effect of commutatingcapacitors and draw the wave forms at base and collector of transistors.
12. Design an Astable Multivibrator and draw the wave forms at base and collectorof transistors.
13. Design a Monostable Multivibrator and draw the input and output waveforms.
14. Draw the response of Schmitt trigger for gain of greater than and less than one

Note: At least 12 experiments shall be performed.

Faculty members who are handling the laboratory shall see that students are given design specifications for a given circuit appropriately and monitor the design and analysisaspects of the circuit.

II Year B.Tech. ECE – II Semester

L	T	P	C
0	1	2	2

(EG23ASC401) SOFT SKILLS

COURSE OBJECTIVES:

The objective of this course is:

- To encourage all round development of the students by focusing on soft skills.
- To make the students aware of critical thinking and problem-solving skills.
- To enhance healthy relationship and understanding within and outside an organization.
- To function effectively with heterogeneous teams.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1: List out various elements of soft skills.
CO 2: Describe methods for building professional image.
CO 3: Apply critical thinking skills in problem solving.
CO 4: Analyze the needs of an individual and team for well-being.
CO 5: Assess the situation and take necessary decisions.
CO 6: Create a productive workplace atmosphere using social and work-life skills ensuring personal and emotional well-being

UNIT I:

Soft Skills & Communication Skills: Soft Skills - Introduction, Need - Mastering Techniques of Soft Skills – Communication Skills -Significance, process, types - Barriers of communication - Improving techniques.

Activities:

Intrapersonal Skills - Narration about self- strengths and weaknesses- clarity of thought – self-expression – articulating with felicity.

(The facilitator can guide the participants before the activity citing examples from the lives of the great, anecdotes and literary sources).

Interpersonal Skills - Group Discussion – Debate – Team Tasks - Book and film Reviews by groups - Group leader presenting views (non- controversial and secular) on contemporary issues or on a given topic.

Verbal Communication-Oral Presentations – Extempore - brief addresses and speeches – Convincing - Negotiating- Agreeing and disagreeing with professional grace.

Non - verbal communication - Public speaking - Mock interviews - presentations with an objective to identify non - verbal clues and remedy the lapses on observation.

UNIT II:

Critical Thinking: Active Listening – Observation – Curiosity – Introspection – Analytical Thinking – Open- mindedness – Creative Thinking - Positive thinking – Reflection.

Activities:

Gathering information and statistics on a topic - sequencing – assorting – reasoning – critiquing issues – placing the problem – finding the root cause - seeking viable solution – judging with rationale – evaluating the views of others - Case Study, Story Analysis.

UNIT III:

Problem Solving & Decision Making: Meaning & features of Problem Solving – Managing Conflict – Conflict resolution – Team building - Effective decision making in teams – Methods & Styles.

Activities:

Placing a problem which involves conflict of interests, choice and views - formulating the problem - exploring solutions by proper reasoning - Discussion on important professional, career and organizational decisions and initiate debate on the appropriateness of the decision. Case Study & Group Discussion.

UNIT IV:

Emotional Intelligence & Stress Management: Managing Emotions – Thinking before Reacting – Empathy for Others – Self-awareness – Self-Regulation – Stress factors – Controlling Stress – Tips.

Activities:

Providing situations for the participants to express emotions such as happiness, enthusiasm, gratitude, sympathy, and confidence, compassion in the form of written or oral presentations. Providing opportunities for the participants to narrate certain crisis and stress –ridden situations caused by failure, anger, jealousy, resentment and frustration in the form of written and oral presentation, Organizing Debates

UNIT V:

Corporate Etiquette: Etiquette- Introduction, concept, significance - Corporate etiquette - meaning, modern etiquette, benefits - Global and local culture sensitivity - Gender Sensitivity - Etiquette in interaction- Cell phone etiquette - Dining etiquette - Netiquette - Job interview etiquette - Corporate grooming tips - Overcoming challenges.

Activities

Providing situations to take part in the Role Plays where the students will learn about bad and good manners and etiquette - Group Activities to showcase gender sensitivity, dining etiquette etc. - Conducting mock job interviews - Case Study - Business Etiquette Games.

NOTE:

1. The facilitator can guide the participants before the activity citing examples from the lives of the great, anecdotes, epics, scriptures, autobiographies and literary sources which bear true relevance to the prescribed skill.
2. Case studies may be given wherever feasible for example for Decision Making- The decision of King Lear.

TEXT BOOKS:

1. Mitra Barun K, Personality Development and Soft Skills, Oxford University Press, Pap/Cdr edition 2012.
2. Dr Shikha Kapoor, Personality Development and Soft Skills: Preparing for Tomorrow, I K International Publishing House, 2018.

REFERENCE:

1. Sharma, Prashant, Soft Skills: Personality Development for Life Success, BPB Publications 2018.
2. Alex K, Soft Skills S.Chand& Co, 2012 (Revised edition)
3. Gajendra Singh Chauhan & Sangeetha Sharma, Soft Skills: An Integrated Approach to Maximise Personality Published by Wiley, 2013
4. Pillai, Sabina & Fernandez Agna, Soft Skills and Employability Skills, Cambridge University Press, 2018.
5. Soft Skills for a Big Impact (English, Paperback, Renu Shorey) Publisher: Notion Press.
6. Dr. Rajiv Kumar Jain, Dr. Usha Jain, Life Skills (Paperback English) Publisher: Vayu Education of India, 2014.
7. Jain Er. A. K, Bhatia, S R Pravin and Sheik A.M., Professional Communication Skills: Publisher: S Chand, Revised Edition 2014.

ONLINE RESOURCES:

1. https://youtu.be/DUlsNJtg2L8?list=PLLy_2iUCG87CQhELCytvXh0E_y-bOO1_q
2. https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHlsQFwJZel_j2PUy0pwjVUgj7KlJ
3. https://youtu.be/-Y-R9hDl7lU
4. https://youtu.be/gkLsn4ddmTs
5. https://youtu.be/2bf9K2rRWwo
6. https://youtu.be/FchfE3c2jzc
7. https://www.businesstrainingworks.com/training-resource/five-free-business- etiquette-training-games/
8. https://onlinecourses.nptel.ac.in/noc24_hs15/preview
9. https://onlinecourses.nptel.ac.in/noc21_hs76/preview

COMMUNITY SERVICE PROJECT

Experiential learning through community engagement

Introduction

- Community Service Project is an experiential learning strategy that integrates meaningful community service with instruction, participation, learning and community development.
- Community Service Project involves students in community development and service activities and applies the experience to personal and academic development.
- Community Service Project is meant to link the community with the college for mutual benefit. The community will benefit with the focused contribution of the college students for the village/ local development. The college finds an opportunity to develop social sensibility and responsibility among students and emerge as a socially responsible institution.

Objective

Community Service Project should be an integral part of the curriculum, as an alternativeto the 2 months of Summer Internships / Apprenticeships / On the Job Training, wheneverthere is an exigency when students cannot pursue their summer internships.

The specific objectives are;

- To sensitize students to the living conditions of the people who are around them'To help students to realize the stark realities of society.
- To bring about an attitudinal change in the students and help them to develop societal consciousness, sensibility, responsibility and accountability
- To make students aware of their inner strength and help them to find new /out ofbox solutions to social problems.
- To make students socially responsible citizens who are sensitive to the needs ofthe disadvantaged sections.
- To help students to initiate developmental activities in the community in coordination with public and government authorities.
- To develop a holistic life perspective among the students by making themstudy culture, traditions, habits, lifestyles, resource utilization, wastages and its management, social problems, public administration system and the roles and responsibilities of different persons across different social systems.

Implementation of Community Service Project

- Every student should put in 6 weeks for the Community Service Project during the summer vacation.
- Each class/section should be assigned with a mentor.
- Specific Departments could concentrate on their major areas of concern. For example, Dept. of Computer Science can take up activities related to Computer Literacy to different sections of people like - youth, women, housewives, etc
- A logbook must be maintained by each of the students, where the activities undertaken/involved to be recorded.
- The logbook has to be countersigned by the concerned mentor/faculty in charge.
- An evaluation to be done based on the active participation of the student and grade could be awarded by the mentor/faculty member.
- The final evaluation to be reflected in the grade memo of the student.The Community Service Project should be different from the regular programs of
- NSS/NCC/Green Corps/Red Ribbon Club, etc.
- Minor project reports should be submitted by each student. An internal Viva shallalso be conducted by a committee constituted by the principal of the college.
- Award of marks shall be made as per the guidelines of Internship/apprentice/ onthe job training.

Procedure

A group of students or even a single student could be assigned for a particular habitation or village or municipal ward, as far as possible, in the near vicinity of their place of stay, to enable them to commute from their residence and return back by evening or so.

The Community Service Project is a twofold one –

- First, the student/s could conduct a survey of the habitation, if necessary, in terms of their own domain or subject area. Or it can even be a general survey, incorporating all the different areas. A common survey format could be designed. This should not be viewed as a duplication of work by the Village or Ward volunteers, rather, it could be another primary source of data.
- Secondly, the student/s could take up a social activity, concerning their domain or subject area. The different areas, could be like
  - Agriculture Health
  - Marketing and Cooperation
  - Animal Husbandry
  - Horticulture
  - Fisheries Sericulture
  - Revenue and Survey
  - Natural Disaster Management
  - Irrigation
  - Law & Order
  - Excise and Prohibition
  - Mines and Geology
  - Energy
  - Internet
  - Free Electricity
  - Drinking Water

EXPECTED OUTCOMES

Benefits of Community Service Project To Students

Learning Outcomes

- Positive impact on students' academic learning
- Improves students' ability to apply what they have learned in "the real world"
- Positive impact on academic outcomes such as demonstrated complexity of understanding, problem analysis, problem-solving, critical thinking, and cognitive development.
- Improved ability to understand complexity and ambiguity

Personal Outcomes

- Greater sense of personal efficacy, personal identity, spiritual growth, and moral development
- Greater interpersonal development, particularly the ability to work well with others, and build leadership and communication skills.

Social Outcomes

- Reduced stereotypes and greater inter-cultural understanding
- Improved social responsibility and citizenship skills
- Greater involvement in community service after graduation

Career Development

- Connections with professionals and community members for learning and career opportunities
- Greater academic learning, leadership skills, and personal efficacy can lead to greater opportunity.

Relationship with the Institution
- Stronger relationships with faculty
- Greater satisfaction with college
- Improved graduation rates

Benefits of Community Service Project to Faculty Members
- Satisfaction with the quality of student learning
- New avenues for research and publication via new relationships between faculty and community
- Providing networking opportunities with engaged faculty in other disciplines or institutions
- A stronger commitment to one's research.

Benefits of Community Service Project to Colleges and Universities
- Improved institutional commitment.Improved student retention
- Enhanced community relations

Benefits of Community Service Project to Community
- Satisfaction with student participation
- Valuable human resources needed to achieve community goals.
- New energy, enthusiasm and perspectives applied to community Work. Enhanced community-university relations.

SUGGESTIVE LIST OF PROGRAMMES UNDER COMMUNITY SERVICE PROJECT

The following are the recommended list of projects for Engineering students. The lists are not exhaustive and open for additions, deletions, and modifications. Colleges are expected to focus on specific local issues for this kind of project. The students are expectedto carry out these projects with involvement, commitment, responsibility, and accountability. The mentors of a group of students should take the responsibility of motivating, facilitating, and guiding the students. They have to interact with local leadership and people and appraise the objectives and benefits of this kind of project. The project reports shall be placed in the college website for reference. Systematic, Factual, methodical and honest reporting should be ensured.

For Engineering Students
1. Water facilities and drinking water availability
2. Health and hygiene
3. Stress levels and coping mechanisms
4. Health intervention programmes
5. Horticulture
6. Herbal plants
7. Botanical survey
8. Zoological survey
9. Marine products
10. Aqua culture
11. Inland fisheries
12. Animals and species
13. Nutrition
14. Traditional health care methods
15. Food habits
16. Air pollution
17. Water pollution
18. Plantation
19. Soil protection
20. Renewable energy
21. Plant diseases

22. Yoga awareness and practice
23. Health care awareness programmes and their impact
24. Use of chemicals on fruits and vegetables
25. Organic farming
26. Crop rotation
27. Floury culture
28. Access to safe drinking water
29. Geographical survey
30. Geological survey
31. Sericulture
32. Study of species
33. Food adulteration
34. Incidence of Diabetes and other chronic diseases
35. Human genetics
36. Blood groups and blood levels
37. Internet Usage in Villages
38. Android Phone usage by different people
39. Utilization of free electricity to farmers and related issues
40. Gender ration in schooling level- observation.

Complementing the community service project the students may be involved to take up some awareness campaigns on social issues/special groups. The suggested list of programs are

Programs for School Children

1. Reading Skill Program (Reading Competition)
2. Preparation of Study Materials for the next class.
3. Personality / Leadership Development
4. Career Guidance for X class students
5. Screening Documentary and other educational films
6. Awareness Program on Good Touch and Bad Touch (Sexual abuse)
7. Awareness Program on Socially relevant themes.

Programs for Women Empowerment

1. Government Guidelines and Policy Guidelines
2. Women's Rights
3. Domestic Violence
4. Prevention and Control of Cancer
5. Promotion of Social Entrepreneurship

General Camps

1. General Medical camps
2. Eye Camps
3. Dental Camps
4. Importance of protected drinking water
5. ODF awareness camp
6. Swatch Bharath
7. AIDS awareness camp
8. Anti-Plastic Awareness
9. Programs on Environment
10. Health and Hygiene
11. Hand wash programmes
12. Commemoration and Celebration of important days

Programs for Youth Empowerment

1. Leadership
2. Anti-alcoholism and Drug addiction
3. Anti-tobacco
4. Awareness on Competitive Examinations
5. Personality Developmen

Common Programs

1. Awareness on RTI
2. Health intervention programmes
3. Yoga
4. Tree plantation
5. Programs in consonance with the Govt. Departments like –
    i. Agriculture
    ii. Health
    iii. Marketing and Cooperation
    iv. Animal Husbandry
    v. Horticulture
    vi. Fisheries
    vii. Sericulture
    viii. Revenue and Survey
    ix. Natural Disaster Management
    x. Irrigation
    xi. Law & Order
    xii. Excise and Prohibition
    xiii. Mines and Geology
    xiv. Energy

Role of Students:

- Students may not have the expertise to conduct all the programmes on their own. The students then can play a facilitator role.
- For conducting special camps like Health related, they will be coordinating with the Governmental agencies.
- As and when required the College faculty themselves act as Resource Persons.
- Students can work in close association with Non-Governmental Organizations like Lions Club, Rotary Club, etc or with any NGO actively working in that habitation.
- And also, with the Governmental Departments. If the program is rolled out, the District Administration could be roped in for the successful deployment of the program.
- An in-house training and induction program could be arranged for the faculty and participating students, to expose them to the methodology of Service Learning.

Timeline for the Community Service Project Activity

Duration: 8 weeks

1. Preliminary Survey (One Week)

- A preliminary survey including the socio-economic conditions of the allotted habitation to be conducted.
- A survey form based on the type of habitation to be prepared before visiting the habitation with the help of social sciences faculty. (However, a template could be designed for different habitations, rural/urban.
- The Governmental agencies, like revenue administration, corporation and municipal authorities and village secretariats could be aligned for the survey.

2. Community Awareness Campaigns (One Week)

- Based on the survey and the specific requirements of the habitation, different awareness campaigns and programmes to be conducted, spread over two weeks of time. The list of activities suggested could be taken into consideration.

3. Community Immersion Programme (Three Weeks)

- **Along with the Community Awareness Programmes**, the student batch can also work with any one of the below-listed governmental agencies and work in tandem with them. This community involvement programme will involve the students in exposing themselves to experiential learning about the community and its dynamics. Programs could be in consonance with the Govt. Departments.

4. Community Exit Report (One Week)

- During the last week of the Community Service Project, a detailed report of the outcome of the 8 weeks' works to be drafted and a copy shall be submitted to the local administration. This report will be a basis for the next batch of students visiting that habitation. The same report submitted to the teacher-mentor will be evaluated by the mentor and suitable marks are awarded for onward submission to the University. Throughout the Community Service Project, a daily logbook need to be maintained by the students batch, which should be countersigned by the governmental agency representative and the teacher-mentor, who is required to periodically visit the students and guide them.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)
Karakambadi Road Tirupati-517 507

Course Structure and Syllabus
MBA Regular Two Year Degree Programme
(For the batches admitted from the academic year 2020-21)

SRI VENKATESWARA COLLEGE OF ENGINEERING

Accredited by NBA & NAAC 'A' Grade
(Approved by AICTE New Delhi, Affiliated to JNTUA, Anantapur)
Karakambadi Road, Tirupati A.P-517507
DEPARTMENT OF MASTER OF BUSSINESS ADMINISTRATION

CURRICULUM and SYLLABUS – 2020

MBA Semester – I

S. No	Course Code	Subject	L-T-P-C
1.	BA20EPC101	MANAGEMENT & ORGANIZATIONAL BEHAVIOUR	4-0-0-4
2.	BA20EPC102	BUSINESS ENVIRONNENT & LAW	4-0-0-4
3.	BA20EPC103	MANAGERIAL ECONOMICS	4-0-0-4
4.	BA20EPC104	ACCOUNTING FOR MANAGEMENT	4-0-0-4
5.	BA20EPC105	BUSINESS STATISTICS	4-0-0-4
6	BA20EPC106	BUSINESS COMMUNICATION	4-0-0-4
7.	BA20EPC107	INFORMATION TECHNOLOGY FOR MANAGERS	2-0-0-2
8.	BA20EPC108	BUSINESS COMMUNICATION LAB	0-0-2-1
9.	BA20EAC109	PERSONALITY DEVELOPMENT (AUDIT COURSE)	2-0-0-0
		Total	28-0-2-27

MBA Semester – II

S. No	Course code	Subject	L-T-P-C
1.	BA20EPC201	HUMAN RESOURCE MANAGEMENT	4-0-0-4
2.	BA20EPC202	MARKETING MANAGEMENT	4-0-0-4
3.	BA20EPC203	BUSINESS RESEARCH METHODS	4-0-0-4
4.	BA20EPC204	FINANCIAL MANAGEMENT	4-0-0-4
5.	BA20EPC205	OPERATIONS RESEARCH	4-0-0-4
6.	BA20EPC206	OPERATIONS MANAGEMENT	4-0-0-4
7.	BA20EPC207	MANAGEMENT INFORMATION SYSTEM	2-0-0-2
8.	BA20EPC208	BUSINESS ANALYTICS LAB	0-0-2-1
9	BA20EAC209	WORLD TRADE ORGANIZATION AND INTELLECTUAL PROPERTY RIGHTS(AUDIT COURSE)	2-0-0-0
		Total	**28-0-2-27**

***Note: The student shall initiate project work immediately after II semester and evaluation shall take place in IV semester**

MBA Semester – III

S. No	Course code	Subject	L-T-P-C
1.	BA20EPC301	INNOVATION AND ENTREPRENEURSHIP DEVELOPMENT	4-0-0-4
2.	BA20EPC302	Green Business Management	4-0-0-4
3.	 BA20EPE303 BA20EPE304 BA20EPE305 BA20EPE306	Elective I Cost and Management Accounting Product and Brand Management Human Resource Development Mobile Commerce	4-0-0-4
4.	 BA20EPE307 BA20EPE308 BA20EPE309 BA20EPE310	Elective II Financial Institutions and Services Consumer Behavior Labor laws and Legislation Supply Chain Management	4-0-0-4
5.	 BA20EPE311 BA20EPE312 BA20EPE313 BA20EPE314	Elective III Investment and Portfolio Management Retail Marketing Performance Management Enterprise Resource Planning	4-0-0-4
6.	 BA20EPE315 BA20EPE316 BA20EPE317 BA20EPE318	Elective IV Mergers and Acquisitions Advertising and Sales Promotion Management Knowledge Management Data warehousing and Mining	4-0-0-4
7.	BA20EPC319	Business Simulation Lab	0-0-4-2
8.	BA20EMC320	MOOCS	0-0-0-0
9.	BA20EMC321	Business Ethics and Corporate Governance (Mandatory Course)	0-0-0-0
		Total	**24-0-4-26**

MBA Semester – IV

S. No	Course code	Subject	L-T-P-C
1.	BA20EPC401	Strategic Management	4-0-0-4
2.	BA20EPC402	E-Business	4-0-0-4
3.	 BA20EPE403 BA20EPE404 BA20EPE405 BA20EPE406	Elective V Financial Derivatives Services Marketing Organization Development Data Communication and Network Analysis	3-0-0-3
4.	 BA20EPE407 BA20EPE408 BA20EPE409 BA20EPE410	Elective VI International Financial Management International Marketing Global Human Resource Management Corporate Information Management	3-0-0-3
5.	BA20ETS411	Seminar (Contemporary Issues on Business)	0-0-0-2
6.	BA20EPW412	Project Work	0-0-0-10
		Total	**14-0-0-26**

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA I Semester	**L**	**T**	**P**	**C**
	4	**0**	**0**	**4**

(BA20EPC101) MANAGEMENT & ORGANIZATIONAL BEHAVIOUR

Objective:
Togive a basic perspective of Management theories and Practices. This will form foundation to study other functional areas of management and to provide the students with the conceptual framework and the theories underlying Organisational Behaviour.

UNIT-I
Role of Management – Concept – Significance – Role of Manager- Functions – Principles of Management - Patterns of Management: Scientific – Behavioural – Systems – Contingency.

UNIT-II
Decision Making & Controlling – Process – Techniques.Planning – Process - Making It Effective.Controlling - System of Controlling – Controlling Techniques – Making Controlling Effective

UNIT-III
Individual Behaviour & Motivation – Understanding Individual Behaviour – Perception – Learning – Personality Types – Johari window- Transactional Analysis-Motivation– Concept of Motivation - Motivational Theories of Maslow, Herzberg, David McClelland, and Porter and Lawler

UNIT-IV
Leadership: Differences between Leader & Manager - Leadership – Leadership styles Leadership theories – Managerial Grid – Transactional Vs Transformational Leadership – Qualities of a good leader- Women Leadership in India.

UNIT-V
Organisational Behaviour–Organizing Process – DepartmentationTypes - Decentralization– Making Organizing Effective – Organisational culture- Types of culture – Organisational Culture VsOrganisational climate - Conflict management - Change Management.

Textbooks:
- Stephen P. Robbins (2018), Organisational Behaviour, 18th Edition, Pearson Education,
- Subbarao P (2017), Management and Organisational Behaviour, 3rd Edition, Himalaya Publishing House

References:
- Organisational Behaviour ,S.S.Khanka, S.Chand
- Organisational Behaviour , Mishra .M.N ,Vikas
- Management and Organisationalbehaviour, Pierce Gordner, Cengage.
- Behaviour in Organizations, Hiriyappa .B.New Age Publications
- Organisational Behaviour, Sarma, Jaico Publications.
- Principles of Management ,Murugesan ,Laxmi Publications
- Stephen P. Robbins and David A. Decenzo, Fundamentals of Management, Pearson
  Education

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA I Semester	**L**	**T**	**P**	**C**
	4	**0**	**0**	**4**

(BA20EPC102) BUSINESS ENVIRONMENT AND LAW

Objective:
To provide the student with a background of various environment factors that have major repercussions on business and sharpen their mind to watch and update the changes that occur constantly in this sphere.

UNIT-I
Introduction to Business Environment: Meaning, Components of Business Environment.-Industrial policy of 1991, Liberalization, Privatization and Globalization.

UNIT-II
Monetary,Fiscal and Trade Policy: Monetary& Fiscal Policy –, EXIM Policy, Role of EXIM Bank. Balance of Payments: WTO:Role and functions of WTO in promoting world trade –TRIPS, TRIMS and GATS, - Dumping and Anti-dumping measures.

UNIT-III
Law-Definition -Need, classification and sources of Business Law, Law of Contract - 1872 (Part-I): Nature of Contract and essential elements of a valid Contract, Offer and Acceptance. Law of Contract – 1872 (part-II): Consideration, Capacity to Contract and free consent, Legality of the object.

UNIT-IV
Companies Act, 1956 (Part-I): Kinds of Companies, Formulation of Companies, Incorporation, and Company Documents. Company Act, 1956 (Part-II): Company Management, Directors, Company meetings, Resolutions, Auditors, Modes of Winding-up of a company.

UNIT-V
Information Technology Act, 2000: Scope and Application of ITAct,2000-Digital signature e-governance, penalties and adjudication,cyber regulations appellate,tribunals,duties of subscribers- Right to Information Act,2005 –GST Act 2017.

Textbooks:
- K.Aswathappa (2017), Essentials of Business Environment, 13th Edition, Himalaya publishers.
- N.D.Kapoor (2019), Elements of Mercantile Law, 38th Edition, Sultan Chand & Sons.

References:
- Indian Economy, Dutt and Sundaram, S. Chand, New Delhi.
- Business Environment – Text and Cases, Justin Paul, TMH.
- Indian Economy- Misra and Puri, Himalaya.
- Business Environment, Suresh Bedi, Excel.
- Mercantile Law, S.S. Gulshan, 3/e, Excel Books,
- Legal Aspects of Business, Ravinder Kumar, Cengage.
- A Manual of Business Laws,S.N.Maheshwari&Maheshwari, Himalaya.
- Business law for management, K.R.Bulchandani-Himalaya Publishing.

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA I Semester	**L**	**T**	**P**	**C**
	4	**0**	**0**	**4**

(BA20EPC103)MANAGERIAL ECONOMICS

Objective: To understand the relevance of economics in business management. This will enable the students to study functional areas of management such as Marketing, Production and Costing from a broader perspective.

UNIT-I

Introduction to Managerial Economics: Definition, Nature and Scope, Relationship with other areas in Economics, Production Management, Marketing, Finance and Personnel, Operations research - The role and responsibilities of managerial economist. Objectives of the firm: Managerial theories of firm, Behavioural theories of firm.

UNIT-II

Theory of Demand: Demand Analysis – Law of Demand - Elasticity of demand, types and significance of Elasticity of Demand. Demand estimation – Marketing research approaches to demand estimation. Need for forecasting, forecasting techniques.

UNIT-III

Production Analysis: Production function, Isoquants and Isocosts, Production function with one/two variables, Cobb-Douglas Production Function, Economies of scale, Policy on adding New products and dropping old products - Cost concepts - cost-output relationship in the short run and long run, Average cost curves – Managerial uses Break Even Analysis.

UNIT-IV

Market Structure and Pricing practices: Features and Types of different competitive situations - Price-Output determination in Perfect competition, Monopoly, Monopolistic competition and Oligopoly. Pricing philosophy – Pricing methods in practice: Price discrimination, product line pricing. Pricing strategies: skimming pricing, penetration pricing, Loss Leader pricing.Pricing of multiple products.

UNIT-V

Inflation and Business Cycles:-Definition and meaning-characteristics of Inflation- types of inflation - effects of inflation - Anti-Inflationary methods - Definition and characteristics of business cycles-phases of business cycle - steps to avoid business cycle.

Textbooks:

- Mehta,P.L.(2016), Managerial Economics -Analysis, Problems ,Cases , 21st Edition Sultan Chand &Sons.
- Gupta (2011), Managerial Economics, 2nd Edition, TMH

References:

- Managerial Economics, D.N.Dwivedi,EighthEdition,Vikas Publications
- Managerial Economics, Pearson Education, James L.Pappas and EngeneF.Brigham
- Managerial Economics, Suma Damodaran, Oxford.
- Macro Economics by MN Jhingan-Oxford
- Managerial Economics- Dr.DM.Mithani-Himalaya Publishers

- Managerial Economics-Dr.H.LAhuja-S.Chand and Com pvt ltd, NewDelhi

(AUTONOMOUS)

MBA I Semester

L	T	P	C
4	0	0	4

(BA20EPC104) ACCOUNTING FOR MANAGEMENT

Objective: To provide the basic knowledge of book keeping and accounting and enable the students to understand the Financial Statements and make analysis financial accounts of a company.

*** Standard discounting and statistical tables to be allowed in the examinations.**

UNIT-I

Introduction to Accounting: Definition, Importance, Objectives, uses of accounting and book keeping Vs Accounting, Single entry and Double entry systems, classification of accounts – rules of debit & credit, Role of accounts in modern organization.

UNIT-II

Financial Accounting System: Generally Accepted Accounting Principles and Accounting Standards governing financial statements-Books of Original Record; Journal, ledger, Trial Balance, Final accounts: Trading accounts- Profit & loss accounts- Balance sheets with adjustments.

UNIT-III

Valuation of Assets: Introduction to Depreciation- Methods (Simple problems from Straight line method, Diminishing balance method and Annuity method). Inventory Valuation: Methods of inventory valuation (Simple problems from LIFO, FIFO).

UNIT-IV

Financial Analysis –I Analysis and interpretation of financial statements from investor and company point of view, Liquidity, leverage, solvency and profitability ratios.

UNIT-V

Financial Analysis-II: Objectives of fund flow statement - Steps in preparation of fund flow statement, Objectives of Cash flow statement- Preparation of Cash flow statement - Funds flow statement Vs Cash flow statement.

Textbooks:

- Dr.S.N. Maheshwari and Dr.S.K. Maheshwari (2018), Financial Accounting, 6th Edition, Vikas Publishing House Pvt. Ltd.,
- M P Gupta &Agarwal (2019), Accountancy,S.Chand

References:

- I. M. Pandey : Management Accounting Vikas Publishing House.ND
- Needles, Financial Accounting, Cengage, New Delhi
- Jawaharlal, Accounting for Management, Himalaya, Mumbai
- Hilton,Ramesh&Jayadev, Managerial Accounting, TMH, New Delhi
- B.Banerjee, Financial Policy & Management Accounting,PHI, New Delhi
- P Periasamy, A Text Book of Cost & Management Accounting, Himalaya, Mumbai
- Horngren, C.T., Introduction of Management Accounting,, Prentice Hall of India.
- Khan and Jain, Management Accounting, Tata McGrawHill , Delhi.
- Blocher, Chen, Cokins and Lin, Cost Management, A Strategic Emphasis, TMH, ND

- Porwal, LS, Accounting Theory, TMH, New Delhi

(AUTONOMOUS)

MBA I Semester

L	T	P	C
4	0	0	4

(BA20EPC105) BUSINESS STATISTICS

Objective: The objective of this course is to familiarize the students with the statistical techniques popularly used in managerial decision making. It also aims at developing the computational skill of the students relevant for statistical analysis.

UNIT-I

Introduction of Statistics: Nature & Significance of Statistics to Business, collection and presentation of data, Measures of Central Tendency- Arithmetic – Weighted mean – Median, Mode – Geometric mean and Harmonic mean – Measures of Dispersion, range, quartile deviation, mean deviation, standard deviation, coefficient of variation – Application of measures of central tendency and dispersion for business decision making.

UNIT-I

Probability and Random variables: Basic concepts of probability, Addition and multiplication laws, Conditional probability, Baye's Rule. Discrete and Continuous random variables, expectations and properties.

UNIT-I

Probability Distributions: Binominal, Poisson, Uniform, Normal distributions and their applications in Business management.

UNIT-I

Statistical Inference: Hypothesis testing: One sample and Two sample tests for means and proportions of large samples (z-test), One sample and Two sample tests for means of small samples (t-test), F-test for two sample standard deviations, Chi-square test.

UNIT-I

Correlation: Curve Fitting: Fitting of a Straight Line and Parabola, Significance and types of correlation – Measures of correlation – Co-efficient of correlation. Regression analysis – Meaning and utility of regression analysis – Comparison between correlation and regression – Properties of regression coefficients Rank Correlation - Multiple linear regressions.

Textbooks:

- Statistical Methods, Gupta S.P., S.Chand. Publications References:
- Statistics for Management, Richard I Levin, David S.Rubin, Pearson,

Reference books:

- Business Statistics, J.K.Sharma, Vikas house publications house Pvt Ltd
- Complete Business Statistics, Amir D. Aezel, Jayavel, TMH,
- Statistics for Management, P.N.Arora, S.Arora, S.Chand
- Statistics for Management,Lerin, Pearson Company, New Delhi.

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA I Semester	**L**	**T**	**P**	**C**
	4	**0**	**0**	**4**

(BA20EPC106) BUSINESS COMMUNICATION

Objective: The objective of this Course is to understand the communication concepts and to develop the students' competence in communication at an advanced level. Assuming that the students are fairly proficient in the basic communication skills of listening, speaking, reading and writing in English the course aims to train them in communicating efficiently in the workplace and professional contexts.

UNIT-I

Concept of Communication – Significance, Scope & Nature – Communication Process – Essentials of good communication – Channels of Communication – Formal, Informal Communication – Upward, Downward, Horizontal Communication.

UNIT-II

Types of communication: Verbal – Oral Communication: Advantages and Limitations of Oral Communication, Written Communication – Characteristics, Advantages & Limitations Non verbal Communication: Sign language – Body language – Kinesics – Proxemics – Time language and Hepatics: Touch language.

UNIT-III

Interpersonal Communication: Communication Styles, Communication etiquettes,Role of emotion in Inter personal Communication.

UNIT-IV

Barriers of Communication: Types of barriers – Technological – Socio-Psychological barriers – Overcoming barriers, Types of listening.

UNIT-V

Report writing – Formal reports – Writing effective letters – Different types of business letters, Writing Project Reports.

Text Books:

- C.S.Rayudu (2018), Business Communication, 1st Edition, HPH.
- Meenakshi Raman (2012), Business Communication, Oxford University Press.

References:

- Business communication, ShaliniVarma, Vikas.
- Business Communication, Raymond V.Lesikar, NeerajaPandit et al.,TMH
- English for Business Communication, Dr.T.MFarhatulla, Prism books Pvt. Ltd.
- Business Communications, Hudson, Jaico Publications
- Business communication for managers, Penrose, Raspbery, Myers, Cengage
- The Skills of Communication, Bills Scot, Gower publishing company Limited, London.

- Effective Communication, Harward Business School, Harward Business Review
- Essentials of Business Communication, Rajendra Pal, JS.Korlahhi, S.Chand

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA I Semester	**L**	**T**	**P**	**C**
	2	**0**	**0**	**2**

(BA20EPC107) INFORMATION TECHNOLOGY FOR MANAGERS

Objective: To make the student familiarize in information technology and their applications to business processes.

UNIT-I

Fundamentals of IT:-Components of a system- Meaning and nature – Role of IT in various sectors- Information technology management- Strategies for gaining IT advantage.

UNIT-II

Database Management Systems: Introduction to DBMS- Applications to data base-concepts, data access methods –Types of data processing-data base languages

UNIT-III

Understanding Ms-Office:-MS-Word- MS-Excel-Formulae, Graphs, Basis Statistical Formulae, MS-Access, MS-PowerPoint - Creating Effectiveness presentations**.**

UNIT-IV

Data Communication and Networks: Concepts of Data Communication, Types of Data-Communication Networks, Communications Media, Concepts of Computer Networks, the Internet, Intranet and Extranets: Operation of the Internet, Services provided by Internet, World Wide Web.

UNIT-V

Emerging Trends in IT: Introduction to SAP,IP addresses, IP protocol, various ERP packages, Implementation of ERP-Introduction to big data-cloud computing

Textbooks:

- Alexis Leon, & Mathews Leon ,Fundamentals of Information Technology, 2nd Edition - Vikas.

References:

- Basics of Computer Sciencs, BehrouzForouzan, FirozMosharraf, Cengage.
- Information Technology for Management, Ramesh Behi, McGraw Hill.
- Introduction to Computers and Communications, Peter Norton-Sixth Edition-Tata McGraw Hill.
- V.Rajaraman, Introduction to Information Technology, Prentice Hall India.
- Information Technology and theory Aksoy, CengageLearnings.
- Foundations of IT,Dhiraj Sharma, Excel Books.
- MS Office 2000 for every one, Sanjay Saxena – Vikas

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA I Semester	**L**	**T**	**P**	**C**
		0	**0**	**2 1**

(BA20EPC108) BUSINESS COMMUNICATION LAB

Objective: To enable students understand how to write business letters and improve Written
Communication

Learning Outcome: At the end of the course, students will be enabled with the following skills.
a. English language skills for effective written business communication (‘s).
b. Will be able to understand how to write project report.

UNIT-I
Business Writing: Introduction, Direct and Indirect Approach to Business Messages, Five Main Stages of Writing Business Messages. Practice Exercises.

UNIT-II
Business Correspondence: Writing Effective Letters, Memos & Circulars. Practice Exercises.

UNIT-III
Instructions: Introduction, Written Instructions, General Warning, Caution and Danger, Oral Instructions. Practice Exercises.

UNIT-IV
Business Reports and Proposals: Parts of a Report, Steps in writing an effective Business Report & Writing an effective Business Proposal.

UNIT-V
Careers and Resumes: Introduction, Career Building, Electronic and Video Resumes and Write your resume to market yourself, Interview Skills.

Textbook :

- Meenakshi Raman and Prakash Singh, Business Communication, Oxford.
- Lesikar: Basic Business Communication, TMH.

References:

- Stephen Bailey, Academic Writing for International Students of Business, Routledge.
- David Irwin: Effective Business Communications, Viva-Thorogood.
- Rajendra Pal, J S KorlahaHi: Essentials of Business Communication: Sultan Chand & Sons,
- SaileshSengupta, Business and Managerial Communications, PHI.

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA I Semester

L	T	P	C
2	0	0	0

(BA20EAC109) PERSONALITY DEVELOPMENT

Objective: The objective of the course is to make students understand theImportance of personality and transform the energy to students to take unexplored career paths .

UNIT-I

Personality: Determinants of Personality DevelopmentDefine Personality,Grooming,Personal,Hygiene,SocialEffectiveness,BusinessEtiquettes (Po wer Dressing).

UNIT-II

Team Behaviour: Types of Teams,Team Roles and Behaviour, Group Discussion,Do's and Don'ts .Role play.

UNIT-III

Attitude: Concept -Significance -Factors affecting attitudes – Positive attitude– Advantages –Negative attitude-Disadvantages -Ways to develop a positive attitude, Carl Jung 's contribution to personality development theory.

UNIT-IV

Factors of Association: Relationship, Personality Traits, Developing Effective Habits, Emotional Intelligence.

UNIT-V

Interpersonal Relationship: Personality – Spiritual journey beyond the management of change, Good manners &General etiquties, Effective Speech, Understanding Body language, projective positive body language.

Text Books :

- Hurlock, E. (1974). Personality development. New York: McGraw Hill Inc.
- Norman, L., Munn, L., Fernord, D. J., Peter, S., &Fernold. (1972). Introduction to Psychology. New Delhi: Oxford& IBH publishing Company.

References:

- Gopikrishnan M, A course guide to Personality Development. Bharathiar University.
- PP.67
- Mile, D.J., Power of Positive thinking, Delhi, Rohan Book Company (2004)

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA II Semester

L	T	P	C
4	0	0	4

(BA20EPC201) HUMAN RESOURCE MANAGEMENT

Objective: The objective of the course is to provide basic knowledge of functional area of Human Resource Management. This will be the prerequisite for enabling students to take any HRM stream electives offered in third and fourth semesters.

UNIT-I

Introduction:-Meaning of HR and HRM, Nature & Scope of HRM, Functions of HRM, Role and Objectives of HRM, Personnel Management, Policies and Strategies of HRM.

UNIT-II

Designing and Developing HR systems:- Human Resource Planning, Job Design, Job Analysis, Job Evaluation, Job Enlargement, Job Enrichment, Job Rotation, Recruitment & Selection, Placement, Promotion & Transfer.

UNIT-III

Compensation Management: -Introduction, objectives of wages and salaries administration, influencing factors for determining compensation- Monetary and non monetary benefits.

UNIT-IV

Human Resource Development: -Training and Development, Performance Appraisal & Career Planning and Development, HR Audit, HR Accounting.

UNIT-V

Recent Trends in HRM: Outsourcing, Work Life Balance, Green HRM, HR Metrics and HR Analytics

Textbooks:

- P. Subbarao (2010), Personnal and Human Resource Management – Text and cases, Himalaya.
- NoeA.Raymond, John Hollenbeck, Barry Gerhart and Patrick Wright (2006), Human Resource Management, 5th Edition, Tata McGraw Hill.

References:

- Human Resource Management, Aswathappa, 4th Edition, TMH 2006
- Human Resource Mangement, Ian Beardwell& Len Holden-Macmillan India Ltd.
- Managing Human Resources: Productivity, quality of work life, profits-Wayne F.
- Cascio TMH.
- Strategies HRM by Rajeev LochanDhar, Excel Books.
- Human Resource Management, Text and Cases, VSP Rao, Excel Books 2006.
- Rao TV, Pereira DP, Recent Experiences in Human Resource Development.

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA II Semester

L	T	P	C
4	0	0	4

(BA20EPC202) MARKETING MANAGEMENT

Objective: The objective of the course is to have the basic concepts of Marketing which is one of the important areas of functional management. This is a pre-requisite for taking up any elective paper in 3rd and 4th semester in the stream of Marketing.

UNIT-I

Understanding Marketing Management: Concepts of Marketing, Marketing Strategies & Plans, Creating long term loyalty relationships, Marketing mix, PLC, Analyzing Competitors,Conducting Marketing research.

UNIT-II

Connecting with Customers & Building Strong Brands: Analyzing Consumer Markets, Analyzing Business Markets, Tapping into global markets, Identifying market segments and targets, Crafting Brand Positioning, Creating Brand Equity-Addressing Competition and driving growth.

UNIT-III

Creating & Communicating Value: -Setting product strategy, Designing & managing services, Introducing new market offerings. Developing pricing strategies &programmes. Designing & Managing Integrated Marketing Communications, Advertising & Sales Promotions, Events and experiences, Managing digital communication - online, social media & mobile, Publicity.

UNIT-IV

Delivering Value: -Managing retailing, wholesaling and logistics. Designing and Managing Integrated Marketing Channels, E-tailing.

UNIT-V

Sales Management: -Nature & Importance of Sales Management, Skills of sales manager, Sales objectives, Concepts of sales organization, Types of sales organizations, Theories of selling.

Textbooks:

- Marketing Management, Phillip Kotler, Kevin Lane Keller, 15th edition,Pearson.

References:

- Marketing, A South Asian Prospective, Lamb, Hair, Sharma, Mcdaniel, Cengage .
- Marketing Asian Edition Paul Baines Chris Fill Kelly page, Oxford.
- Marketing Management 22e, ArunKuar, Menakshi, Vikaspublishing .
- Marketing in India, Text and Cases, S.Neelamegham, Vikas .
- Marketing Management, RajanSaxena, TMH.
- Marketing – The Core, Kerin, Hartley and Rudelius, McGraw Hill, Irwin.
- Case Studies in Marketing, The Indian Context, Srinivasan, PHI.
- Marketing Management, V.S. Ramaswamy and S. Namakumari, McMillan.
- Marketing – concepts and Cases, Etzel, Walker, Stanton, Pandit, TMH.
- Introduction to Marketing theory and practice, Adrian Palmer , Oxford University Press.

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA II Semester	**L**	**T**	**P**	**C**
	4	**0**	**0**	**4**

(BA20EPC203)BUSINESS RESEARCH METHODS

Objective: Objective of the course is to have a general understanding of statistics as applicable to business and its use in areas of management research. The Course addresses the methods of research with an emphasis on various stages that are necessary to obtain and process information to enable well informed decision-making. It allows the students to grasp and comprehend the methods and techniques used in research and provide with the knowledge and skill to undertake research.

***Standard Statistical tables shall be allowed in the examination**

UNIT-I

Introduction to Business Research: Definition-Types of Business Research. Scientific Investigation, Technology and Business Research: Information needs of Business - Technologies used in Business Research: The Internet, E-mail, Browsers and Websites. Role of Business Research in Managerial Decisions.

UNIT-II

The Research Process: Problem Identification: Broad Problem Area-Preliminary Data Gathering. Literature Survey - Hypothesis Development - Statement of Hypothesis- Procedure for Testing of Hypothesis. The Research Design: Types of Research Designs: Exploratory, Descriptive, Experimental Designs and Case Study -Measurement of Variables- Operational Definitions and Scales-Nominal and Ordinal Scales- Rating Scales- Ranking Scales- Reliability and Validity - Sampling and Methods of sampling.

UNIT-III

Collection and Analysis of Data Sources of Data-Primary and Secondary Sources of Data - Data Collection Methods- Interviews: Structured Interviews and Unstructured Interviews- Observational Surveys: Questionnaire Construction: Organizing Questions- Structured and Unstructured Questionnaires – Guidelines for Construction of Questionnaires.

UNIT-IV

Data Analysis: An overview of Descriptive, Associational and Inferential-Statistical Measures.

UNIT-V

The ResearchReport: Research Report: Research Reports- Types, Objectives, Importance of Reports, Components-Title Page - Table of Contents - Executive Summary - Introductory Section - Body of the Report – Common Errors in Report Writing, Conclusion of the Report- References- Appendix - Guidelines for Preparing a Good Research Report Oral Presentation- The Presentation and Handling Questions.

Textbooks:

- C.R. Kothari (2019), Research Methodology – Methods & Techniques, Vishwaprakashan.
- Uma Sekaran (2013), Research Methods for Business–A Skill Building Approach, John Wiley & Sons (Asia) Pte.Ltd, Singapore.
-

References:

- Business Research Methods, Donald R Cooper and Pamela S Schindler,9/e,Tata McGraw-Hill Publishing Company Limited.
- Methodology and Techniques of Social Science Research, Wilkinson &Bhandarkar, Himalaya Publishing House.
- An Introduction to Management for Business Analysis, Speegal, M.R., McGraw Hill
- Research Methodology in Management, Michael, V.P., Himalaya Publishing House.

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA II Semester

L	T	P	C
4	0	0	4

(BA20EPC204)FINANCIAL MANAGEMENT

Objective: The objective of the course is to provide the necessary basic tools for the students so as to manage the finance function. The students should be able to understand the management of the financing of working capital needs and the long term capital needs of the business organization.

*** Standard Discounting Table and Annuity tables shall be allowed in the examination**

UNIT-I

Introduction to Financial Management: Nature, Scope and objectives of financial management. Importance of Finance function– Goals of Finance function; Profit Vs Wealth maximization– The role in the contemporary scenario.

UNIT-II

The Financing Decision: Sources of Finance – A brief survey of financial instruments. The Capital Structure Decision in practice: EBIT-EPS analysis. Cost of Capital: The concept, Measurement of cost of capital – Component Costs and Weighted Average Cost. Theories of capital structure.

UNIT-III

The Investment Decision: Investment decision process – Project generation, Project evaluation, Project selection and Project implementation. Capital Budgeting methods– Traditional and DCF methods. The NPV Vs IRR Debate.

UNIT-IV

Introduction to Working Capital: Concepts and Characteristics of Working Capital, Factors determining the Working Capital, Estimated working capital requirements. The Dividend Decision: Major forms of Dividends, Theories of dividend.

UNIT-V

Corporate Restructures: Corporate Mergers and Acquisitions and Take-overs-Types of Mergers, Motives for mergers, Principles of Corporate Governance.

Textbooks:

- V.K.Bhalla (2014), Financial management,S.Chand
- I.M.Pandy (2015). Financial management, 11th Edition, Vikas Publishers.

References:

- Brealey,Myers,Allen and Mohanty, Principles of Fin Management, TataMcGrawhill,ND
- Pandey IM - Financial Management, Vikas, New Delhi.
- JC Varshney, Financial Management, Wisdom, Delhi.
- Brigham and Houston, Fundamentals of Financial Management, Cengage, New Delhi.
- Banerjii, B., Fundamentals of Financial Management, PHI, New Delhi.
- Weston & Brigham, Managerial Finance, The Dryden Press,Illinois.
- James C.Van Horne -- Financial Management & Policy, Prentice Hall of India.
- Khan & Jain - Financial Management, Tata McGraw Hill.
- RM Srivasthava: Financial Management and Policy, Himalaya Publication.

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA II Semester

L	T	P	C
4	0	0	4

(BA20EPC205)OPERATIONS RESEARCH

Objective: The objective of the course is to provide the basic tools of Operations Research in solving the management problems through modeling and using mathematical approach.

UNIT-I

Introduction to OR: Meaning, Nature, Scope & Significance of OR - Typical applications of Operations Research. The Linear Programming Problem – Introduction, Formulation of Linear Programming problem, Limitations of L.P, Graphical solution to L.P.P, Simplex Method.

UNIT-II

Transportation Problem: Introduction, Transportation Model, Finding initial basic feasible solutions, moving towards optimality, Unbalanced Transportation problems, Transportation problems with maximization, Degeneracy. Assignment Problem – Introduction, Mathematical formulation of the problem, Solution of an Assignment problem, Hungarian Algorithm, Multiple Solution, Unbalanced Assignment problems, Maximization in Assignment Model.

UNIT-III

Sequencing: Job sequencing, Johnsons Algorithm for n Jobs and Two machines, n Jobs and Three Machines, n jobs through m machines, two jobs and m Machines Problems.

UNIT-IV

Game Theory: Concepts, Definitions and Terminology, Two Person Zero Sum Games, Pure Strategy Games (with Saddle Point), Principal of Dominance, Mixed Strategy Games (Game without Saddle Point), Significance of Game Theory in Managerial Application.

UNIT-V

Project Management: Rules for drawing the network diagram, Application of CPM and PERT techniques in Project Planning and Control.

Textbooks:

- Operations Research / S.D.Sharma-Kedarnath
- Operations Research /A.M.Natarajan,P.Balasubramani,A. Tamilarasi/Pearson Education.

References:

- Introduction to O.R/Hiller &Libermann (TMH).
- Operations Research: Methods & Problems / Maurice Saseini, ArhurYaspan& Lawrence Friedman. Pearson
- Quantitative Analysis For Management/ Barry Render, Ralph M. Stair, Jr and Michael E. Hanna/
- Operations Research / R.Pannerselvam, PHI Publications.

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA II Semester

L	T	P	C
4	0	0	4

(BA20EPC206) OPERATIONS MANAGEMENT

Objective: The Objective of the course is to enable students to understand the production Planning and Controlling aspects of a typical production and operations organization. To study understand the concepts of work study and Quality management.

UNIT-I

Introduction: Overview of Production and Operations Management (POM) Function,Historical Development of POM, POM scenario Today. Product and Process Design - Product and Process Development, Manufacturing Process Technology.

UNIT-II

Facilities Management & Aggregate Planning: Location of Facilities, Layout of Facilities, Optimization of Product/Process Layout, Group Technology: Aggregate Planning - Preparation of Aggregate Demand Forecast, Specification of Organisational Policies For Smoothing, Capacity Utilization, Determination of feasible Production Alternatives

UNIT-III

Scheduling: Scheduling In Job, Shop Type Production, Shop- Loading, Assignment and Sequencing, Scheduling In Mass, Line of Balance, Methods of Production Control ,World class production

UNIT-IV

Work Study & Quality Management: Method Study, Work measurement, Industrial Engineering Techniques. Economics of Quality Assurance Inspection and Quality Control, Acceptance Sampling, Theory of control charts, control charts for variables and control charts for attributes, Quality Management Techniques.

UNIT-V

Materials Management: Introduction, Objectives, Importance of Materials Management-Issues in Materials Management – Functions – Activities –Selection of Materials-Advantages of Materials Management.

Textbooks:

- Aswathappa K (2015), Production and Operation Management, Himalaya Publishing House

References:

- Operations Management and control, Biswajit Banerjee-S.Chand.
- Production and Operations Management –Dr.K.C.Arora ,2nd Edition-University Science Press.
- Production and Operations Management, R. Panneerselvam: PHI Learning Private Ltd.
- Production Management , Martand T Telsang-S.Chand
- Modern Production/Operations Management, Elwood S.Buffa and RakeshK.Sarin,Wiley ..
- Production and Operations Management, SN Chary, Tata McGraw Hill, New Delhi.
- Operations Management, Mahadevan, Pearson Education, New Delhi.

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA II Semester	**L**	**T**	**P**	**C**
	2	**0**	**0**	**2**

(BA20EPC207)MANAGEMENT INFORMATION SYSTEM

Objective: To provide the basic concepts of systems concepts and Management of Information System and utility of the systems for the managerial decisions.

UNIT-I

MIS An overview: Introduction, Need for MIS and IT nature and scope of MIS, MIS characteristics, Structure of MIS, role of MIS in global business. Challenges of Managing MIS.

UNIT-II

Data resource management: Data base concepts, The traditional approaches, the modern approaches (Data base management approaches) DBMS, Data models, Data ware housing and mining.

UNIT-III

Business application of IS: Enterprise systems, ERP, CRM, SCM, DSS, Types of decisions, Decision support techniques, Decision making and Role of MIS, Business intelligence and Knowledge management systems.

UNIT-IV

Management of IS: Project planning, SDLC, System development models, Project management, system analysis, system design, Implementation process, Product based MIS evaluation, Cost /Benefit based evaluation, Process based calculation, System maintenance.

UNIT-V

Security, Ethical & Social Issues:IS security threats, Protecting IS, IS Security Technologies, The disaster recovery plan, IS Ethical Issues, social issues.

Textbook:

- D.P.Goyal (2014), MIS –Managerial Perspective, 4th Edition,Vikas Publications.

References:

- Management Information Systems, C Laudon and Jane P.Laudon, et al, Pearson Education.
- MIS, HosseinBidgoli, NilanjanChattopadhyay, Cengage Learning
- Management Information Systems Text & Cases, W S Jawadekar, Tata McGraw-Hill.
- Introduction to Information Systems, Rainer, Turban, Potter, WILEY-India.
- Management Information Systems, James A. Obrein, Tata McGraw-Hill .
- Management Information Systems, Dharminder and Sangeetha, 1/e, Excel books.
- Cases in MIS, Mahapartra, PHI.
- Management Information Systems, Gordon B. Davis &MargretheH.Olson, Tata McGraw-Hill.

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA II Semester **L T P C**

0 0 2 1

(BA20EPC208) BUSINESS ANALYTICS LAB

Objective: To make the students apply information systems in business areas.

UNIT-I

Accounting- Creation of company, Preparation of Ledger, Posting Trial Balance, Profit and loss account, Balance sheet(Sole Traders).

UNIT-II

Finance: -Capital Budgeting decisions, Calculations of NPV, IRR, Profitable Index , preparation of budgets- cash, sales, purchases and expenditure, Calculation of cost of capital.

UNIT-III

Marketing: -Storing and Retrieving of data of customers, sales, dealers, products and geographical areas(Tables and graphs).

UNIT-IV

Human Resource Management: -Employees data base and Salary Administration.

UNIT-V

Systems: -Understanding Information Systems , Design of MIS , Internet and Internet tools.

Note:-

- The programmes have to be taught to the students using MS Excel, Access, Power Point and Accounting packages.

References:

- Ms Office-Sanjay Saxena
- Ms Office Excel-Frye, PHI publications
- Ms Office Access- Step by step, PHI publications
- Reading material on accounting packages.

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA II Semester	**L**	**T**	**P**	**C**
	2	**0**	**0**	**0**

(BA20EAC209) WORLD TRADE ORANISATION AND INTELLECTUAL PROPERTY RIGHTS

Objective: To understand, define, and differentiate different types of intellectual property(IP) and their roles in contributing to organizational competitiveness, understand the framework of the strategic management of IP, To derive value from IP and leverage its value in new product and service development and To understand the role of WTO in developing the business globally.

UNIT-I

Introduction- General Agreement on Tariffs and Trade (GATT) Eighth Round: Uruguay Round - World Trade Organization- Structure – Technology Transfer – Dispute resolution Mechanism- Doha Declaration – WTO Agreements including TRIPS & TRIMS.

UNIT-II

WIPO – Paris convention – Bern Convention – WCT- Budapest treaty – Madrid Agreement – Hague Agreement – UPOV.

UNIT-III

IPR-1 Patents: Historical Background of IPR- Introduction- definition and classification of intellectual Property - Patents – Patentable and Non patentable inventions – Legal requirements for patents – Types of patent applications- Patent document- specification and claims – Important procedural aspects – Management of IP Assets and IP portfolio – Commercial exploitation of IP.

UNIT-IV

IPR – 2 : Designs and Geographical Indication (GI) – Designs- Basic requirements – Procedure – Convention application – Term – Date Geographical Indication: Definition – What can be registered – Who can apply– Rights – Term – RestrictionS

UNIT-V

IPR-3: Trademarks and Copy rights: Definitions – Classification of trademarks – Classifications of goods and services – Vienna classification – Trademarks procedure – Trademarks enforcement- Infringement and passing off – Remedies – Copy rights – Term of copyrights – Procedure of copyright-Assignment of copy right – Copyright infringement – Remedies.

TEXT BOOKS:

- P. K.Vasudeva, World Trade Organization: Implications on Indian Economy, Pearson Education, 2015
- P.KrishnaRao, WTO-Text and cases, Excel Books, 2015.

REFERENCES :

- Caves, Frankel, Jones, World Trade and Payments-An Introduction, Pearson Education, 2015.
- Carlos M.Correa , Intellectual property rights , The WTO and Developing countries, Zedbooks,2018
- Peter-Tobias s toll, Jan busche , Katrianarend, WTO- Trade –related aspects of IPR, Library ofcongress,2017

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA III Semester

L	T	P	C
4	0	0	4

(BA20EPC301) INNOVATION ANDENTREPRENEURSHIPDEVELOPMENT

Objective: The objective of the course is to make students understand the nature of entrepreneurship, and transform energy to students to take unexplored career paths.

UNIT-I

Introduction to Innovation and Entrepreneurship: Introduction to concepts Types of innovation, Models of Innovation, Innovation process Managed innovation Features - Entrepreneur's competencies, attitude, qualities, functions- Entrepreneurial scenario in India and Abroad. Small Business, Importance in Indian Economy, Types of ownership, sole trading, partnership, important features of various types of businesses - corporate entrepreneurship, intra-preneurship - Role of Government in the promotion of Entrepreneur.

UNIT-II

Institutions supporting business enterprises: Central level institutions - NBMSME, KVIC, The coir board, NSIC, NSTEDB, NPC, EDI, NRDCI, National entrepreneurship Development Institutes. State level Institutions - State Directorate of Industries & Commerce, DIC, SFC, SIDC, SIADB- Other institutions: NABARD, HUDCO, TCO, SIDBI, Business incubators

UNIT-III

Project Planning and Feasibility Studies: The Concept of Project, Project Life Cycle - Project Planning, Feasibility – Project Aspects and phases of a project proposal & report preparation.

UNIT-IV

MSMEs& New Venture Creation: Concept of MSME, Role & Importance of Classifications of MSME, Growth & development of MSMEs in India, Current schemes for MSMEs, Business opportunities in India, Contents of business plans, presenting a business plan. Startup Product Management

UNIT-V

Women &Rural Entrepreneurship and EDPs: Scope-Challenges faced by women entrepreneurs, Institutions supporting women entrepreneurs. Successful cases of women entrepreneurs.-Need, Rural Industrialization – Role of NGO's – Organizing EDPs – Need, Objectives, Evaluation of Entrepreneurship Development Programmes

Text Books:

- The Dynamics of Entrepreneurial Development and Management, Vasanth Desai, Himalaya.
- Entrepreneurship Development & Small Business Enterprises – Second Edition, PoornimaM.Charantimath , Pearson

References:

- Entrepreneurial Development, S. Chand and Company Limited, S.S. Khanka,
- Fundamentals of Entrepreneurship, H. Nandan, PHI.
- Entrepreneurship, 6/e, Robert D Hisrich, Michael P Peters, Dean A Shepherd, TMH.

- Entrepreneurship – New venture Creation, Holt, PHI.
- Entrepreseurship- Successfully Launching New Ventures, Barringer, Ireland, Pearson.
- Entrepreneurship,Roy, Oxford.

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA III Semester

L	T	P	C
4	0	0	4

(BA20EPC302) GREENBUSINESS MANAGEMENT

Objective: The objective of the course is to impart students in understanding of green business, its advantages, issues and opportunities and to provide knowledge over the strategies for building eco-business.

UNIT-I

Introduction to Green Management: The Concept of Green Management; Evolution; nature, scope, importance and types; Developing a theory; Green Management in India; Relevance in twenty first century

UNIT-II

Organizational Environment: Indian Corporate Structure and Environment; How to go green; spreading the concept in organization; Environmental and sustainability issues for the Career opportunities in green business management and Sustainability Business Plan production of high-tech components and materials, Life Cycle Analysis of materials, sustainable production and its role in corporate environmental responsibility (CER).

UNIT-III

Approaches from Ecological Economics: Indicators of sustainability; Eco-system services and their sustainable use; Bio-diversity; Indian perspective; Alternate theories

UNIT-IV

Environmental Reporting and ISO 14001: Climate change business and ISO 14064; Green financing; Financial initiative by UNEP; Green energy management; Green product management

UNIT-V

Green Techniques and Methods: Green tax incentives and rebates (to green projects and companies); Green project management in action; Business redesign; Advanced Technology and Eco-friendly design; Eco-commerce models

Text Books:

- Green Management and Green Technologies: Exploring the Causal Relationship by JazminSeijasNogarida, ZEW Publications.
- The Green Energy Management Book by Leo A. Meyer, LAMA books

References:

- Green Marketing and Management: A global Perspective by John F. Whaik, Qbase Technologies.
- Green Project Management by Richard MaltzmanAnd David Shiden, CRC Press Books.
- Green and World by Andrew S. Winston, Yale Press B

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA III Semester

L	T	P	C
4	0	0	4

(BA20EPE303) COSTANDMANAGEMENTACCOUNTING (ElectiveI)

Objective: To describe the cost concepts, cost behaviors, and cost accounting techniques that are applied to manufacturing and service businesses. To provide an understanding of the use of cost information in support of different strategies

UNIT-I

Nature and scope of Cost accounting: Cost analysis, concepts and classifications, Cost sheets, preparation of cost sheets, Tenders and Quotations. Budget control

UNIT-II

Material Purchase control: Levels, aspects, need and essentials of material control. Stores control-stores department, EOQ, Stores records, ABC analysis, VED analysis.

UNIT-III

Labor cost: Computation and control, Time keeping-Methods of wage payment-Time rate and piece rate system-Payroll procedures-Idle time and overtime-Labor turnover.

UNIT-IV

Management Accounting: Meaning, scope, importance and limitations – Management Accounting Vs Cost Accounting - Management Accounting Vs Financial Accounting.

UNIT-V

Analysis and Interpretation Of Financial Statements: Nature, Objectives, Tools, Methods-Comparative Statements, Common size statements and Trend analysis

Text Book:

- A Text book of Cost and Management Accounting – Arora M. N, 11/e, Vikas

Reference Books:

- Cost Accounting: Theory and Practice - Bhabatosh Banerjee, 12/e, PHI.
- Financial Statement Analysis and Reporting - MohanaRao P, PHI, 2011.
- Cost Management: A strategic Approach - Vaidya S. C, Suveera Gill Macmillan 2010.
- Cost Accounting- Jawaharlal, &SeemaSrivastava, 4/e, TMH.
- Accounting & Costing for Management – Sinha P. K, Excel BOOKS, 2010.
- A Textbook of Cost Management- G.V KesavaRao, D Gopinath, M.G. Krishnamurthy and Anita S. Yadav, Paramount Publishing House,

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA III Semester

L	T	P	C
4	0	0	4

(BA20EPE304)PRODUCTANDBRANDMANAGEMENT (ElectiveI)

Objective: The objective of the course is to provide students with detailed knowledge of Classification of Products, Product Mix, Product Line, Product Strategies, Product Positioning Strategies, Product Planning and Development for existing products, New Product Development, Brands in New economy – Brand Hierarchy, Brand Personality, Brand Image, Brand Identity.

UNIT-I

Product Decisions: - Product Concepts – Product Classification – Consumer Goods and Industrial Goods Classification – Product Line and Product Mix – Product Characteristics
– Responsibility of Product Manager – Types of Product Strategies

UNIT-II

Product Management: Product differentiation – Product Organisation – Stages in the New Product Development – Product Positioning Strategies – Packaging Management

UNIT-III

Branding Decisions: Essentials of Good Brand Name – Types of Brands – Advantages of branding – Brand Loyalty – Brand Valuation Methods – Brand Positioning

UNIT-IV

Creating and Managing Brand Equity: Advantages of Brand Equity – Brand Building Strategies – Brand Extension – New Brand Failures –Brand Loyalty.

UNIT-V

Branding in Different Sectors: Branding in Industrial sector, Retail Sector, Service sector, Banking Sector and Insurance Sector.-Brand Management Practice

Text book :

- Marketing Management –Philip Kottler,Kevin Lane Keller ,15th Edition, Pearson.

REFERENCES:

- Product &Brand Management–Text & Cases, Prof.K.VenugopalRao,Himalaya
- Product Management in India, RamanujMajumdar, PHI
- Product Management ,C.Nandan, , TMH.
- Compendium of Brand Management,Chunawalla. S.A, Himalaya
- Product & Brand Management,Mathur.U.C , Excel
- Brand Positioning, SubrotoSengupta, TMH.
- Marketing and Branding, S.Ramesh Kumar, Pearson.
- What's in a Brand? , John Philip Jones, TMH
- Brand Management – Text & Cases , Harsh V Verma , Excel
- Become the Brand of Choice, Jason Hartman, Jaico.

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA III Semester

L	T	P	C
4	0	0	4

(BA20EPE305)HUMANRESOURCEDEVELOPMENT
(ElectiveI)

Objective: The objective of the course is to provide an understanding of the human resources development framework and focuses on management best practices, tools and models to implement an effective HRD system

UINT-I
Introduction to Human Resource Development: Meaning, significance and objectives of Human Resource Development, Human Resource Management and Human Resource development functions, Human Resource Development challenges

UNIT-II
HRD Need Assessment & Designing of HRD programs: Strategic/ Organizational Analysis- Task Analysis- Person Analysis- prioritizing HRD needs, defining the objectives of HRD Intervention - Selecting the trainer - Selecting the Training methods - Preparing training material Scheduling an HRD program

UNIT-III
Implementation &Evaluation of HRD programs: Training methods - Classroom training Approaches - Computer based Training, Purpose of HRD Evaluation- Kirkpatrick's evaluation frame work - Data collection for HRD Evaluation - Assessing the impact of HRD programs in Monetary Terms

UNIT-IV
Career Management and Development: Introduction to Career management, meaning - Stages of life and Career Development - process of career Development - Issues in career development.

UNIT-V
HRD & Diversity: Introduction - Organizational culture - Labor market changes and discrimination adapting to demographic changes

Text books:

- Jon M Werner,Randy L DeSimone:Human Resource development (Thomson/Cengage)
- Raymond A Noe : Employee Trainee Development (Tata McGraw Hill)

References:

- John P. Wilson Human Resource Development (Kogan Page Business Books)
- Tripathi P.C : Human Resource Development (Sultan Chand & Sons)
- Uday Kumar Haldar : Human Resource Development (Oxford)

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA III Semester

L	T	P	C
4	0	0	4

(BA20EPE306)MOBILECOMMERCE
(ElectiveI)

Objective: The objective of the course is to describe M-commerce system concepts to critically analyze examples and cases of M-commerce systems and to examine some of the applications in M-commerce

UNIT-I

Current Status and Future Trends in Mobile Commerce, Technology Issues in Mobile Commerce, Mobile Commerce Systems, Mobile Ecommerce on Mobile Phones, Technologically advanced handheld devices, like Smart phones, PDAs, Laptops, Tablets and Portable gaming consoles etc.

UNIT-II

Transactional Database Accesses for M-Commerce Clients, Techniques to facilitate Information Exchange in Mobile Commerce, Information System and Application Issues in Mobile Commerce, The emergence of Location based Mobile Commerce, The need for Mobile based Approaches

UNIT-III

Managing the Interactions between Handheld Devices Mobile Applications and Users, Mobile Commerce and Usability, a Landscape Analysis.

UNIT-IV

Mobile marketing, mobile ticketing, mobile computing, mobile payments and mobile banking vis-a-vis latest technologies (wireless and mobile communication technology, digital cellular technology, mobile access technology and 4G and 5G systems

UNIT-V

Configuring M-Commerce Portals for Business Success, Knowledge Management in a Mobile Computing Context, Multimedia Messaging Peer Mobile Financial Services, Mobile Banking – A Strategic Assessment, Service for Mobile Commerce Applications, Quality of Perception in M Commerce

Text Book:

- Advances in Mobile Commerce Technologies, EE-Peng Lim, KengSiau, Idea Group of Publishing

Reference Books:

- Mobile Commerce Applications, Shi, Nansi, Idea Group of Publishing
- Mobile Commerce, KarabiBandyopadhyay, PHI

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA III Semester

L	T	P	C
4	0	0	4

(BA20EPE307)FINANCIALINSTITUTIONSAND SERVICES (ElectiveII)

Objective: The objective of the course is to provide to students an understanding of Financial Markets, the major institutions involved and the services offered within this framework.

UNIT-I

Introduction: The structure of financial system, Elements of financial system and economic development, Regulatory and Promotional Institutions - Function and Role of RBI, Monetary Policy and techniques of RBI

UNIT-II

The Banking and Non-banking Institutions: The public and the private sectors – structure and comparative performance, Bank capital and Banking Innovations, Commercial and Co-operative banks-The Non-banking financial Institutions - Mutual Funds, Growth of Indian Mutual funds and its Regulation -The Role of AMFI, Insurance Companies- Role of IRDA. Fin. Tech

UNIT-III

Financial and securities Markets: Primary and Secondary Markets, Structure and functions of Money Market, -Call call money market ,Government Securities Market T-bills market, Commercial Bills market, Commercial paper and certificate of deposits. Securities markets:- Organization and structure, listing trading and settlement of securities market, The role and functions of SEBI

UNIT-IV

Fund based services - Lease and hire purchase consumer credit and Factoring - Definition, Functions, Advantages, Evaluation, venture capital financing, Housing Finance.

UNIT-V

Fee-based services - Stock broking, credit rating, Merchant Banking, portfolio services- Underwriting, Depository services, Challenges faced by investment bankers.

Text Books:

- Financial Institutions and Markets, L. M. Bhole, 4/e Tata McGraw Hill.
- Financial services, Gorden&Natarajan, Himalaya publishers.

References:

- Financial Services and markets, Dr.PunithavathyPandian, Vikas
- Financial Markets and services, Appannaiah, Reddy and Sharma, HPH
- Indian Financial System, Ramachandra and others, HPH
- Investment Institutions and Markets, Jeff Madura, Cengage, 1st Edition.
- Financial services, Thirpati, PHI.
- Financial Markets &Services, Vasanthdesai, Himalaya.
- Financial Institutions and Markets, Gupta Agarwal, Kalyani publishers.
- Management of Financial Services ,C.RamaGopal ,Vikas.

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA III Semester

L	T	P	C
4	0	0	4

(BA20EPE308)Consumer Behavior
(ElectiveII)

Objective: The objective of the above course is to enable students to understand the perspectives of consumers and their buying behavior. The pre-requisite for the course is Marketing Management.

UNIT-I

Introduction to consumer behavior: Understanding consumers and market segments. Consumer behavior and marketing strategy, Psychographic Dimensions-consumer motivation, Perception, personality, Information processing, Attitude formation and attitude change.

UNIT-II

Environmental Factors of C.B : Economic, Demographic, Cross Cultural and socio-cultural influences, Social Stratification, Reference Groups and family influences, personal influence.-Economic-Personal-Political.

UNIT-III

Communication and consumer behavior: Process, designing persuasive communication and diffusion of Innovations-Models of Buyer behavior- Howard – Sheth Model, EKB Model, Webster and Wind Model.

UNIT-IV

Consumer decision process : High and Low Involvement, Pre-purchase processes, Purchase ,post purchase process, Consumption and Evaluation, Brand Loyalty and Repeat Purchase Behavior.

UNIT-V

Consumerism: The roots of consumerism, consumer safety, consumer information, environmental concerns, consumer privacy, legislative responses to consumerism, and marketer responses to consumer issues. Consumer protection Act 1986, Consumer disputes Redressal agencies and Commission.

Text Book:

- Schiff man , L.G and Kanuk L.L : Consumer Behavior, 8/e ,Pearson,2009

References :

- Ramesh Kumar : Consumer Behaviour (pearson Education)
- LeonG.Scistman& Leslie Leaserkarmal :Consumer Behaviour, PHI
- SujaR.Nair : Consumer Behaviour in Indian Perspective, Himalaya
- Subash Mehta : Consumer Behaviour, Tata McGraw Hill
- RajjevKumra : Consumer Behaviour, Himalaya Publications

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA III Semester

L	T	P	C
4	0	0	4

(BA20EPE309) LABOR LAWS AND LEGISLATIONS (Elective II)

Objective: In this era of Industrialization it is very significant to understand basics of management. This programme enables the candidate to capture the significant elements of laws to run an industry. It is a course which should be done by candidates who wants to understand management fundamentals and basic elements of an Industry

UNIT-I

Legal frame work: evolution of labour laws in India – labour legislations – meaning, importance and relevance to HRM

UNIT-II

Legislations relating to employment and working conditions: Industrial employment (standing orders) Act, 1946 – Factories Act 1948 - contract labour (Regulation and abolition) Act 1970

UNIT-III

Laws relating to remuneration: Payment of wages Act, 1936, Minimum wages Act, 1948 – Payment of Bonus Act, 1965

UNIT-IV

Laws relating to industrial Relations: Industrial Disputes Act, 1947 - preventive and settlement machinery – trade unions Act, 1926 – workers participation in management

UNIT-V

Laws relating to social security: Workmen's compensation Act, 1923 – ESI Act, 1948- Employees provident fund and miscellaneous provisions Act,1952 - Maternity benefits Act,- 1961 Payment of gratuity Act, 1972- Recent Amendments in Wage Code Bill-2020.

Text Books:

- Industrial Relations and labourlaws -Tripati. P.C- Sultan chand and sons
- Mercantile law – N.D. Kapoor - Sultan chand and sons

Reference books:

- Industrial Relations and labour laws - Sri Vastva – vikas publishers
- Industrial Relations and laws in India – Agarwal LL
- Industrial Relations and labour laws - Sinha&sinha, Oxford IBH
- Legal aspects of business – Pillai.RSN&Bhagavathi (2011), Sultan chand and sons
- Industrial Law- P.L.Malik, eastern book company

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA III Semester

L	T	P	C
4	0	0	4

(BA20EPE310)SUPPLYCHAINMANAGEMENT
(ElectiveII)

Objective: The Objective of this course is to gain the knowledge of possibilities of efficient optimization and management of operation in integrated supply chains and also the ability to apply them in the enterprise reality. The course will also strengthen the holistic view on supply chain operations, management and strategy and some current research areas in supply chain management.

UNIT-I

Role of Distribution in Value discovery: Designing a distribution logistics system – Outsourcing of distribution logistics – Distinction between distribution logistics and supply chain management. Introduction -Supply Chain – Fundamentals –Evolution- Role in Economy -Importance - Decision Phases - Supplier- Manufacturer-Customer chain - Enablers/Drivers of Supply Chain Performance.

UNIT-II

Strategic Sourcing: Outsourcing – Make Vs buy - Identifying core processes - Market Vs Hierarchy - Make Vs buy continuum -Sourcing strategy - Supplier Selection and Contract Negotiation. Creating a world class supply base- Supplier Development - World Wide Sourcing

UNIT-III

Supply Chain Network - Distribution Network Design – Role – Factors Influencing Options, Value Addition – Distribution Strategies - Models for Facility Location and Capacity allocation. Distribution Center Location Models- Supply Chain Network optimization models- Impact of uncertainty on Network Design – Network Design decisions using Decision trees

UNIT-IV

Planning Demand, Inventory And Supply - Managing supply chain cycle inventory- Uncertainty in the supply chain –- Analyzing impact of supply chain redesign on the inventory - Risk Pooling - Managing inventory for short life – cycle products - multiple item -multiple location inventory management. Pricing and Revenue Management

UNIT-V

Current Trends - Supply Chain Integration - Building partnership and trust in SC Value of Information: Bullwhip Effect - Effective forecasting - Coordinating the supply chain. . SC Restructuring - SC Mapping -SC process restructuring, Postpone the point of differentiation.

Text Books:

- D K Agrawal, Textbook of Logistics and Supply Chain Management, MacMillan 2003, 1st Edition.
- G Raghuram& N Rangaraj, Logistics and Supply Chain Management - Cases and Concepts. Mac Millan.

References:

- Supply chain Logistics Management, Bowersox, Closs, Cooper, 2/e,TMH.
- Supply chain management concepts and cases, Rhaul V. Altekar, PHI.
- Exploring Supply Chain – theory and practice, UpendraKachru, excel.
- Supply Chain Management, R.P. Mohanty and S.G. Deshmukh, Jaico .

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA III Semester

L	T	P	C
4	0	0	4

(BA20EPE311)INVESTMENTANDPORTFOLIOMANAGEMENT
(ElectiveIII)

Objective: The objective of the course is to provide students an understanding of working of capital markets and management of portfolios of stocks. The pre-requisite for the course is Financial Accounting and Analysis and Financial Management.

*** Standard discounting and statistical tables to be allowed in the examinations.**

UNIT-I

Investment: Introduction to stock markets -objectives, Process of Investment, Investment and speculation.

UNIT-II

Fundamental Analysis & Technical Analysis: Framework of Fundamental analysis- Economic analysis, Industry analysis-Industry Life cycle - Company analysis, Fundamental Analysis Vs Technical Analysis - Dow Theory.

UNIT-III

Measurement of Risk and Return: Revenue Return and Capital appreciation, holding period –Calculation of expected return, Risk factors, risk classification – systematic risk – unsystematic risk – standard deviation – variance– Beta

UNIT-IV

Valuation of Securities: Types of Securities - Approaches of valuation – Bond valuation – Preference share Valuation – Common stock Valuation

UNIT-V

Portfolio Management: Process of Portfolio Management, Modern Portfolio – Portfolio models – Markowitz model – Sharpe single index model, Capital Asset Pricing Models.

Text Books:

- Investment Management,V.K.Balla, S.Chand Company Ltd
- Security Analysis and Portfolio Management ,PunithavathyPandian, Vikas

References:

- Investment Analysis and portfolio management, Chandra, Tata McGraw Hill .
- Secuerity Analysis Portfolio Management, Ranganatham&Madhumathi, Pearson Education.
- Security Analysis and Portfolio Management, SudhindraBhat, excel.
- Security analysis and portfolio management, Avadani, Himalaya publishers.
- Investment analysis portfolio management, Frank Reilly & Brown, Cengage.
- Investment Management, Preethi Singh, Himalaya Publishing House, Mumbai..
- Investment, Bodie, McGraw Hill Book Company.
- Investment Management ,Hiriyappa ,New Age Publications

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA III Semester

L	T	P	C
4	0	0	4

(BA20EPE312)RETAIL MANAGEMENT
(Elective III)

Objective: The objective of the course is to give an understanding about the structure of Retail markets in India & Government role in promoting retail management.

UNIT-I
An overview of Retailing Management – Introduction, Concept and Significance – Types of Retailers – Building and Sustaining Relationships in Retailing – Strategic Planning in Retailing.

UNIT-II
Retail Store Location – Factors influencing the Location –Finance and Human Resource Management in Retailing – Marketing Management and related issues in Retailing.

UNIT-III
Planning and Merchandise Man
agement for Retail Outlets –Implementing Merchandize Plans Financial Merchandise Management- Pricing In Retailing.- Promotion in Retailing.

UNIT-IV
Retailing and Information Technology Support System – Supply Chain Management – Importance of Customer Service and Quality Management – Franchising, Brand and Mall Management

UNIT-V
Retailing in India – Changes impacting Retailing in India – Impact of Global Brands on Indian Retiling – Common Woes in Retailing – Consumerism and Ethics in Retailing – Research for Retailing.

Text books:

- Suja Nair : Retail Management (Himalaya)

References:

- Barry Berman & Joel R Evans : Retail Management A Strategic Approach
- (Pearson Education)
- Levy, Weitz: Retailing Management (Tata McGraw Hill)
- SwapnaPradhan : Retailing Management (Tata McGraw Hill)

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA III Semester

L	T	P	C
4	0	0	4

(BA20EPE313)PERFORMANCEMANAGEMENT
(ElectiveIII)

Objective: The objective of the course is to provide an outline of performance management of individuals in the organization. The prerequisite for the course is knowledge of HRM.

UNIT-I

Introduction to Performance Management: Concept -Performance management vs. performance appraisal--Performance management vs. Human resource management- Purposes- Significance.

UNIT-II

Mentoring and Monitoring: Concept of mentoring - Benefits of mentoring - Characteristics of mentor- Mentoring process-Group mentoring -Benefits -Types of Group Mentoring – Pitfalls Monitoring performance- Bench marking- Competency mapping

UNIT-III

Coaching and counseling: Coaching for performance improvement -. Concept - Tips for effective coaching Counseling -Functions of counseling- Steps in counseling process

UNIT-IV

Annual Stock taking: Stock taking of performance -Uses –Appraisal system design-Process and approaches - Appraisal methods - MBO and Assessment centre -360 degree appraisal - Balanced score card. Stock taking of potential- Appraisal for reward - Appraisal for recognition

UNIT-V

Learning organisation: Concept of learning organisation- Learning approaches- Learning sources - Importance of learning- Characteristics of learning organisation- Reward and compensation Management -Concept and types of compensation- Objectives - Competitive compensation design - Fringe benefits- Objectives - Factors influencing fringe benefits - Types of fringe benefits

Text books:

- Performance Management, A.S.Kohli, T.Deb,Oxford.
- PremChadha, Performance Management, McMillan.

References:

- Performance Management, Bagchi, CengageLearnings.
- Performance Appraisal and Management, Sharma, Davinder, HPH
- Performance Management, Herman,Aguinis, Pearson Education.
- Performance Management and Appraisal Systems, T.V.Rao, Response.
- Performance management, Kandula, PHI.
- 360 Degree Feedback and Assessment and Development Centres, T.V.Rao, Excel.
- Performance Management, Dinesh k.Srivatsava, Excel

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA III Semester

L	T	P	C
4	0	0	4

(BA20EPE314) ENTERPRISERESOURCEPLANNING
(ElectiveIII)

Objective: The objective of the course is to provide the basic concepts of Enterprise Resource Planning, ERP Implementation and Maintenance.

UNIT-I

Introduction to ERP: Overview of ERP,MRPI, MRPII and Evolution of ERP, Business Modeling, ERP related technologies, Business PROCESS Re-engineering (BPR) – BPR Process, Myths regarding BPR, ERP Architecture.

UNIT-II

Business Intelligence Systems-Data Mining, Data Warehousing, On-line Analytical Processing (OLAP), On-line Transaction Processing (OLTP)

UNIT-III

ERP Modules: Finance Controlling, Accounting System, Manufacturing and Production Systems. Sales and Distribution Systems, Human Resource Systems-Plant Maintenance System, Material Management System, Quality Management System

UNIT-IV

ERP Implementation: ERP Implementation life cycle, ERP package selection, ERP Implementation process, ERP project teams, ERP operation and Maintenance

UNIT-V

ERP Products: SAP, Oracle, Microsoft Dynamic, People Soft, Baan and their impact on enterprise applications.

Text Books:

- Enterprise Resource Planning, Singla, CengageLearnings.
- Enterprise Resource Planning,MahadeoJaiswal& Ganesh Vanapalli,Macmillan

References:

- Enterprise Resource Planning, Alexis Leon, TMH.
- Enterprise Resource Systems,Motiwala,Pearson.
- ERP in practice, Jagan Nathan Vaman, TataMc.GrawHill.
- Enterprise Resource Planning and MIS,VenugopalRao, Excel.
- ERP concepts &Practice,Vinod Kumar Kard arid NK VenkataKristean, PHI.
- Concepts in ERP ,Monk,2/e Thomson.
- Managerial Issues of ERP, David L.Olson , TMH

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA III Semester

L	T	P	C
4	0	0	4

(BA20EPE315) 324 – MERGERS AND ACQUISITIONS (ElectiveIV)

Objective: The objective of the course is to give an understanding about corporate restructuring Mergers, acquisitions and Takeovers in India.

UNIT-I

An overview of corporate restructuring – Value drivers – Due Diligence Process for M & A– Ethical issues in M & A.

UNIT-II

Different forms of mergers – Rationale for mergers and acquisitions – Value creation through mergers and acquisitions – Tax implications – Financing mergers and acquisitions – Merger Negotiations

UNIT-III

Takeovers – Tender offer – Defensive tactics – Leveraged buyouts – Divestment – Buyback of shares – Employee Stock Ownership Plans – Creeping acquisitions.

UNIT-IV

Regulations for Mergers and Takeovers in India – SEBI Guidelines for takeovers – SEBI Guidelines for buyback of securities – SEBI Guidelines for ESOP.

UNIT-V

Cross border Mergers and Acquisitions: Motivations - Opportunities and Threats – Recent cases

Text Books:

- S. Ramanujam, et al: Mergers – Issues Implications and Case Laws in Corporate
- Restructuring (Tata McGraw Hill)

References:

- Dr. JC.Verma : Corporate Mergers, Amalgamation and Takeovers
- (Bharat Publishing House)
- RavindharVadapalli: Merger Acquisitions and Business Valuation (Excel)
- Chandrasekhar Krishnamurti and Viswanath: Mergers Acquisitions and Corporate
- Restructuring (Response Books)
- Kevin K. Boeh and Pall W. Beamish: Mergers and Acquisitions (Sage)
- Krishnamurthi: Mergers, Acquisitions and Corporate Restructuring
- Weston, et al : Takeovers Restructuring and Corporate Governance(Pearson Education

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA III Semester **L T P C**

4 0 0 4

(BA20EPE316)ADVERTISINGANDSALESPROMOTIONMANAGEMENT
(ElectiveIV)

Objective: The objective of the course is to provide students with detailed knowledge of some of the marketing mixes such as Sales and Promotion.

UNIT-I

Advertising: Meaning, Role of advertising, types of advertisement, industrial, institutional, retail, trade and professional, marketing mix, Advertising department and advertisement manager.

UNIT-II

Organizing for Advertising: Objectives and functions - Role and functions of advertisement agencies- Advertising agency and services, client agency relationship- Visual layout, art work, production traffic copy

UNIT-III

Advertisement budgets and effectiveness: Types, optimal expenditure, decision models, sales response and decay, competitive share, Pre-testing, post testing, experimental designs.-Advertising Audit.

UNIT-IV

Sales Promotion: Importance and scope; Need and objectives of sales promotion; Consumer promotion; channel promotion; Timing of sales promotion; Measurement of impact of sales promotion; sales promotion budgeting.

UNIT-V

Publicity and public relations: Scope and importance. Methods of publicity, Power of Publicity, advantages and disadvantages of Publicity, Process of Public relations- Marketing public relations functions; Public relations officer- role and functions

Text Books:

- Advertising & Promotion : George E.Belch,THM
- Advertising and Promotion- An Integrated Marketing Communication approach, Shimp, Cengage

References:

- Integrated Advertising, Promotion and Marketing Communications, Clow, Baack, Pearson.
- Integrated Advertising, Promotion and Marketing Communications, Kruti shah, Alon D'Souza, TMH.
- Advertising Management, Jethwaney, Jain, Oxford.
- Contemporary Advertising, Arens, TMH.
- Advertising, Sales and Promotion Management, S.A.Chunawalla, Himalaya.
- Sengupta, Subroto: Brand Positioning, Strategies for Competitive Advantages, Tata McGraw Hill

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA III Semester

L	T	P	C
4	0	0	4

(BA20EPE317) KNOWLEDGEMANAGEMENT
(ElectiveIV)

Objective: The objective of the course is to provide the basics of the emerging area of Knowledge Management to students. This course focuses on few important concepts as Knowledge management and Information Technology, Knowledge process, etc.

UNIT-I

Introduction to KM: Definition, scope and significance of Knowledge Management, Principles of Knowledge Management, Techniques of Knowledge Management, Data-Information-knowledge-Wisdom relationship

UNIT-II

Creating the culture of Knowledge sharing: Basic types of Knowledge management, Organisational Knowledge Management - Organisational knowledge types- Knowledge Life cycle- Organisational knowledge sources- process, Knowledge Conversion

UNIT-III

Knowledge Management Application: Discussion on Roadblocks to success, KM Road Map, Information Architecture: A three-way Balancing Act of KM

UNIT-IV

Knowledge Management and Information Technology: Role Information Technology in Knowledge Management Systems, E-commerce and Knowledge Management, Bench marking and Knowledge Management

UNIT-V

Future of Knowledge Management and Industry perspective: Knowledge Management in Manufacturing and service industry, future of Knowledge Management

Text books:

- Knowledge Management, Sudhir Warier: Vikas Publishing House.
- Srikantaiah.T.KKoening.M, "Knowledge Management for the Information Professional"

References:

- Knowledge management: An Evolutionary view, Becerra Fernandez: PHI.
- Knowledge Management,Fernando: Pearson.
- Knowledge Management, B.Rathan Reddy: Himalaya.
- Knowledge Management, Tapan K Panda: Excel.
- Knowledge Management systems, Barnes: Cengage.
- The Knowledge Management tool kit, Tiwana: 2/e, Pearson Education.
- Knowledge Management,Sislop: Oxford University Press,.
- Knowledge Management, Debowski: Wiley Student Edition, Wiley Ind
- Knowledge management, A Thothathri Raman, Excel books

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA III Semester

L	T	P	C
4	0	0	4

(BA20EPE318) DATAWAREHOUSINGANDMINING (ElectiveIV)

Objective: The objective of the course is to give an understanding Data Warehousing and Data Mining concepts

UNIT-I

Managing Data: Individual Data Management, Organisational Data Warehousing and Data Management, Components of Organisational Memory, Evaluation of Database Technology

UNIT-II

Database Systems in the Organisation: Data Sharing and Data Bases – Sharing Data between Functional Units, Sharing Data between Different Levels of Users, Sharing Data between Different Locations.

UNIT-III

The Data Warehouse Data Base: Context of Data Warehouse Data Base, Data Base Structures – Organizing Relational Data warehouse – Multi-Dimensional Data Structures

Choosing a Structure- Meta Data: Human Meta Data, Computer Based Meta Data for people to use, Computer based Meta Data for the Computer to use.

UNIT-IV

Analyzing the Contexts of the Data warehouse: Active Analysis, User Queries – OLAP Constructing a Data warehouse System: Stages of the Project – Developing a Project Plan, Data warehousing Design Approaches – The Architecture Stage.

UNIT-V

Getting Data into the Data warehouse – Extraction, Transformation, Cleaning, Loading and Summarization- Data Mining, Creating a Decision Tree, Correlation and Other Statistical Analysis, Neural Networks, Nearest Neighbor Approaches, Putting the Results to Use

Text Books:

- Data Mining – Concepts and Techniques - Jiawei Han &MichelineKamber, Morgan Kaufmann Publishers, 2nd Edition, 2006.
- Data Mining Introductory and advanced topics –Margaret H Dunham, Pearson education

References:

- Decision Support Systems and Data warehouse Systems, Efram G. Mallach: TMH.
- Data Mining Techniques and Tasks, T.H.M.Sivanandam, Thomson.
- Data Management, Data Bases and Organizations, Richard T Watson : Wiley.
- Modern Data Warehousing, Mining and Visualization Core Concepts, Marakas, Pearson
- Data warehousing, Data Mining OLAP, Berson Smith, TMH

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA III Semester

L	T	P	C
0	0	4	2

(BA20EPE319)BUSINESSSIMULATIONLAB

Objective: The course aims is to practice statistical tools in computer with MS-Excel and SPSS.

Learning Outcome: The learning outcome is that the students should be able to: Analyse the data to draw inference for decision making. Understand application of statistical measures of central tendency. Understand application of ANOVA. Analyse trends. Test hypotheses.

UNIT-I

EXCEL Lessons:- Customizing the Quick Access Toolbar.- Creating and Using Templates.-Working with Data: Entering, Editing, Copy, Cut, Paste, Paste Special.- Formatting Data and Using the Right Mouse Click.- Saving, Page Setup, and Printing.- Using Headers and Footers.- Manipulating Data, using Data Names and Ranges, Filters and Sort and Validation Lists.- Data from External Sources.- Using and Formatting Tables.- Basic Formulas and Use of Functions.-Data Analysis Using Charts and Graphs.- Managing, Inserting, and Copying Worksheets.- Securing the Excel Document (Protect Cells and Workbook).

UNIT-II

Advanced excel lessons- Advanced Formulas and Functions.-Advanced Worksheet Features.-Advanced Data Analysis using PivotTables and Pivot Charts.

UNIT-III

Overview of SPSS, Uses, Data Analysis- Making students/Learn Familiar with Main menu and other features of SPSS Package

UNIT-IV

Simulation of frequency distributions: -Binomial, poisson, exponential, weibull and Normal Distributions

UNIT-V

Statistical tools for execution using excel:- Tabulation, bar diagram, Multiple Bar diagram, Pie diagram, Measure of central tendency-mean, median, mode, Measure of dispersion: variance, standard deviation, Coefficient of-variation. Correlation, regression lines test, F-test, ANOVA one way classification, chi square test, independence of attributes.

Text Book :

- Glyn Davis &BrankoPecar "Business Statistics Using Excel" Oxford University Press.

References :

- David Whigham "Business Data Analysis Using Excel'' Oxford University Press.
- Winstion "Excel 2010 Data Analysis and Business Modelling" PHI Learning Private Limited.
- Bajpai "Business Statistics" Pearson.
- D P Apte : Statistical Tools for Managers USING MS EXCEL, Excel Books.

- David M Levine, David. F. Stephan & Kathryn A. Szabat, Statistics for Managers – Using MS
- Bruce Bowerman, Business Statistics in Practice, TMH.
- Shelly, MS Office, 2007, Cengage.

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA III Semester

L	T	P	C
0	0	0	0

(BA20EMC321) BUSINESS ETHICS AND CORPORATE GOVERNANCE (Mandatory Course)

Objective: The objective of the course is to make students aware of ethical and moral issues concerning business both in Indian and International context and develop sensitivity of students for right ethical practices in conduct of business, to understand the principles of corporate governance, to know the social responsibility of the corporate.

UNIT I

Business Ethics and Corporate Ethics – Meaning, Importance, Functions, Unethical Practises and Ethical dilemma, Ethical theories and Approaches, Modern Decision making - Ethical Models for Decision Making, Indian Ethos, Ethics for Managers, Ethics in Business Competition.

UNIT II

Ethical Aspects in Organisation – I: Marketing ethics and Consumer ethics – Ethical issuesin Advertising, Criticisms in Marketing ethics, Ethics in HRM: Selection, Training and Development – Ethics at work place – Ethics in Performance Appraisal.

UNIT III

Ethical Aspects in Organisation – II: Ethics in Finance: Insider trading - Ethical investment - Combating Frauds. Ethical issues in Information Technology: Information Security and Threats – Intellectual Property Rights – Cyber crime.

UNIT IV

Corporate Governance: Purpose – Theories and Philosophies of Corporate Governance

UNIT V

Corporate Governance Structures: Directors, Committees,Institutional investors – Auditors. Corporate Social Responsibility: Stakeholders – Environment – social Development.

TextBook :

- Business Ethics andCorporate Governance –A.C. Fernando, Pearson Education.

References:

- "Perspectives in Business Ethics", Laura P Hartman, Tata McGraw Hill.
- Ethics in management and Indian Ethos, BiswanathGhosh, Vikas
- Bob Tricker, Corporate Governance, Oxford.
- Corporate Governance and Social responsibility, Balachandran, Chandrasekharan, PHI
- Business Ethics -Concepts and Cases, Weiss,Cengage.
- Business Ethics, Himalaya, C.S.V.Murthy.
- Ethical Management, SatishModh, Mcmillan.

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA IV Semester **L T P C**

4 0 0 4

(BA20EPC401)STRATEGICMANAGEMENT

Objective: The Objective of the course is to enable students have a grasp of various business strategies in general and functional management areas. It will provide a strategic orientation in conduct of the business

UNIT-I

Introduction- Concepts in Strategic Management, Strategic Management as a process –Developing a strategic vision, Mission, Objectives, Policies – Factors that shape a company's strategy – Environmental Scanning -Concepts of Core Competence, Crafting a strategy for competitive advantage.

UNIT-II

Strategic Analysis and Choice: Tools and techniques- Porter's Five Force Model, BCG Matrix, GE Model, SWOT Analysis and TOWS Matrix, Market Life Cycle Model - and Organisational Learning, and the Experience Curve

UNIT-III

Strategy Formulation: Formulation of strategy at corporate, business and functional levels. Strategy Alternatives:- Stability Strategy, Growth Strategy, Retrenchment Strategy, and Combination Strategy

UNIT-IV

Strategy Implementation: Types of Strategies: Offensive strategy, Defensive strategy, vertical integration, horizontal strategy; Tailoring strategy to fit specific industry and company situations, Strategy and Leadership, Resource Allocation as a vital part of strategy – Planning systems for implementation.

UNIT-V

Strategy Evaluation and control – Establishing strategic controls - Role of the strategist benchmarking to evaluate performance - strategic information systems – Guidelines for proper control- Strategic surveillance -strategic audit - Strategy and Corporate Evaluation and feedback in the Indian and international context.

Text Book:

- Strategic Management – J.S.Chandan&Nitishsen Gupta, Vikas

References:

- Strategic Management Concepts and Cases, Fred. R David, PHI.
- Strategic Management,Hill, Ireand, manikutty, Cengage.
- Concepts in Strategic Management and Business Policy,Wheelen& Hunger, Pearson Education.
- Strategic Management – Text and Cases, V.S.P. Rao, Excel.
- Strategic Management – Theory and Application, Habergerg, Rieple, oxford .
- Strategic Management, P. SubbaRao, Himalaya.
- Business policy and strategic management, SukulLomash, P.K.Mishra, Vikas

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA IV Semester **L T P C**

4 0 0 4

(BA20EPC402)E-BUSINESS

Objective: The course imparts undertaking of the concepts and various application issues of e-business like Internet infrastructure, security over internet, payment systems and various online strategies for e-business.

UNIT-I

Introduction to e-business : Electronic business, Electronic commerce, difference between e-business & e-commerce, electronic commerce models, types of electronic commerce, value chains in electronic commerce, E-commerce in India, internet, web based tools for electronic commerce. Electronic data, Interchange, components of electronic data interchange, electronic data interchange process.

UNIT-II

Security threats to e- business: Security overview, Electronic commerce threats, Encryption, Cryptography, public key and private key Cryptography digital signatures, digital certificates, security protocols over public networks : HTTP, SSL, Firewall as security control, public key infrastructure (PKI) For Security.

UNIT-III

Electronic payment system: Concept of money, electronic payment systems, types of electronic payment systems, smart cards and electronic payment systems, infrastructure issues in EPS, Electronic fund transfer.

UNIT-IV

E-business applications and strategies : Business models & revenue models over internet, emerging trends in e- businesse - governance, digital commerce, mobile commerce, strategies for business over web, internet based business models.

UNIT-V

E –business infrastructure and e- marketing: Hard works system software infrastructure, ISP's, managing e-business applications infrastructure, what is e-marketing, e-marketing planning, tactics, strategies.

Text books:

- Dave chaffey: e-business & e-commerce management- Pearson.
- e- commerce- e-business :Dr.C.S.Rayudu, Himalaya.

References :

- Whitley, David (2000) ,e-commerce strategy, Technologies and applications.TMH.
- Schneider Gary P.and Perry, James T(1ST edition 2000) Electronic commerce, Thomson Learning.
- Bajaj, Kamlesh K and Nag, Debjani (1st edition 1999) ,e- commerce, The cutting edge of business, TMH Publishing company

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA IV Semester	**L**	**T**	**P**	**C**
	4	**0**	**0**	**4**

(BA20EPE403)FINANCIALDERIVATIVES
(ElectiveV)

Objective: The objective of this course is to make students efficient in the area of Financial Derivatives, giving them the knowledge of basics in Financial Derivatives, Future Markets, Option Strategies, etc.

*** Standard discounting and statistical tables to be allowed in the examinations.**

UNIT-I

Introduction to Derivatives: Development and Growth of Derivative Markets, Types of Derivatives, Uses of Derivatives, Financial and Derivative markets - Fundamental linkages between spot& Derivative Markets, The Role of Derivatives Market in India.

UNIT-II

Future and Forward Market: Structure of forward and Future Markets, Mechanics of future markets, Hedging Strategies, Using futures. Determination of forward and future prices - Interest rate futures, Currency futures and Forwards

UNIT-III

Options: Distinguish between Options and Futures, Structure of Options Market, Principles of Option Pricing, Option Pricing Models: The Binomial Model, The Black Scholes Merton Model.

UNIT-IV

Basic Option Strategies: Advanced Option Strategies, Trading with Options, Hedging with Options, Currency Options.

UNIT-V

Swaps: Concept and Nature of Swaps—Major Types of Financial Swaps –Interest Rate Swaps –Currency Swaps –Commodity Swaps – Credit Risk in Swaps

Text Books:

- Financial Derivatives, Gupta, 1st Edition, PHI.
- Fundamentals of futures and options market, John C Hull: Pearson Education.

References:

- Financial Derivatives and Risk Management, OP Agarwal, HPH
- Commodities and Financial Derivatives, Kevin, PHI
- Fundamentals of Financial Derivatives, Swain.P.K, HPH
- Financial Derivatives, Mishra: Excel.
- Risk Management & Derivatives, Stulz, Cengage.
- Derivatives and Risk Management, Jayanth Rama Varma: TMH.
- Risk Management Insurance and Derivatives, G. Koteshwar: Himalaya

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA IV Semester	**L**	**T**	**P**	**C**
	4	**0**	**0**	**4**

(BA20EPC404) SERVICES MARKETING
(ElectiveV)

Objective: The objective of the course is to provide a deeper insight into the marketing management of companies offering services as product.

UNIT-I

Understanding services marketing: Introduction, Characteristics of services marketing mix, services in the modern economy, Classification of services, marketing services Vs. Physical services.

UNIT-II

Customer Expectations of service: Service expectations, types of expectations, factors that influence customer expectations of service. Issues in involving customers service expectations, Customer defined service standards.

UNIT-III

Pricing & Promotion strategies for services: Service pricing, establishing monetary pricing objectives, foundations of pricing, pricing and demand, putting service pricing strategies into practice.

UNIT-IV

Service promotion: The role of marketing communication. Implication for communication strategies, marketing communication mix.

UNIT-V

Marketing plans for services: The marketing planning process, strategic context, situation review marketing strategy formulation, resource allocations and monitory marketing planning and services.

Text Books:

- Services Marketing – Text and Cases, RajendraNargundkar, TMH.
- Services Marketing—Integrating Customer Focus Across the Firm,ValarieA. Zeithaml& Mary Jo-Bitner: TMH.

References:

- Services Marketing People, Technology, Strategy, Christopher Lovelock, Wirtz, Chatterjee, Pearson.
- Services Marketting – Concepts planning and implementation, Bhattacharjee, excel,2009
- Services Markeing, Srinivasan, PHI.
- Services – Marketing, Operations and Management, Jauhari, Dutta, Oxford.
- Marketing of Services, Hoffman, Bateson,Cengage.
- Service sector Management, C.Bhattacharjee, Jaico.

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA IV Semester	**L**	**T**	**P**	**C**
	4	**0**	**0**	**4**

(BA20EPE405)ORGANIZATIONDEVELOPMENT
(ElectiveV)

Objective: The objective of the course is to provide the students with the conceptual framework and the theories underlying Organizational Development.

UNIT-I
Organization Development –Definition – Characteristics - Contributory Stems, Values, Assumptions, and Beliefs in OD - Ethical issues in OD.

UNIT-II
Foundations of OD- Systems Outlook- Third Wave Management and Organization Transformation

UNIT-III
Diagnostic Process and Areas of Diagnosis –Action Research- As a Process and Approach- OD

UNIT-IV
Interventions classification – Team Interventions – Intergroup Interventions- Third party peacemaking intervention, Structural Interventions- Comprehensive Interventions and Training Experience, Other Interventions- T- Groups, Behaviour Modelling, Life and Career Planning.

UNIT-V
Consultant Issues – System Ramifications – Power politics in OD – Future of OD.

Text Books:

- Organisation Development and Transformation, French, Bell &Zawacki, TMH.
- Organization Development, French&Bell, Pearson

References:

- Organisation Change and Development,Kavita Singh: Excel.
- Organization Development, Daniel Robey& Steven Actman, Macmillan.
- Organisation Development Change, Cummins&Worley,Thomson/Cengage.
- Organisation Development Interventions &Strategics, S. Ramnarayan, T.vRao&kuldeepsingh, Response.

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA IV Semester	**L**	**T**	**P**	**C**
	4	**0**	**0**	**4**

(BA20EPE406)DATACOMMUNICATIONANDNETWORKANALYSIS
(ElectiveV)

Objective: The objective of the course is to provide the basic concepts of Data Communication and Network Analysis, network security, privacy and data encryption.

UNIT-I

Introduction – General structure of Networks – ISO, OSI Reference Model. Hierarchical Network, connectivity analysis – delay analysis – local access Network design Physical layer: transmission and multiplexing – digital transmission – circuit switching packet switching – terminal handling – error correction and error correcting codes.

UNIT-II

Data – link layer: simple protocols. Unrestricted stop and wait sliding window protocols -Network layer: virtual circuits and data grams, centralize hierarchical and broadcasting algorithms.

UNIT-III

Transportation layer and Session layer: Transport service – addressing and connection establishment – flow control and buffering – synchronization – crash recovery gate way– internet work fragmentation – session layer.

UNIT-IV

Presentation layer: Network security and privacy – data encryption – key distribution authentication and digital signatures – virtual terminal protocols – file transfer protocols.

UNIT-V

Application layer – Distribution systems ISDN – Service & History, TCP/IP and Net Working and Internetworking Derives.

Text Books:

- Understanding Data Communications & Networks, William A. Shay, Vikas.
- Data Communications and Net Working, Behrouz A. Forouzan, TMH

References:

- Data Communication and Computer Networks, Duck& Read, Person.
- Data Networks, Bertsekas&Gallages, PHI
- Computer Communications and Networking Technologies, Michael A. Gallo, Cengage.

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA IV Semester **L T P C**

4 0 0 4

(BA20EPE407)INTERNATIONALFINANCIAL MANAGEMENT
(ElectiveVI)

Objective: The objective of the course is to provide students with a broad view of International Monetary Systems and its understanding to enable a global manager to do business in a global setting. The prerequisite for the course is Financial Accounting and Analysis and Financial Management.

UNIT-I

Introduction to International Financial management: IFM meaning, Difference between FM & IFM, Nature, Scope, Importance.

UNIT-II

Foreign Exchange Market: Functions and Structure of the Forex markets, major participants, types of transactions and settlements, Foreign exchange quotations

UNIT-III

Management of foreign exchange exposure and risk: Types of Exposure, Economic Exposure, Transaction Exposure, Operating Exposure.

UNIT-IV

Cross-border Investment Decisions: Capital budgeting, Approaches to Project Evaluation, Risk in Cross-border Investment Decisions.

UNIT-V

Financing Decisions of MNC`s & Working Capital Management: Introduction, the cost of capital, capital structure, Cash management, management of receivables, Inventory management.

Text Books:

- International Financial Management, V.K.Bhalla ,S.Chand
- International Financial Managemen, EphriamClark ,Cengage.

References:

- International Finance , Prakash .G.Apte, TMH
- International Financial Management, T.Siddaiah: Pearson.
- International Financial Management ,M.K.Rastogi
- International Financial Management, S.EunChoel and Risnick Bruce: TMH.
- International Financial Management, MachiRaju, HPH.
- international finance management, Jeff Madura, Cengage.
- International Financial Management, Sharan5th Edition, PHI.
- International Financial Management, MadhuVij: Excel, .
- International Financial Management, V. A Avadhani, Himalaya .

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA IV Semester **L T P C**

4 0 0 4

(BA20EPE408)INTERNATIONALMARKETING
(ElectiveVI)

Objective: The objective of the course is to provide students with a perspective of International Marketing Management, its environment and complexities.

UNIT-I

International Marketing: Scope and Significance of International Marketing, The importance of international marketing, Differences between international and domestic marketing, legal environment and regulatory environment of international marketing.

UNIT-II

International Market Entry Strategies: Indirect Exporting, Direct Exporting, Foreign Manufacturing Strategies with Direct Investment. Entry Strategies of Indian Firms

UNIT-III

International product management: International product positioning, Product saturation Levels in global Market, New products in International Market, Products and culture, brands in International Market.

UNIT-IV

International Marketing Channels: Distribution Structures, Distribution Patterns, Factors effecting Choice of Channels, the Challenges in Managing an international Distribution Strategy, Selecting Foreign Country Market intermediaries. The management of physical distribution of goods, Grey Market goods

UNIT-V

Export Marketing: Introduction to Export Marketing, Export Policy Decisions of a firm, EXIM policy of India. Export costing and pricing, Export procedures and export documentation. Export assistance and incentives in India.

Text books:

- International Marketing, Michael R.Czinkota, Likka A Ronkainen, Cengage .
- Global marketing Management
- Keegan, Green, 4/e, Pearson

References:

- International Marketing Analysis and Strategy, SakOnkvisit, John J. Shaw, PHI.
- International Marketing, Philip R. Cateora, John L. Graham, PrasanthSalwan, TMH.
- International Marketing,Vasudeva PK, excel.
- Global Maketing, Management, Lee, Carter, Oxford.
- International Marketing and Export management, Albaum , Pearson Education.
- Global Marketing, Johansson, TMH.

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA IV Semester **L T P C**

4 0 0 4

(BA20EPE409)GLOBALHUMANRESOURCE MANAGEMENT

(ElectiveVI)

Objective: The objective of the course is to provide an outline of Global Human Resource management of MNC`S.

UNIT-I

Global Human Resource Management concept, expanding role – Global issues and challenges, Differences between Domestic HRM and GHRM.

UNIT-II

Social and Cultural Variables in Global Organizations – Cross Cultural Differences – Cross Cultural Research Methodologies – Hofetede's Hermes Study, Cultural Issues.

UNIT-III

Global staffing and Compensation Practices – Nature, Sources, Policies – Human Resource Planning – Recruitment and Selection for global Assignment, Selection process- Expatriate and Repatriate. – Compensation- International Compensation structure, Differentiating HCN'S, PCN`S and TCN`S

UNIT-IV

Training & development and Appraisal in the global perspective- Programmes and Agencies– Performance Appraisal system – Training and development need, cross cultural training, Areas of international training and development.

UNIT-V

Global Industrial Relations and People Management – Trade Unions, Collective bargaining, Disputes/Conflicts, Quality Circles and Participative Management.- USA–European Countries, Asian Countries and Middle East.

Text books:

- International Human Resource Management, Aswathappa, TMH.
- InternationalDimension of Human Resource Management, Dowling P.J, Thomson/Cengage

References:

- International Human Resource Management, Tony Edwards & Chris Rees, Pearson.
- Internal Human Resource Management, Rao P.L, Excel.
- International Human Resource Management, SubbaRao P, Himalaya.
- International Dimensions of Organizational Behaviour, Adler N.J, Kent

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA IV Semester **L T P C**

4 0 0 4

(BA20EPE410)CORPORATEINFORMATIONMANAGEMENT (ElectiveVI)

Objective: The objective of the course is to provide a broad outline of Information Technology and its application at corporate business units and to understand all the issues related to the IT management.

UNIT-I

IT planning and strategy tools: Strategy analysis – environment analysis- Conducting strategy audit- Assessing opportunities and risks- Company – technology analysis – Industry –technology analysis Trajectories of technology.

UNIT-II

Extending the enterprise: Organising for innovation –Collaboration- Understanding business networks: differentiation interdependence and ownership – Designing hybrid governance models- Building collaborative community- Emerging network business models.

UNIT-III

IT Alignments : Building the case for IT- leveraging infrastructure and creating options- Components of internetworking infrastructures –Rise of internetworking – business implications, Managing IT services : Availability facilities- uninterruptible power –Delivery- climate control – security – New service models.

UNIT-IV

IT outsourcing - Managing risk through incremental outsourcing- Outsourcing advantages and disadvantages- Outsourcing opportunities- Managing relationships with outsourcing agencies, Coordination and control of IT :Development stages of IT in organising- Nolans' model- Distributed data processing - Centralisationvsdecentralisation- drivers toward user dominance- Drivers towards centralised policy- Coordination and location IT policy.

UNIT-V

Project management: Project categories- Project management: stage in project – planning and controlling tools-Problems – Towards effective project management, Technology and innovation: Understanding technological developments- Technology cycles-. Creative idea generation- Employee creativity – R&D- Role in technology development

Text Books:

- C,S,G,,Krishnamcaharyulu and Lalitha R. Management of Technology, Himalaya
- Lynda M.Applegate, Robert D.Ausitn and F. Warren McFarlan, Corporate Information strategy and Management, TMH

References:

- SanjivaShnkarDubey, IT strategy and Management, PHI.
- ParagKulkarni IT strategy for Business, Oxford.

- V.K.Narayan, Managing Technology and Innovation for competitive Advantage, Pearson.
- C.K. Prahlad, The New Age of Innovation. TMH.

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA IV Semester **L T P C**

0 0 32

(BA20ETS411)SEMINAR(ContemporaryIssuesonBusiness)

The objective of the seminar is to evaluate the skills required for the manager's viz., communication skills, logical skills, analytical skills, presentation skills, and persuasion skills, decision making skills acquired by the students in the course of M.B.A and to analyse the managerial capabilities.

Students are required to present a seminar on any contemporary issue of the business.

SRIVENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

MBA IV Semester **L T P C**

0 0 12 10

(BA20EPW411) PROJECT WORK

Students are required to take up a project work, in which the student can chooseany specific problem of Industry or Industry based project work. Alternatively it can besecondary source based or Field based project work. Before the commencement of the projectwork each student is required to submit a synopsis indicating the objectives, Methodology,Frameworkforanalysis,Actionplanwithmilestonesinordertohaveclarityforthesubsequent work. The project should have an internal faculty as guide. The student shallinitiate project work immediately after II semester and evaluation shall take place in IVsemester

References:

- Business Essentials: Research Project, Viva.
- Paul Oliver:Writing Your Thesis, Sage.
- M.K.Rampal&S.L.Gupta: Project Report Writing, Paragon International.
- Michael Jay Polonsky: David S Waller: Designing and Managing a Research Project, Sage.
- Surendra Kumar: An Aid to Project Work, Paragon International.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

Karakambadi Road Tirupati-517 507



Department of Computer Science & Engineering

Course Structure for

I, II, III & IV Years

R 20 Regulations

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)
Karakambadi Road, TIRUPATI – 517507

Computer Science & Engineering

B.Tech I Semester

S.No	CourseNo	CourseName	Category	L-T-P	Credits
1.	MA20ABS101	Linear Algebra and Calculus	BS	3-0-0	3
2.	CH20ABS103	Chemistry	BS	3-0-0	3
3.	CS20AES101	Problem Solving using C	ES	3-0-0	3
4.	EE20AES101	Basic Electrical& Electronics Engineering	ES	3-0-0	3
5.	ME20AES101	EngineeringWorkshop	ES	0-0-3	1.5
6.	CS20AES103	ITWorkshop	ES	0-0-3	1.5
7.	CH20ABS104	ChemistryLab	BS	0-0-3	1.5
8.	CS20AES102	ProblemSolvingusingCLab	ES	0-0-3	1.5
9.	EE20AES102	BasicElectrical&Electronics EngineeringLab	ES	0-0-2	1.5
10.	EG20AMC101	Speech&OralCommunication	MC	2-0-0	0
				Total	**19.5**

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)
Karakambadi Road, TIRUPATI – 517507

Computer Science & Engineering

B.Tech II Semester

S.No	CourseNo	CourseName	Category	L-T-P/D	Credits
1.	MA20ABS201	Differential Equations and Vector Calculus	BS	3-0-0	3
2.	PH20ABS103	Applied Physics	BS	3-0-0	3
3.	EG20AHS101	Communicative English	HS	3-0-0	3
4.	CS20AES201	Data Structures	ES	3-0-0	3
5.	ME20AES102	Engineering Drawing	ES	1-0-0/2	2
6.	ME20AES103	Engineering Graphics Lab	ES	0-0-2	1
7.	EG20AHS102	Communicative English Lab	HS	0-0-3	1.5
8.	PH20ABS104	Applied Physics Lab	BS	0-0-3	1.5
9.	CS20AES202	Data Structures Lab	ES	0-0-3	1.5
10.	BA20AMC201	Universal Human Values	MC	3-0-0	0
11	BA20AHS201	Mandatory course (AICTE Suggested): Universal Human Values	HS	3-0-0	*3
12.	MA20AMC101	Logical Skills for Professionals – I	MC	2-0-0	0
				Total	**19.5**

***UHV** is considered as Credit Based Course From 2021 Batch

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous) Karakambadi Road,
TIRUPATI–517507

Computer Science and Engineering

B. Tech III Semester

S. No	Course No	Course Name	Category	L-T-P	Credits
1	MA20ABS303	Discrete Mathematics & Graph Theory	BS	3-0-0	3
2	EC20AES301	Digital Electronics & Microprocessors	ES	3-0-0	3
3	CS20APC305	Software Engineering	PC	3-0-0	3
4	CS20APC303	Database Management Systems	PC	3-0-0	3
5	IT20APC301	Python Programming	PC	3-0-0	3
6	EC20AES302	Digital Electronics & Microprocessors Lab	ES	0-0-3	1.5
7	CS20APC304	Database Management Systems Lab	PC	0-0-3	1.5
8	IT20APC302	Python Programming Lab	PC	0-0-3	1.5
9	AM20ASC301	**Skill oriented course-I** Linux Administration	SC	1-0-2	2
10	CH20AMC201	**Mandatory non-credit course-II** Environmental Science	MC	2-0-0	0
11	EG20AMC302	Enhancing English Language Skills **(Lateral Entry Students Only)**	MC	2-0-0	0
12	BA20AHS201	Mandatory course (AICTE Suggested): Universal Human Values**(Lateral Entry Students Only)**	HS	3-0-0	*3
				Total	**21.5**

***UHV** is considered as Credit Based Course From 2021 Batch

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous) Karakambadi Road,
TIRUPATI–517507

Computer Science and Engineering

B. Tech IV Semester

S. No	Course No	Course Name	Category	L-T-P	Credits
1	MA20ABS401	Numerical Methods, Probability and Statistics	BS	3-0-0	3
2	CS20APC401	Object Oriented Programming Through Java	PC	3-0-0	3
3	CS20APC301	Computer Organization and Architecture	PC	3-0-0	3
4	AM20APC301	Design and Analysis of Algorithms	PC	3-0-0	3
5	BA20AHS301	**Humanities Elective-I** Managerial Economics and Financial Analysis	HS	3-0-0	3
	BA20AHS302	Business Environment			
	BA20AHS303	Organizational Behavior			
6	CS20APC402	Object Oriented Programming Through Java Lab	PC	0-0-3	1.5
7	CS20APC302	Computer Organization and Architecture Lab	PC	0-0-3	1.5
8	AM20APC302	Algorithms Lab	PC	0-0-3	1.5
9	IT20ASC401	**Skill Oriented Course-II** Exploratory Data Analysis With R	SC	1-0-2	2
10	CS20AMC401	**Mandatory non-credit course-III** Design Thinking for Innovation	MC	2-0-0	0
11	SH20AAC401	NSS/YOGA/Cultural Activities/Sports	AC	0-0-2	0
12	MA20AMC401	Engineering Mathematics (Lateral Entry Students Only)	MC	2-0-0	0.0
				Total	**21.5**
Community Service Project – After the end of IV Semester – 4 Weeks – 1.5 Credits					
Honors/Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)				0-0-2	0

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

KarakambadiRoad, TIRUPATI–517507

Computer Science and Engineering

B. Tech V Semester

IIIB. Tech-I Semester(Theory-5,lab–2,SOC-1MC-3)					
S. No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1	CS20APC501	Computer Networks	PC	3-0-0	3
2	CS20APC502	Formal Languages and Compiler Design	PC	3-0-0	3
3	CS20APC504	Operating Systems	PC	3-0-0	3
4	CE20AOE501 EC20AOE501 EE20AOE501 ME20AOE502	**Open Elective-I** Basics of civil engineering Basic VLSI Design Introduction to control Systems Solar and wind energy systems	OE	3-0-0	3
5	CS20APE501 CS20APE502 CS20APE503 CS20APE504 CS20APE505	**Professional Elective-I** Advanced Computer Architecture Data Warehousing and Data mining Digital Image Processing Object Oriented Analysis Design & Testing Principles of Programming Languages	PE	3-0-0	3
6	CS20APC503	Computer Networks Lab	PC	0-0-3	1.5
7	CS20APC505	Operating Systems Lab	PC	0-0-3	1.5
8	EG20ASC301	Skill Oriented Course-III Soft Skills	SC	1-0-2	2
9	BA20AMC502	Mandatory non-credit course-IV Intellectual Property Rights	MC	2-0-0	0
10	CH20AMC301	Mandatory non-credit course-V Biology for Engineers	MC	2-0-0	0
11	CS20AIP501	Evaluation of Summer Internship (4 Weeks)	IP		1.5
12	CS20ATS501	Technical SeminarPresentation-I	TS		0.5
13	IT20AMC501	Problem Solving and Programming **(Lateral Entry Students only)**	MC	2-0-0	0
				Total	**22**
14	Honors/Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)			**4-0-0**	**4**
15	Honors/Minor courses (NPTEL/MOOCS)			**2-0-0**	**2**

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)
KarakambadiRoad, TIRUPATI–517507

Computer Science and Engineering

B.Tech VI Semester

IIIB.Tech-IISemester(Theory-5,lab–3,SOC-1MC-2)					
S. No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1	CS20APC601	Cryptography and Network Security	PC	3-0-0	3
2	CS20APC603	Machine Learning	PC	3-0-0	3
3	CS20APC605	Web and Internet Technologies	PC	3-0-0	3
4	CS20APE601 CS20APE602 CS20APE603 CS20APE604 CS20APE605	**Professional Elective-II** Artificial Intelligence Big Data Analytics Computer Vision Internet of Things Software Testing	PE	3-0-0	3
5	ME20AOE501 EE20AOE503 EC20AOE602 CE20AOE603	**Open Elective-II** Introduction to Automation Renewable Energy Resources Signal Processing Water Resources Planning & Management	OE	3-0-0	3
6	CS20APC602	Cryptography and Network Security Lab	PC	0-0-3	1.5
7	CS20APC604	Machine Learning Lab	PC	0-0-3	1.5
8	CS20APC606	Web and Internet Technologies Lab	PC	0-0-3	1.5
9	CS20ASC601	**Skill Oriented Course-V** Dev Ops	SC	1-0-2	2
10	BA20AMC501	**Mandatory non-credit course-V** Constitution of India	MC	2-0-0	0
11	CS20ATS601	Technical SeminarPresentation-II	TS		0.5
12	AM20AMC601	AI Tools Techniques & Applications for LE	MC	2-0-0	0
13.	MA20AMC301	LogicalSkillsforProfessionals - II	MC	2-0-0	0

Industrial/Research/Mini Project (Mandatory) 1 Monthduring summer vacation			
		Total	**22**
13	Honors / Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)	4-0-0	4
14	Honors/Minor courses (NPTEL/MOOCS)	2-0-0	2

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)
KarakambadiRoad, TIRUPATI–517507

Computer Science and Engineering

B. Tech VII Semester

IVB.Tech-ISemester(Theory-6,lab–0,SOC-1)					
S. No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1	CS20APE701 CS20APE702 CS20APE703 CS20APE704 CS20APE705	**Professional Elective-III** Block Chain Technologies Data Science Data Visualization Techniques Distributed Computing Service oriented Architecture	PE	3-0-0	3
2	CS20APE706 CS20APE707 CS20APE708 CS20APE709 CS20APE710	**Professional Elective-IV** Advanced Language Processors Cyber Security Deep Learning Full Stack Development Software Project Management	PE	3-0-0	3
3	CS20APE711 CS20APE712 CS20APE713 CS20APE714 CS20APE715	**Professional Elective-V** Agile Methodologies Cloud Computing Malware Analysis Natural language processing Reinforcement Learning	PE	3-0-0	3
4	CE20AOE701 EE20AOE603 ME20AOE602 EC20AOE702	**Open Elective-III** Air Pollution and Quality Control Optimization Techniques Through MATLAB Power Generation Techniques Principles of Communication Engineering	OE	3-0-0	3
5	EE20AOE701 EC20AOE705 CE20AOE705 ME20AOE702	**Open Elective-IV** Embedded Systems Introduction to Image Processing Low Cost Housing Techniques Robotics in Industrial Engineering	OE	3-0-0	3
6	BA20AHS701 BA20AHS705 BA20AHS706	**Humanities Elective-II** Business Ethics and Corporate Governance Management Science Strategic Management	HS	3-0-0	3
7	CS20ASC701	**Skill Oriented Course-V** MOOC-2 (NPTEL)/Digital Marketing	SC	1-0-2	2

8	CS20AIP701	Industrial/Research Internship 1 Month Evaluation Mini Project	IP	0-0-0	3
9	CS20APW701	Project Work Stage-I	PW		2
10	CS20ATS701	Technical SeminarPresentation- III	TS		0.5
				Total	**25.5**
11	Honors/Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)			**4-0-0**	**4**

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous) KarakambadiRoad,
TIRUPATI–517507

Computer Science and Engineering

B. Tech VIII Semester

S. No	Course No	Course Name	Category	L-T-P	Credits
1	CS20APW801	Project Work Stage – II / Full Internship in Industry	PW	0-0-0	8.5
				Total	**8.5**