

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	CE20AOE705	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 PRO	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
Embedded 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: rreddy.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 x Meet - hmu-kxvp-pfb

https://meet.google.com/hmu-kxvp-pfb?pli=1

hod_ece svce (Presenting)

11:37 | hmu-kxvp-pfb

Participants: hod_ece svce, Viceprincipal SVCE, rreddy ECE, N Bheema Rao, Sujatha Gaddam, Krishnamohan A, Varadarajan Sourirajan, 9 others, Dr.K.Lokesh Krishna.

SVCE-ECE-4TH BOS MEETING on x 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.

11:38 | hmu-kxvp-pfb

Participants: hod_ece svce, Varadarajan Sourirajan, rreddy ECE, N Bheema Rao, Viceprincipal SVCE, Sujatha Gaddam, Krishnamohan A, 9 others, Dr.K.Lokesh Krishna.

SVCE-ECE-4TH BOS MEETING on x Meet - hmu-kxvp-pfb

https://meet.google.com/hmu-kxvp-pfb?pli=1

hod_ece svce (Presenting)

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 (VLSI) WITH AN INTAKE OF 9.

NBA All B.Tech Programmes are accredited by NBA

SVCE-ECE

11:39 | hmu-kxvp-pfb

Participants: hod_ece svce, Varadarajan Sourirajan, rreddy ECE, N Bheema Rao, Viceprincipal SVCE, Sujatha Gaddam, Krishnamohan A, 10 others, Dr.K.Lokesh Krishna

SVCE-ECE-4TH BOS MEETING on x Meet - hmu-kxvp-pfb

https://meet.google.com/hmu-kxvp-pfb?pli=1

hod_ece svce (Presenting)

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 - 16 %
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

11:40 | hmu-kxvp-pfb

Participants: hod_ece svce, Varadarajan Sourirajan, rreddy ECE, N Bheema Rao, Viceprincipal SVCE, Sujatha Gaddam, Krishnamohan A, 10 others, Dr.K.Lokesh Krishna

SVCE-ECE-4TH BOS MEETING on x 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)

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

11:47 | hmu-kxvp-pfb

Participants: hod_ece svce, Webinar ECE, rrrreddy ECE, N Bheema Rao, Viceprincipal SVCE, Sujatha Gaddam, Krishnamohan A, 9 others, Dr.K.Lokesh Krishna

SVCE-ECE-4TH BOS MEETING on x Meet - hmu-kxvp-pfb

https://meet.google.com/hmu-kxvp-pfb?pli=1

hod_ece svce (Presenting)

Microsoft Word - SVCE_ECE_4TH BOS MEETING Part 2 Basic Electronics Engineering.docx - Microsoft Word

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 - 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 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

11:55 | hmu-kxvp-pfb

Participants: hod_ece svce, Allabaksh Shaik, rrrreddy ECE, N Bheema Rao, Viceprincipal SVCE, Sujatha Gaddam, Krishnamohan A, 9 others, Dr.K.Lokesh Krishna

Inbox (329) - lokeshkrishna.k@svce x Meet - hmu-kxvp-pfb x +

https://meet.google.com/hmu-kxvp-pfb?pli=1

hod_ece svce (Presenting)

Network Analysis and Simulation Lab.docx - Microsoft Word

CO1: Verify Kirchhoff's Laws and network Theorems
 CO2: Analyze time domain and frequency response of RL & RC circuits
 CO3: Analyze behavior of RLC circuit for different excitations
 CO4: Design resonant circuit for given Specifications
 CO5: Characterize and model the network in terms of its 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 KVL and KCL
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 DFC 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 response
9. Find the Q Factor and Bandwidth of a Series and Parallel Resonant circuit
10. Determination of open circuit (OC) and short circuit (SC) parameters
11. Determination of hybrid (H) and transmission (ABCD) parameters
12. To measure two port parameters of a two-port 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).

12:16 | hmu-kxvp-pfb

Participants: hod_ece svce, Allabaksh Shaik, rrrreddy ECE, N Bheema Rao, Viceprincipal SVCE, Sujatha Gaddam, Upendra Raju K, 10 others, Dr.K.Lokesh Krishna

Participants: Jagannath M, hod_ece svce, N Bheema Rao, rrrreddy ECE, Dr.Chandrasekhar C, Narasimham Melanathur, Salma Syed, Viceprincipal SVCE, Sujatha Gaddam, Allabaksh Shaik, Upendra Raju K, Dr.K.Lokesh Krishna, Krishnamohani, Padma Priya Sathiyatham, Dr. V. Madhurima, Mahesh Babu Kota, Webinar ECE

12:22 | SVCE BOS MEETING @12/09/2023

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

Copy to
 Principal,
 Chairman,
 BoS Members,
 To file

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.

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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

- A semester comprises 90 working days and an academic year is divided into two semesters.
- 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.
- 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

- Total duration of the of B. Tech (Regular) Programme is four academic years.
- Each academic year of study is divided into two semesters.
- Minimum number of instruction days in each semester is 90 days.
- 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.
- Health/wellness/yoga/sports and NSS /NSS /Scouts & Guides / Community service activities are made mandatory as credit courses for all the under graduate students.
- Courses like Environmental Sciences, Indian Constitution, Technical Paper Writing & IPR are offered as non-credit mandatory courses for all the undergraduate students.
- Design Thinking for Innovation & Tinkering Labs are made mandatory as credit courses for all the undergraduate students.
- Increased flexibility for students through an increase in the elective component of the curriculum, with 05 Professional Elective courses and 04 Open Elective courses.
- 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: $(25 \times 0.8) + (20 \times 0.2) = 24$

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: $(25 \times 0.8) + (0 \times 0.2) = 20$

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.,

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

Where, C_i is the number of credits of the i^{th} subject, G_i is the grade point scored by the student in the i^{th} 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 a programme, i.e.

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

Where S_i is the SGPA of the i^{th} 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	$\geq 6.5 < 7.5$
Second Class	$\geq 5.5 < 6.5$
Pass Class	$\geq 5.0 < 5.5$

CGPA to Percentage Conversion Formula – $(CGPA - 0.5) \times 10$

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 be 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 & Electronics Engineering	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.Bhattacharya, 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 Ψ^2 , molecular orbital theory – bonding in homo- and hetero nuclear diatomic molecules – energy level diagrams of O₂ and CO, etc. n-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. Chromatography-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. Billmeyer 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 social or 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, Elliot 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 for 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

- Evaluate the following expressions.
 - $A+B*C+(D*E) + F*G$
 - $A/B*C-B+A*D/3$
 - $A+++B---A$
 - $J= (i++) + (++i)$
- Find the maximum of three numbers using conditional operator.
- 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.

- Write a C program to find the max and min of four numbers using if-else.
- Write a C program to generate electricity bill.
- Find the roots of the quadratic equation.
- Write a C program to simulate a calculator using switch case.
- 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

- Find the factorial of given number using any loop.
- Find the given number is a prime or not.
- Compute sine and cos series.
- Checking a number palindrome.
- 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

- Find the min and max of a 1-D integer array.
- Perform linear search on 1D array.
- The reverse of a 1D integer array
- Find 2's complement of the given binary number.
- 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 two matrices
- 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 a recursive 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 Publishers 2019, 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, 38th Edition.
4. Highway Engineering, S.K.Khanna, C.E.G. Justo and Veeraraghavan, Nemchand Brothers Publications 2019. 10th Edition.
5. Indian Standard DRINKING WATER — SPECIFICATION IS 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 Text 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 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. 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, Involute, 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 circuit analysis.
- 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. Principle of Duality with examples.

Network Theorems: Thevenin's, Norton's, Millman'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-homogeneous, 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-resonance 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 rule of 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, New Delhi, 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](https://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 peripheral and 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 active 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 TeX and 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 Anfinson 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.

(EC23APC202) NETWORK ANALYSIS AND SIMULATION LABORATORY**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 with required 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, Jamie Phillips, 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 Stark and 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-ahead 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 Zvonko Vranesic, "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. Zvi Kohavi and Niraj K. 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.

(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 and Applications", 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.

(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 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.

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.

(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 of operation.
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 and 7 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 its stability.

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 , I_P , I_v , V_P , & V_v 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 Python Programming 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.elif 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 1st Edition 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:

- Forest Ecosystem.
- Grassland Ecosystem
- Desert Ecosystem.
- 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

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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, and FM 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 using BJT & MOSFETs at low and high frequencies.
- CO 3:** Apply basic principles to solve the problems related to oscillators and feedback amplifiers.
- 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 & n 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. Shruti N Shetty, Design the Future, Norton Press
3. William Lidwell, Universal Principles of Design - Kritin Holden, 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 from each 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

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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 amplifiers 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 commutating capacitors and draw the wave forms at base and collector of transistors.
12. Design an Astable Multivibrator and draw the wave forms at base and collector of 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 analysis aspects 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/DUIsNJtg2L8?list=PLLy_2iUCG87CQhELCYtvXh0E_y-bOO1_q
2. https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHIsQFwJZeI_j2PUy0pwjVUgj7KIJ
3. <https://youtu.be/-Y-R9hDI7IU>
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 alternative to the 2 months of Summer Internships / Apprenticeships / On the Job Training, whenever there 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 of box solutions to social problems.
- To make students socially responsible citizens who are sensitive to the needs of the 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 them study 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 shall also 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/ on the 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 expected to 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)

(Approved by AICTE |Accredited by NAAC with 'A' Grade

Accredited by NBA| Permanently Affiliated to JNTUA)

Karakambadi Road, Tirupati-517507



B.Tech CSE (AI & ML)

Course Structure& Syllabus under

R20 Regulations

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

Karakambadi Road, TIRUPATI-517507

Computer Science and Engineering (AI&ML)

B. Tech II Year I Semester
(Theory – 5, Lab-3, SC-1, MC-2)

S.No	Course No	Course Name	Category	L-T-P	Credits
1.	MA20ABS303	Discrete Mathematics & Graph Theory	BS	3-0-0	3
2.	AM20APC301	Design and Analysis of Algorithms	PC	3-0-0	3
3.	AM20APC303	Computer Organization and Architecture	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.	AM20APC302	Algorithms Lab	PC	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	EG20AMC301	Enhancing English Language Skills(Lateral Entry Students only)	MC	2-0-0	0
11	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 (AI&ML)

B. Tech II Year II Semester

(Theory – 5, Lab – 3, SC-1, MC-2)

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	IT20APC401	Operating Systems	PC	3-0-0	3
4	EC20AES301	Digital Electronics & Microprocessors	ES	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	IT20APC402	Operating Systems Lab	PC	0-0-3	1.5
8	EC20AES302	Digital Electronics & Microprocessors Lab	ES	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	2-1-0	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
Total					21.5
Community Service Project – After the end of the 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)

Karakambadi Road, TIRUPATI-517507

Computer Science and Engineering (AI&ML)

B. Tech III Year I Semester
(Theory – 5, Lab – 2, SC-1, MC-2)

S.N	Course No	Course Name	Category	L-T-P	Credits
1	AM20APC501	Artificial Intelligence	PC	3-0-0	3
2	AM20APC503	Data Warehousing and Data mining	PC	3-0-0	3
3	AM20APC504	Formal Languages and Compiler Design	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	AM20APE501 AM20APE502 AM20APE503	Professional Elective-I Computer Networks Digital Image Processing No SQL Databases	PE	3-0-0	3
6	AM20APC502	Artificial Intelligence & Data Mining Tools Lab	PC	0-0-3	1.5
7	AM20APC505	Compiler Design Lab	PC	0-0-3	1.5
8	EG20ASC301	Skill Oriented Course-IV Soft Skills	SC	1-0-2	2
9	BA20AMC501	Mandatory non-credit course-IV Constitution of India	MC	2-0-0	0
10	CH20AMC301	Mandatory non-credit course-V Biology for Engineers	MC	2-0-0	0
11	AM20ATS501	Technical Seminar Presentation-I	TS		0.5
12	AM20ACS501	Community Service Project	CS		1.5
13	IT20AMC501	Problem solving & 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		4
15	Honors/Minor courses (NPTEL/MOOCs)		2-0-0		2

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

Computer Science and Engineering (AI & ML)

B. Tech III Year II Semester
(Theory – 5, Lab – 3, SC-1, MC-1)

S. No	Course No	Course Name	Category	L-T-P	Credits
1	AM20APC601	Big Data Analytics	PC	3-0-0	3
2	AM20APC603	Machine Learning	PC	3-0-0	3
3	AM20APC605	Natural Language Processing	PC	3-0-0	3
4	AM20APE601 AM20APE602 AM20APE603	Professional Elective-I Cloud computing Computer Applications using programming Tools and Techniques Software Project Management	PE	3-0-0	3
5	ME20AOE501 EE20AOE503 EC20AOE602 CE20AOE603	Open Elective-II Industrial Automation Renewable Energy Resources Signal Processing Water Resources Planning & Management	OE	3-0-0	3
6	AM20APC602	Big Data Analytics Lab	PC	0-0-3	1.5
7	AM20APC604	Machine Learning Lab	PC	0-0-3	1.5
8	AM20APC606	Natural language processing Lab	PC	0-0-3	1.5
9	AM20ASC601	Skill Oriented Course-V Full stack development-1	SC	1-0-2	2
10	BA20AMC502	Mandatory non-credit course-V Intellectual Property Rights & Patents	MC	2-0-0	0
11	AM20ATS601	Technical Seminar Presentation II	TS		0.5
12	AM20AMC601	AI Tools Techniques & Applications (for LE Students only)	MC		0
13	MA20AMC301	Logical Skills for Professionals - II	MC	2-0-0	0
14	Internship (Mandatory) 1 Month during summer vacation				
	Total				22
15	Honors / Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)		4-0-0		4
16	Honors/Minor courses (NPTEL/MOOCs)		2-0-0		2

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

Karakambadi Road, TIRUPATI-517507

Computer Science and Engineering (AI & ML)

B. Tech IV Year I Semester

(Theory -6,SC – 1)

S. No	Course No	Course Name	Category	L-T-P	Credits
1	AM20APE701 AM20APE702 AM20APE703	Professional Elective-III Intelligent Information Retrieval Systems Internet of Things Recommender Systems	PE	3-0-0	3
2	AM20APE704 AM20APE705 AM20APE706	Professional Elective-IV Block Chain Technology Data Visualization Ethical Hacking	PE	3-0-0	3
3	AM20APE707 AM20APE708 AM20APE709	Professional Elective-V Agile Methodologies Deep Learning Design Patterns	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 Usage	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	AM20ASC701	Skill Oriented Course-V Full stack development-2	SC	1-0-2	2
8	AM20AIP701	Internship	IP		3
9	AM20APW701	Project Work Stage-I	PW		2
10	AM20ATS701	Technical Seminar Presentation-III	TS		0.5
					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)

Computer Science and Engineering (AI & ML)

B. Tech IV Year II Semester

S. No	Course No	Course Name	Category	L-T-P	Credits
1	AM20APW801	Project work Stage -II or Full internship in industry	PW	0-0-0	8.5
Total					8.5

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech III Sem.

L T P C

3 0 0 3

(MA20ABS303) DISCRETE MATHEMATICS AND GRAPH THEORY

(CSE, AI&ML, IT)

Course Objectives:

- To describe logical sentences in terms of predicates, quantifiers, and logical connectives in theory of inference for the statement calculus. (L2)
- To demonstrate the application of basic methods of discrete mathematics in Computer Science problem solving. (L3)
- To explain about the Graph theory and Recurrence relations. (L5)
- To reveal the concepts of graph theory which is applied in addressing the problems related to computer science. (L3)
- To introduce the mathematical concepts which will be useful to study advanced courses such as Design and Analysis of Algorithms, Theory of Computation, Cryptography and Software Engineering etc. (L4)

UNIT – 1: Mathematical logic:

Statements and Notation, Connectives- Negation, Conjunction, Disjunction, Conditional and Bi-conditional, Statement formulas and Truth Tables. Well-formed formulas, Tautologies, Equivalence of Formulas, Duality Law, Tautological Implications.

Normal Forms: Disjunctive Normal Forms, Conjunctive Normal Forms, Principal Disjunctive Normal Forms (PDNF), Principal Conjunctive Normal Forms (PCNF).

The Theory of Inference for the Statement Calculus: Rules of Inference, Consistency of Premises and Indirect Method of Proof.

The predicate Calculus, and Inference theory of the Predicate Calculus: Predicates, the statement function, variables and quantifiers, predicate formulas, free and bound variables, the universe of discourse, valid formulas and equivalences, some valid formulas over finite universe, special valid formulas involving quantifiers, theory of inference for the predicate calculus.

Learning Outcomes:

At the end of this unit, the student will be able to

- Describe logical sentences in terms of predicates, quantifiers, and logical connectives. (L2)
- Evaluate basic logic statements using truth tables and the properties of logic. (L5)
- Apply rules of inference to test the consistency of premises and validity of arguments and verify the equivalence of two formulas and their dual. (L3)
- Find the Principal Conjunctive and Principal Disjunctive Normal Forms of a statement formula. (L1)

UNIT – II: Set Theory:

Basic concepts of Set theory: Notation, inclusion and equality of sets, the power set, some operation on sets, Venn diagrams, some basic set identities, Cartesian products.

Relations and Ordering: Relations, properties of binary relations in a set, relation matrix and the graph of a relation, partition and covering of a set, equivalence relations, compatibility relations, composition of binary relations, and partial ordering, Hasse Diagram.

Functions: Definition and introduction, composition of functions, inverse functions, binary and n-ray operations, characteristic function of a set.

Learning Outcomes:

At the end of this unit, the student will be able to

- Describe the basic concepts of set theory. (L2)
- Describe equivalence, partial order and compatible relations. (L2)
- Describe functions and composition of functions. (L2)
- Describe binary and n-ray operations. (L2)

UNIT – III: Algebraic Structures

Algebraic Systems: Examples and General Properties.

Semi Groups and Monoids: Definitions and examples, homomorphism of semi groups and Monoids, Sub semigroups and Sub Monoids.

Groups: Definition and examples, subgroups and homomorphisms, cosets and Lagrange's theorem, normal subgroups, algebraic systems with two binary operations.

Learning Outcomes:

At the end of this unit, the student will be able to

- Describes the properties of Semi groups.(L2)
- Describes the properties of Monoids.(L2)
- Describes the properties of Groups.(L2)

UNIT – IV: Recurrence Relations:

Recurrence Relations: Generating Functions of Sequences, Calculating Coefficients of Generating Functions, Recurrence Relations, Solving Recurrence Relations by Substitution and Generating Functions, The method of Characteristic Roots, Solution of In-homogeneous Recurrence Relations.

Learning Outcomes:

At the end of this unit, the student will be able to

- Find the generating functions for a sequence.(L1)
- Solve recurrence relations by using the method of Characteristic roots and Generating functions.(L3)

UNIT – V: Graph Theory:

Graphs: Basic Concepts, Isomorphism and Sub graphs, Planar Graphs, Euler's Formula, Multi graphs and Euler Circuits, Hamiltonian Graphs.

Graph coloring: Chromatic Number, The Four-Color Problem.

Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees.

Algorithms to find a spanning tree in connected graph: Minimum spanning tree, Depth first search (DFS) algorithm, Breadth first search (BFS) algorithm and Kruskal's algorithm.

Learning Outcomes:

At the end of this unit, the student will be able to

- Investigate if a given graph is simple or a multigraph, directed or undirected, cyclic or acyclic.(L6)
- Apply the concepts of functions to identify the Isomorphic Graphs and Identify Euler Graphs, Hamilton Graph.(L3)
- Describes Graph coloring and chromatic number of a graph.(L2)
- Apply depth-first and breadth-first search algorithm to find a minimum spanning tree.(L3)
- Apply Kruskal's algorithms to find a minimum spanning tree.(L3)

Text Books:

- J P Tremblay and R Manohar, "Discrete Mathematical Structures with Applications to Computer Science", 1st Edition, McGraw Hill, 2017(For Unit I&II).
- Joe L. Mott. Abraham Kandel and Theodore P. Baker, "Discrete Mathematics for Computer Scientists & Mathematicians", 2nd Edition, Pearson, 2008. (for Units III to V).

Reference Books:

- Kenneth H Rosen, "Discrete Mathematics and Its Applications (SIE)", 7th Edition, McGraw-Hill.
- Ralph P. Grimaldi and B.V. Ramana, "Discrete and Combinatorial Mathematics, an Applied Introduction", 5th Edition, Pearson, 2016.
- Narsingh Deo, "Graph Theory with Applications to Engineering", Prentice Hall, 1979.
- S. Malik and M.K. Sen, "Discrete Mathematics theory and Applications", 1st Edition, Cenegage Learning, 2012.
- L Liu and D P Mohapatra, "Elements of Discrete Mathematics, A computer Oriented approach", 4th edition, McGraw-Hill, 2018.
- Dr. D.S. Chandrasekharaiah, "Mathematical foundations of computer science", 3rd edition Prism books Pvt. Ltd.

Course Outcomes:

At the end of this Course the student will be able to

- Apply mathematical concepts and logical reasoning to solve problems in different fields of Computer science and information technology (L3).
- Apply the properties of Set theory to find Equivalence and Partial Ordering relations and Hasse Diagrams for different functions (L3).
- Analyse the properties of Algebraic Structures to find the given sets are Semi group, Monoids and Groups (L4).
- Analyse the concepts of Generating and Recurrence relations for solving Homogeneous and In-Homogeneous equations (L4).
- Investigate the graphs are Isomorphic Graphs, Euler and Hamilton Graphs (L6).

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech III Sem.

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(AM20APC401) DESIGN AND ANALYSIS OF ALGORITHMS

(CSE, CSM& IT)

Course Objectives:

- Demonstrate the importance of the complexity of a given algorithm.
- Illustrate various algorithm design techniques.
- Make use of data structures and/or algorithmic design techniques in solving new problems.
- Explain the advanced algorithm design and analysis techniques.
- Identify and understand basic computability concepts and the complexity classes P, NP, and NP-Complete.

UNIT I

Introduction: What is an Algorithm, Algorithm specification, Performance analysis.

Divide and Conquer: General method, Binary Search, Finding the maximum and minimum, Merge sort, Quick Sort, Selection sort, Strassen's matrix multiplication.

Learning Outcomes:

At the end of this unit, the student will be able to

- Analyze the complexity of Algorithms. (L4)
- Identify with mathematical formulation, complexity analysis and methodologies to solve recurrence relations for algorithms. (L3)
- Analyze different scenarios for running time of algorithms using asymptotic notations and Design using Recursion. (L4)
- Apply divide and conquer strategy for design of various algorithms. (L3)
- Compare complexities of Merge sort, Quick sort and Selection sort techniques. (L2)

UNIT II

Greedy Method: General method, Knapsack problem, Job Scheduling with Deadlines, Minimum cost Spanning Trees, Optimal storage on tapes, Single-source shortest paths. **Dynamic programming:** General Method, Multistage graphs, All-pairs shortest

paths, Optimal binary search trees, 0/1 knapsack, The traveling sales person problem.

Learning Outcomes:

At the end of this unit, the student will be able to

- Decide and apply algorithmic strategies to solve given problem. (L5)
- Develop algorithms for well known problems using greedy methods. (L3)
- Define Principle of optimality with examples. (L1)
- Contrast Greedy and Dynamic programming paradigms. (L2)
- Apply dynamic-programming approach for designing graph and matrix based algorithms. (L3)

UNIT III

Basic Traversal and Search Techniques: Techniques for binary trees, Techniques for Graphs, Connected components and Spanning trees, Bi-connected components and DFS

Back tracking: General Method, 8-queens' problem, Sum of subsets problem, Graph coloring and Hamiltonian cycles, Knapsack Problem.

Learning Outcomes:

At the end of this unit, the student will be able to

- Define solution space tree. (L1)
- Illustrate graph search strategies: BFS, DFS and D-Search. (L2)
- Demonstrate the recursive and iterative backtracking algorithms. (L2)
- Apply backtracking strategy to solve N – queens' problem, Sum of subsets problem and Knapsack problem. (L3)

UNIT IV

Branch and Bound: The method, Travelling salesperson, 0/1 Knapsack problem, Efficiency Considerations.

String Matching: The Naive String-Matching algorithm, The Rabin-Karp algorithm, String matching with Finite Automata, The Knuth-Morris-Pratt algorithm.

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Learning Outcomes:

At the end of this unit, the student will be able to

- Find optimal solution by applying various methods. (L1)
- Analyze the advantage of bounding functions in Branch and Bound technique to solve the Travelling Salesperson problem. (L4)

- Apply the knowledge to find patterns in the given text.(L3)

UNIT V

NP – Hard and NP – Complete Problems: NP Hardness, NP Completeness, Consequences of being in P, Cook's Theorem, Reduction Source Problems, Reductions: Reductions for some known problems

Learning Outcomes:

At the end of this unit, the student will be able to

- Define P, NP, NP –hard and NP-complete classes of problems.(L1)
- Prove that a certain problem is NP-Complete.(L5)
- Apply algorithm design principles to derive solutions for real life problems and comment on complexity of solution.(L3)

Course Outcomes:

- Analyze the complexity of the algorithms
- Make use of various design techniques like divide and conquer, greedy, dynamic programming, backtracking, branch and bound to solve the problems.
- Identify and analyze criteria and specifications appropriate to new problems, and choose the appropriate algorithmic design technique for their solution.
- Able to prove that a certain problem is NP-Complete.

Text Books:

1. Fundamentals of Computer Algorithms II, Ellis Horowitz, S. Satraj Sahani and Rajasekhran, 2nd edition, University Press. 2014,
2. Introduction to Algorithms, Third Edition, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein.

Reference Books:

1. Introduction to Algorithms II, second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein, PHI Pvt. Ltd./ Pearson Education.
2. Introduction to Design and Analysis of Algorithms A strategic approach II, R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, Mc Graw Hill.
3. Data structures and Algorithm Analysis in C++ II, Allen Weiss, Second edition.

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L T P C

3 0 0 3

(CS20APC301) COMPUTER ORGANIZATION AND ARCHITECTURE (CSE,CSM&IT)

Course Objectives:

- To learn the fundamentals of computer organization and its relevance to classical and modern problems of computer design
- To understand the structure and behavior of various functional modules of a computer.
- To learn the techniques that computers use to communicate with I/O devices
- To acquire the concept of pipelining and exploitation of processing speed.
- To learn the basic characteristics of multiprocessors

UNIT -I

Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization

Basic Structure of Computer: Computer Types, Functional Units, Basic operational Concepts, Bus Structure, Software, Performance, Multiprocessors and Multicomputer.

Machine Instructions and Programs: Numbers, Arithmetic Operations and Programs, Instructions and Instruction Sequencing, Addressing Modes, Basic Input/output Operations, Stacks and Queues, Subroutines, Additional Instructions.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand the various blocks& the definition of Computer Organization (L1)
- Identify the basic functional units and different ways of interconnecting to form a computer system (L1)
- Illustrate various addressing modes for accessing register and memory operands (L2)
- Describe the instruction sequencing and various types of instructions (L3)

UNIT-II

Arithmetic: Addition and Subtraction of Signed Numbers, Design of Fast Adders, Multiplication of Positive Numbers, Signed-operand Multiplication, Fast Multiplication, Integer Division, Floating-Point Numbers and Operations.

Basic Processing Unit: Fundamental Concepts, Execution of a Complete Instruction, Multiple- Bus Organization, Hardwired Control and Multi programmed Control.

Learning Outcomes:

At the end of this unit, the student will be able to

- Outline the arithmetic operations on signed numbers (L1)
- Describe the operations performed on floating point numbers (L1)
- Distinguish between hardwired and micro programmed control units. (L2)

UNIT III

The Memory System: Basic Concepts, Semiconductor RAM Memories, Read-Only Memories, Speed, Size and Cost, Cache Memories, Performance Considerations, Virtual Memories, Memory Management Requirements, Secondary Storage.

Learning Outcomes:

At the end of this unit, the student will be able to

- Recognize the various types of memories (L2)
- Analyze the performance of cache memory (L4)
- Apply effective memory management strategies (L3)

UNIT IV

Input/output Organization: Accessing I/O Devices, Interrupts, Processor Examples, Direct Memory Access, Modes of Transfer, Buses, Interface Circuits, Standard I/O Interfaces.

Learning Outcomes:

At the end of this unit, the student will be able to

- Examine the basics of I/O data transfer synchronization (L5)
- Analyze the interrupt handling mechanisms of various processors (L4)
- Describe various techniques for I/O data transfer methods (L1)

UNIT - V

Pipelining: Basic Concepts, Data Hazards, Instruction Hazards, Influence on Instruction Sets.

Large Computer Systems: Forms of Parallel Processing, Array Processors, the Structure of General-Purpose multiprocessors, Interconnection Networks.

Learning Outcomes:

At the end of this unit, the student will be able to

- Investigate the use of pipelining and multiple functional units in the design of high-Performance processors (L4)
- Design and analyze a high-performance processor (L4)
- Describe the interconnection networks for multiprocessors (L1)

Course Outcomes:

At end of the course the student will be able to

- Understand the computer organization concepts related to design of modern processors, memories and I/Os (L2)
- Identify the hardware requirements for cache memory and virtual memory (L2)
- Understand the importance and tradeoffs of different types of memories (L2)
- Design algorithms to exploit pipelining and multiprocessors (L4)
- Identify pipeline hazards and possible solutions to those hazards (L2)

TEXT BOOKS:

1. M.Morris Mano, "Computer System Architecture", 3rd Edition, Pearson Education
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, "Computer Organization", 5th Edition, McGraw Hill Education, 2013.

REFERENCE BOOKS:

1. Themes and Variations, Alan Clements, "Computer Organization and Architecture", CENGAGE Learning.
2. Smruti Ranjan Sarangi, "Computer Organization and Architecture", McGraw Hill Education.
3. John P.Hayes, "Computer Architecture and Organization", McGraw Hill Education

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(CS20APC303) DATABASE MANAGEMENT SYSTEMS (CSE, CSM & IT)

• Course objectives

This course is designed to

- Train in the fundamental concepts of database management systems, database modeling and design, SQL, PL/SQL and system implementation techniques.
- Enable students to model ER diagram for any customized application.
- Inducting appropriate strategies for optimization of queries.
- Provide knowledge on concurrency techniques.
- Demonstrate the organization of Databases.

UNIT-I: Introduction to DBMS: Database systems applications, Purpose of Database Systems, view of Data, Database Languages, Relational Databases, Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Database users and Administrators.

Database Design and the E-R Model: Overview of the Design Process, The Entity-Relationship Model, Constraints, Entity-Relationship Diagrams, and Convert E-R to Relational Schemas.

Learning outcomes:

At the end of the Unit, students will be able to

- Distinguish between Database and File System (L4).
- Categorize different kinds of data models (L4).
- Define functional components of DBMS (L1).
- Develop E-R model for the given problem (L6).
- Derive tables from E-R diagrams (L5).

UNIT-II: Introduction to Relational Model: Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations.

- **Relational Database Design:** Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Functional-Dependency Theory, Algorithms for Decomposition, Decomposition Using Multi valued Dependencies, More Normal Forms.

Learning outcomes:

At the end of the Unit, students will be able to

- Outline the elements of the relational model such as domain, attribute, tuple, relation and entity (L2).
- Distinguish between various kinds of constraints like domain, key and integrity (L4).
- Differentiate between various normal forms based on functional dependency (L4).
- Apply normalization techniques to eliminate redundancy (L3).

UNIT-III: Introduction to SQL: Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Sub-queries, Modification of the Database, Joins and Views.

Advanced SQL: Accessing SQL from a Programming Language, Functions and Procedures, Triggers.

Learning outcomes:

At the end of the Unit, students will be able to

- Define relational schema (L1)
- Develop queries using Relational Algebra and SQL (L6)
- Perform DML operations on databases (L3)

UNIT-IV: Query Processing: Overview, Measures of Query cost, Selection operation,

Sorting, Join Operation, other operations, Evaluation of Expressions.

- Transaction Management: Transactions: Concept, A Simple Transactional Model, Storage Structures, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Isolation and Atomicity, Transaction Isolation Levels, Implementation of Isolation Levels, Transactions as SQL Statements.

Learning outcomes:

At the end of the Unit, students will be able to

- Identify variety of methods for effective processing of given queries (L2)
- Understand various properties of transaction (L1)
- Design atomic transactions for an application (L6)

UNIT V: Concurrency Control: Lock based Protocols, Deadlock Handling, Multiple granularities, Timestamp based Protocols, and Validation based Protocols.

Recovery System: Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with Loss of Nonvolatile Storage, Early Lock Release and Logical Undo Operations.

Learning outcomes:

At the end of the Unit, students will be able to

- Understand various locking protocols (L1)
- Gain the knowledge about log mechanism and checkpointing techniques for system recovery (L2)

• Course Outcomes

Students will be able to

- Design a database for a real world information system (L6)
- Define transactions which preserve the integrity of the database (L1)
- Generate tables for a database (L4)
- Organize the data to prevent redundancy (L4)
- Pose queries to retrieve the information from database (L3)

TEXT BOOKS:

1. A.Silberschatz, H.F.Korth, S.Sudarshan, "**Database System Concepts**", 6/e, TMH 2019

REFERENCE BOOKS:

1. Shamkant B. Navathe, "**Database Management System**" 6/e RamezElmasriPEA
2. "**Database Principles Fundamentals of Design Implementation and Management**", Carlos Coronel, Steven Morris, Peter Robb, CengageLearning.
3. Raghurama Krishnan, Johannes Gehrke, "**Database Management Systems**", 3/e, TMH

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(IT20APC301) PYTHON PROGRAMMING (CSE, CSM & IT)

Course Objectives:

1. To learn the fundamentals of Python
2. To elucidate problem-solving using a Python programming language
3. To introduce a function-oriented programming paradigm through python
4. To get training in the development of solutions using modular concepts
5. To introduce the programming constructs of python

Unit – I

Introduction to Python Programming: Overview of Programming Languages, History of Python, Installing Python, Executing Python Programs, Commenting in Python, Internal Working of Python.

Basics of Python Programming: Python Character Set, Token, Python Core Data Type, I/O functions, Assigning Value to a Variable, Multiple Assignments, Writing Simple Programs in Python, Formatting Number and Strings, Python In-built Functions.

Operators and Expressions: Operators and Expressions, Arithmetic Operators, Operator Precedence and Associativity, Changing Precedence and Associativity of Arithmetic Operators, Translating Mathematical Formulae into Equivalent Python Expressions, Bitwise Operator, The Compound Assignment Operator.

Learning Outcomes:

At the end of this unit, the student will be able to

- List the basic constructs of Python (L1).
- Understand operators and expressions. (L2).

Unit – II

Decision Statements: Boolean Type, Boolean Operators, Using Numbers with Boolean Operators, Using String with Boolean Operators, Boolean Expressions and Relational Operators, Decision Making Statements, Conditional Expressions.

Loop Control Statements: The while Loop, The range() Function, The for Loop, Nested Loops, The break Statement, The continue Statement.

Functions: Syntax and Basics of a Function, Use of a Function, Parameters and Arguments in a Function, The Local and Global Scope of a Variable, The return Statement, Recursive Functions, The Lambda Function.

Learning Outcomes:

At the end of this unit, the student will be able to

- Apply the conditional execution of the program (L3).
- Apply the principle of recursion to solve the problems (L3).

Unit - III

Strings: The str class, Basic Inbuilt Python Functions for String, The index[] Operator, Traversing String with for and while Loop, Immutable Strings, The String Operators, String Operations.

Lists: Creating Lists, Accessing the Elements of a List, Negative List Indices, List Slicing [Start: end], List Slicing with Step Size, Python Inbuilt Functions for Lists, The List Operator, List Comprehensions, List Methods, List and Strings, Splitting a String in List, Passing List to a Function, Returning List from a Function.

Tuples, Sets and Dictionaries: Introduction to Tuples, Sets, Dictionaries.

Learning Outcomes:

At the end of this unit, the student will be able to

- Design programs for manipulating strings (L6).
- Apply lists, Tuples, Sets and Dictionaries (L3).

Unit – IV

Exceptions: When Something Goes Wrong, Classes of Exceptions, A Final Note on Pythonic Exception Handling.

File Handling: Need of File Handling, Text Input and Output, The seek() Function, Binary Files, Accessing and Manipulating Files and Directories on a Disk.

Modules: Reusing Code with Modules and Packages, Understanding Python Modules, Everyday Module Usage, Advanced Module Behavior, Combining Modules into Packages

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand Exceptions and Modules (L2).
- Organize data in the form of files (L4).

Unit – V

Object-Oriented Programming: Class, Objects and Inheritance: Defining Classes, The Self parameter and Adding Methods to a Class, Display Class Attributes and Methods, Special Class Attributes, Accessibility, The __init__ Method (Constructor), Passing an Object as Parameter to a Method, __del__() (Destructor Method), Class Membership Tests, Method Overloading, Operator Overloading, Inheritance, The Object Class.

Case study: The turtle module, Simple Repetition, Encapsulation, Generalization, Interface design, Refactoring, docstring.

Learning Outcomes:

At the end of this unit, the student will be able to

- Plan programs using object orientation approach (L4).
- Design graphics using turtle module (L4).

Course Outcomes:

- Apply the features of Python language in various real applications (L3).
- Select appropriate core data structure of Python for solving a problem (L5).
- Design object-oriented programs using Python for solving real-world problems (L4).
- Apply modularity to programs (L3).
- Design graphics using turtle module (L4).

Text books:

1. Programming and problem solving with Python by Ashok Namdev Kamthane, Amit Ashok Kamthane (2018): McGraw Hill Education (India) Private Limited.
2. Allen B. Downey, "Think Python", 2nd edition, SPD/O'Reilly, 2016.
3. Python 3 for Absolute Beginners, Tim Hall and J-P Stacey, Apress.

Reference Books:

- R. Nageswara Rao, "Core Python Programming", 2nd edition, Dreamtech Press, 2019.
- Python Pocket Reference 5ed: Python in Your Pocket, Mark Lutz, 2014.

e-Resources:

- https://www.tutorialspoint.com/python3/python_tutorial.pdf

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B. Tech III Sem

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(AM20APC402) ALGORITHMS LAB

(CSE,CSM&IT)

Course objectives

- Analyze a problem and design the solution for the problem.
- Illustrate the method of finding the complexity of algorithms
- Infer the advanced algorithm design and analysis techniques.
- Identify and apply the suitable algorithm for the given real world problem.

Week-1 QUICK SORT

Sort a given set of elements using the quick sort method and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the 1st to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random numbergenerator.

Week-2 MERGESORT

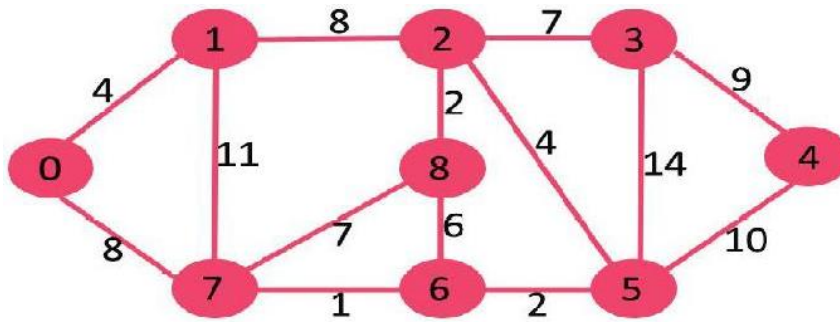
Implement merge sort algorithm to sort a given set of elements and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random numbergenerator.

Week-3 KNAPSACK PROBLEM

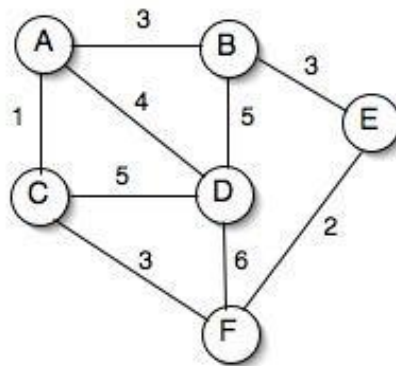
Implement 0/1 Knapsack problem using Dynamic Programming.

Week-4 SHORTEST PATHSALGORITHM

From a given vertex in a weighted connected graph, find shortest paths from 0 to other vertices using Dijkstra's algorithm.



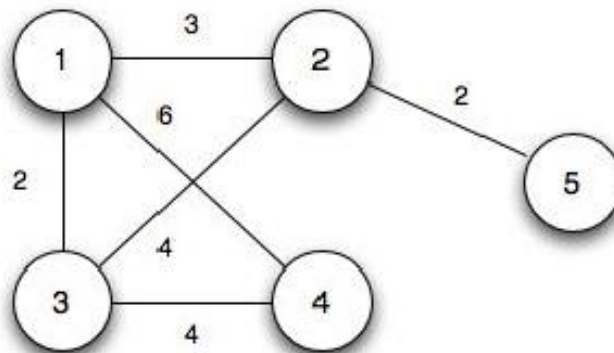
Week-5 MINIMUM COST SPANNINGTREE



Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm.

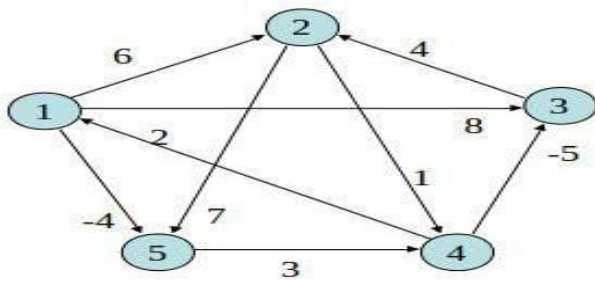
Week-6 MINIMUM COST SPANNINGTREE

Find Minimum Cost Spanning Tree of a given undirected graph using Prim's algorithm.



Week-7 ALL PAIRS SHORTESTPATHS

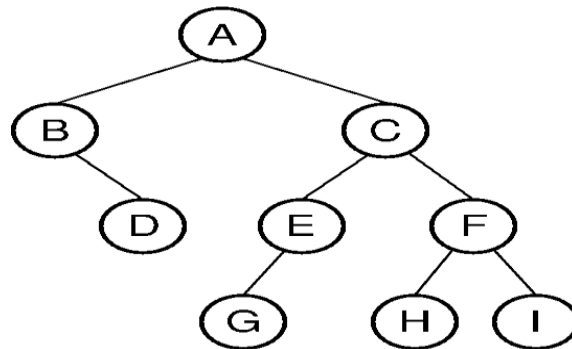
Implement All-Pairs Shortest Paths Problem using Floyd's algorithm.



	1	2	3	4	5
1	0	6	8	∞	-4
2	∞	0	∞	1	7
3	∞	4	0	∞	∞
4	2	∞	-5	0	∞
5	∞	∞	∞	3	0

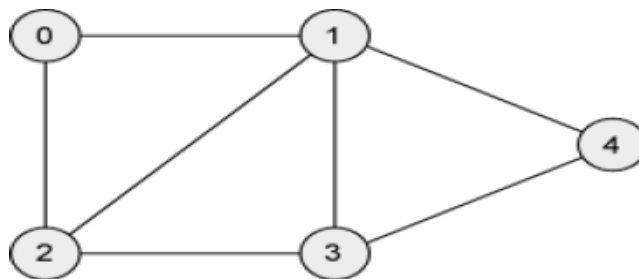
Week-8 TREETRAVERSALS

Perform various tree traversal for a given tree

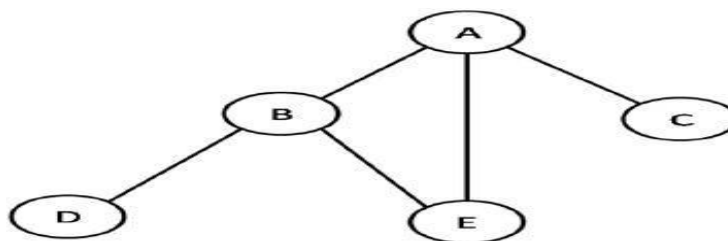


Week-9 GRAPHTRAVERSALS

a. Print all the nodes reachable from a given starting node in a digraph using BFS method.



b. Check whether a given graph is connected or not using DFS method.



Week-10 SUM OF SUB SETSPROBLEM

Find a subset of a given set $S = \{s_1, s_2, \dots, s_n\}$ of n positive integers whose sum is equal to a given positive integer d . For example, if $S = \{1, 2, 5, 6, 8\}$ and $d = 9$ there are two solutions $\{1, 2, 6\}$ and $\{1, 8\}$. A suitable message is to be displayed if the given problem instance doesn't have a solution.

Week-11 TRAVELLING SALES PERSONPROBLEM

Implement any scheme to find the optimal solution for the Traveling Sales Person problem and then solve the same problem instance using any approximation algorithm and determine the error in the approximation.

Week-12 N QUEENSPROBLEM

Implement N Queen's problem using Back Tracking.

Week-13 STRING MATCHING

- a. Implement naïve string matching algorithm.
- b. Implement Rabin-karp string matching algorithm.
- c. Implement knuth-Morris-Pratt algorithm.
- d. Implement finite automata string matching algorithm.

Course outcomes

- Apply the Divide and Conquer strategy to solve searching, sorting problems.(L3)
- Analyze the efficiency of Greedy and Dynamic Programming design techniques to solve the optimization problems.(L2)
- Relate Backtracking technique for solving constraint satisfaction problems.(L3)

Reference Books:

- Levitin A —Introduction to the Design and Analysis of Algorithms, Pearson Education, 2008.

- Goodrich, M.T. R Tomassia —Algorithm Design foundations Analysis andInternet Examples, John Wiley and Sons, 2006.

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B. Tech III Sem

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(CS20APC304) DATABASE MANAGEMENT SYSTEMS LAB

(CSE, CSM& IT)

Course Objectives:

This course is designed to

- Use SQL commands to create, update, modify and retrieve data from the data bases.
- ER model for a practical real-life system.
- Understand the importance of good database design and indexing.
- Understand the properties of transactions in a database system.

List of Experiments

1. Practice DDL and DML Queries
2. Perform various SQL queries on LIKE, AND, OR, NOT AND BETWEEN operations.
3. Perform various SQL queries on select clause, where clause, pattern matching, Order by and Group by.
4. SQL Queries on Set operations, Aggregate functions and Join Operations.
5. Perform DCL, TCL Queries, and Constraints with Primary and Foreign Keys.
6. Design and Create University Library Database using ER diagram and Schema Diagram.
7. Design and create a university database consisting of the following tables Department, Course, Instructor and Student using ER Modelling and Schema Diagram.
8. Create various tables like Branch, banking system with constraints using a Schema diagram.
9. PL/SQL program using controls Structures.
10. Program to implement Procedures and Functions.
11. Program to implement Triggers.
12. Program to implement Cursors.

Course Outcomes:**At the end of the course, students will be able to**

- Work with the concepts of DDL, DML, DCL Commands (L3).
- Design of databases for real life systems using Oracle (L5).
- Learning of SQL queries on the real-life systems (L4).
- Execution of PL/SQL programs for different problems (L6).
- Implementation of procedure, function, trigger and cursor concepts in PL/SQL (L4).

Web References:

1. <https://www.w3schools.com/sql>
2. <https://www.tutorialspoint.com/plsql/index.htm>

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(IT20APC302) PYTHON PROGRAMMING LAB

(CSE, CSM&IT)

Course Objectives:

- To train the students in solving computational problems
- To elucidate solving mathematical problems using Python programming language
- To understand the fundamentals of Python programming concepts and its applications.
- To understand the object-oriented concepts using Python in problem solving.

Laboratory Experiments

1. Install Python Interpreter and use it to perform different Mathematical Computations. Try to do all the operations present in a Scientific Calculator

2. Write a function that draws a grid like the following:

```
+ - - - + - - - +  
| | |  
| | |  
| | |  
| | |  
+ - - - + - - - +  
| | |  
| | |  
| | |  
| | |  
+ - - - + - - - +
```

3. Write a function that draws a Pyramid with # symbols

```
#  
# # #  
# # # # #  
# # # # # # #
```


.Up to 15 hashes at the bottom

4. Using turtles concept draw a wheel of your choice

5. Write a program that draws Archimedean Spiral

6. The letters of the alphabet can be constructed from a moderate number of basic elements, like vertical and horizontal lines and a few curves. Design an alphabet that can be drawn with a minimal number of basic elements and then write functions that draw the letters. The alphabet can belong to any Natural language excluding English. You should consider at least Ten letters of the alphabet.

7. The time module provides a function, also named time that returns the current Greenwich Mean Time in "the epoch", which is an arbitrary time used as a reference point. On UNIX systems, the epoch is 1 January 1970.

```
>>> import time
```

```
>>> time.time()
```

```
1437746094.5735958
```

Write a script that reads the current time and converts it to a time of day in hours, minutes, and seconds, plus the number of days since the epoch.

8. Given $n+r+1 \leq 2^r$. n is the input and r is to be determined. Write a program which computes minimum value of r that satisfies the above.

9. Write a program that evaluates Ackermann function

10. The mathematician Srinivasa Ramanujan found an infinite series that can be used to generate a numerical approximation of $1/\pi$:

Write a function called estimate_pi that uses this formula to compute and return an estimate of π .

$$\frac{1}{\pi} = \frac{2\sqrt{2}}{9801} \sum_{k=0}^{\infty} \frac{(4k)!(1103 + 26390k)}{(k!)^4 396^{4k}}$$

It should use a while loop to compute terms of the summation until the last term is smaller than $1e-15$ (which is Python notation for 10^{-15}). You can check the result by comparing it to `math.pi`.

11. Choose any five built-in string functions of C language. Implement them on your own in Python. You should not use string related Python built-in functions.

12. Given a text of characters, Write a program which counts number of vowels, consonants and special characters.

13. Given a word which is a string of characters. Given an integer say 'n', Rotate each character by 'n' positions and print it. Note that 'n' can be positive or negative.
14. Given rows of text, write it in the form of columns.
15. Given a page of text. Count the number of occurrences of each latter (Assume case insensitivity and don't consider special characters). Draw a histogram to represent the same
16. Write program which performs the following operations on list's. Don't use built-in functions
- a) Updating elements of a list
 - b) Concatenation of list's
 - c) Check for member in the list
 - d) Insert into the list
 - e) Sum the elements of the list
 - f) Push and pop element of list
 - g) Sorting of list
 - h) Finding biggest and smallest elements in the list
 - i) Finding common elements in the list
18. Write a program that reads a file, breaks each line into words, strips whitespace and punctuation from the words, and converts them to lowercase.
19. Go to Project Gutenberg (<http://gutenberg.org>) and download your favorite out-of-copyright book in plain text format. Read the book you downloaded, skip over the header information at the beginning of the file, and process the rest of the words as before. Then modify the program to count the total number of words in the book, and the number of times each word is used. Print the number of different words used in the book.
- Compare different books by different authors, written in different eras.
20. Go to Project Gutenberg (<http://gutenberg.org>) and download your favorite out-of-copyright book in plain text format. Write a program that allows you to replace words, insert words and delete words from the file.
21. Consider all the files on your PC. Write a program which checks for duplicate files in your PC and displays their location. Hint: If two files have the same checksum, they probably have the same contents.
22. Consider turtle object. Write functions to draw triangle, rectangle, polygon, circle and sphere. Use object oriented approach.
23. Write a program illustrating the object oriented features supported by Python.

24. Design a Python script using the Turtle graphics library to construct a turtle bar chart representing the grades obtained by N students read from a file categorising them into distinction, first class, second class, third class and failed.

25. Design a Python script to determine the difference in date for given two dates in YYYY:MM:DD format($0 \leq \text{YYYY} \leq 9999$, $1 \leq \text{MM} \leq 12$, $1 \leq \text{DD} \leq 31$) following the leap year rules.

26. Design a Python Script to determine the time difference between two given times in HH:MM:SS format. ($0 \leq \text{HH} \leq 23$, $0 \leq \text{MM} \leq 59$, $0 \leq \text{SS} \leq 59$)

Course outcomes:

Student should be able to

- Design solutions to mathematical problems (L6).
- Organize the data for solving the problem (L4).
- Develop Python programs for numerical and text-based problems (L6).
- Select appropriate programming construct for solving the problem (L5).
- Illustrate object-oriented concepts (L3).

Reference Books:

1. Peter Wentworth, Jeffrey Elkner, Allen B. Downey and Chris Meyers, "How to Think Like a Computer Scientist: Learning with Python 3", 3rd edition, Available at <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

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(AM20ASC301) LINUX ADMINISTRATION (Skill Oriented Course)

(CSE,CSM&IT)

Course Objectives:

- To familiarize basic concepts of shell programming
 - To learn shell programming.
 - To practice basic administration skills.
 - To demonstrate use of system calls
 - To demonstrate Inter process communication
1. Practice session: practice use of some basic Linux commands. Document the syntax and semantics of the commands like man, passwd, tty, script, clear, date, cal, cp, mv, ln, rm, unlink, mkdir, rmdir, du, df, mount, umount, find, unmask, ulimit, ps, who.
 2. Study and Practice on various commands like cat, tail, head , sort, nl, uniq, grep, egrep,fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, tar, cpio.
 3. Write a shell script that accepts a name from user and displays whether it is a file, directory or something else.
 4. Write a shell script that creates users
 5. Write a shell script that searches for a given string in a file
 6. Write a shell script that compiles all C files in your home directory and creates executable files
 7. Write a shell script that given a filename as argument, deletes all even lines in a file
 8. Implement the grep command in C language
 9. Write a shell script that removes duplicate lines from a file
 10. Write a shell script that enhances find command by adding error messages that explain why the command failed.
 11. Write a shell script to backup files in a specified directory
 12. Write a shell script that finds all links to a file
 13. Write an awk script to count the number of lines in a file that do not contain vowels.
 14. Write an awk script to find the number of characters, words and lines in a file.

15. Write C programs that illustrate communication between two unrelated processes using named pipe (FIFO).
16. Write a C program in which a parent writes a message to a pipe and the child reads the message.
17. Write a C program (sender.c) to create a message queue with read and write permissions to write 3 messages to it with different priority numbers.
18. Write a C program (receiver.c) that receives the messages (from the above message queue) and displays them.
19. Configure mail server and file server.
20. Write Client and Server programs in C for connection oriented communication between Server and Client processes using Unix Domain sockets to perform the following: Client process sends a message to the Server Process. The Server receives the message, reverses it and sends it back to the Client. The Client will then display the message to the standard output device.

Course Outcomes:

At the end of the course students will be able to:

- Understand shell script to create files and handle text documents. (L2)
- Analyze various methodologies in Linux administration. (L3)
- Implementation of IPC through shell programming in the Linux environment.(L5)
- Create child processes and background processes. (L5)

References:

1. "Unix and Shell programming", B.A.Forouzan and R.F.Gilberg, Cengage Learning.
2. "Beginning Linux Programming", 4th Edition, N.Matthew, R.Stones,Wrox, Wiley
3. "Advanced Unix Programming", N.B.Venkateswarulu, BS Publications.
4. "Unix and Shell Programming", M.G. Venkatesh Murthy, Pearson Education.
5. "Unix Shells by Example", 4th Edition, Ellie Quigley, Pearson Education.
6. "Sed and Awk", O.Dougherty&A.Robbins,2nd edition,SPD.
7. "Unix shell Programming", S.G.Kochan and P.Wood,3rd edition, Pearson Education.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech III Sem

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(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:

- Text book of Environmental Studies for Undergraduate Courses ErachBharucha for University Grants Commission, Universities Press.
- Palaniswamy, "Environmental Studies", Pearson education.
- S.AzeemUnnisa, "Environmental Studies" Academic Publishing Company.
- K.Raghavan Nambiar, "Text book of Environmental Studies for Undergraduate Courses as per UGC model syllabus", Scitech Publications (India), Pvt. Ltd.

References:

- Deeksha Dave and E.Sai Baba Reddy, "Textbook of Environmental Science", Cengage Publications.
- M.Anji Reddy, "Text book of Environmental Sciences and Technology", BS Publication.
- J.P.Sharma, Comprehensive Environmental studies, Laxmi publications.

- J. Glynn Henry and Gary W. Heinke, "Environmental Sciences and Engineering", Prentice hall of India Private limited.
- G.R.Chatwal, "A Text Book of Environmental Studies" Himalaya Publishing House.
- 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

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B. Tech III Sem

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(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 oneself 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 hold formal & 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, Effective Technical Communication, Tata McGraw-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. Chase R. 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

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(MA20ABS401) NUMERICAL METHODS, PROBABILITY AND STATISTICS (Common to CIVIL, ME, EEE, CSE, AI&ML, IT)

Course Objectives:

- To familiarize the students with numerical methods of solving the non-linear equations, interpolation, differentiation, integration, and ordinary differential equations.(L2)
- To impart knowledge in basic concepts and few techniques in probability and statistics in various applications in engineering.(L3)

UNIT – 1: Solution to algebraic and transcendental equations& Interpolation:

Solution of algebraic and transcendental equations: Bisection method, Newton-Raphson method and Regula-Falsi method.

Interpolation: Newton's forward and backward difference formulae. Interpolation with unequal intervals: Lagrange's formulae.

Learning Outcomes:

At the end of this unit, the student will be able to

- Find approximate roots of an equation by using different numerical methods(L3)
- Explain various discrete operators and find the relation among operators(L2)
- Apply Newton forward and backward formulas for equal intervals(L3)

UNIT – II: Numerical differentiation, integration &Solution of Initial Value Problems to Ordinary Differential Equations of first order:

Numerical differentiation using Newton's forward & backward interpolation formulae; Numerical Integration by trapezoidal rule, Simpson's $1/3^{\text{rd}}$ and $3/8^{\text{th}}$ rules.

Numerical Solutions of Ordinary differential equation: Solution by Taylor's series, Picard's method of successive approximations, Euler's method, modified Euler's method and Runge-Kutta method of fourth order.

Learning Outcomes:

At the end of this unit, the student will be able to

- Find integration of a function by using different numerical methods. (L3)
- Solve ordinary differential equations using different numerical schemes. (L3)

UNIT – III: Probability & Random Variables:

Probability axioms, addition law, conditional probability, Baye's theorem.

Random variables (discrete and continuous), probability distribution: Binomial - Poisson and Normal distribution-their properties. (All concepts without proofs)

Learning Outcomes:

At the end of this unit, the student will be able to

- Explain the basic concepts of probability theory and elementary theorems on probability.(L2)
- Apply the knowledge of discrete random variable and continuous random variable and the respective probability distributions.(L3)

UNIT – IV: Testing of hypothesis:

Formulation of hypothesis, critical region, level of significance. Large sample tests: test for single proportion, difference of two proportions, test for single mean and difference of two means.

Learning Outcomes:

At the end of this unit, the student will be able to

- Explain the concept of testing of hypothesis(L2)
- Apply the concept of hypothesis testing for large samples(L3)

UNIT – V: Small Sample Tests:

Student t-distribution (single mean, two means and paired t-test), Testing of equality of variances (F-test), χ^2 - test for independence of attributes and goodness of fit.

Learning Outcomes:

At the end of this unit, the student will be able to

- Apply the concept of testing hypothesis for small samples(L3)
- Apply the concept of hypothesis testing for small samples and estimate the goodness of fit (L3)

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017, 44th edition.
2. Miller and Freunds, Probability and Statistics for Engineers,7/e, Pearson, 2008
3. S.S.Sastry, "Introductory methods of Numerical Analysis", 5th edition, PHI, 2012.
4. Advanced Engineering Mathematics, R K Jain and S R K Iyengar, Narosa Publishing House, New Delhi.

Reference Books:

1. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan Chand & Sons

publications, 2012.

2. Erwin kreyszig, Advanced Engineering Mathematics, 9/e, John Wiley & Sons, 2006.

3. Kandasamy, K. Thilagavathy, S. Gunavathy, Numerical Methods, S. Chand & Company, 2nd

Edition, Reprint 2012.

4. S. Ranganatham, Dr. M. V. S. S. N. Prasad, Dr. V. Ramesh Babu, Numerical Analysis, S. Chand

Pulications, 2015

5. Dr. A. Singaravelu, Probability and Statistics, Meenakshi Agency, 2017

Course Outcomes:

At the end of this Course the student will be able to

- Apply different methods to find roots of algebraic and transcendental equations. (L3)
- Apply different methods to find approximate solution of ordinary differential equations and Numerical Integration. (L3)
- Analyse the concepts of probability and their applications. (L4)
- Apply discrete and continuous probability distributions in practical problems. (L3)
- Analyse the statistical inferential methods based on small and large sampling tests. (L4)

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B. Tech IV Sem

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(CS20APC401) OBJECT ORIENTED PROGRAMMING THROUGH JAVA

(CSE, CSM&IT)

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 concurrency mechanism.
- 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 IV Sem

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(IT20APC401) OPERATING SYSTEMS

(CSE,CSM&IT)

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.TechIVSEM

LTPC
3003

(EC20AES301) DIGITAL ELECTRONICS & MICROPROCESSORS

(CSE,CSM&IT)

CourseObjectives:

- To understand all the concepts of Logic Gates and Boolean Functions.
- To understand about Combinational Logic and Sequential Logic Circuits
- To Create Combinational logic circuits using Programmable Logic Devices.
- To understand the concepts of 8085, 8086 Microprocessor and 8051 Microcontroller.
- To Analyze Assembly Language Programming of 8086 & 8051.

UnitI

Number systems and Boolean Algebra: Digital Systems, Introduction to number systems and conversion, Binary codes, Complements, signed and unsigned Binary numbers, Boolean Algebra and its properties, Simplification of Boolean functions, SOP and POS methods – Simplification of Boolean functions using K-maps and realization using Universal Gates.

LearningOutcomes:

- Explain number systems and convert number systems. (L2)
- Explains the simplification of logical statements with using boolean rules and de-morgan theorems (L2)
- Understand the simplification of logical statements with karnaugh maps (L2)

UnitII

Combinational Logic Circuits : Adders & Subtractors, 4-bit binary adder and Subtractor, Decoders, Encoders, Multiplexers, Demultiplexers, Programmable Logic devices-PROM, PAL, PLA, Design of combinational circuits using PLD's.

LearningOutcomes:

- Analyze combinational logic circuits (L4)

- Understand and Analyze the working principle of encoders ,decoders(L2)
- Design combinationalcircuits using PLD's.(L6)

UnitIII

SequentialLogicCircuits : SequentialCircuits, Latches ,Flipflops:RS,D,JK,MasterSlaveJK,TFlip-Flops,ShiftRegisters, TypesofShiftRegisters, Universal Shift registers ,Counters,SynchronousCounters,AsynchronousCounters, Up-Down Counter

Learning Outcomes:

- Analyze sequential circuits(L4)
- Understand and Analyze the counters (L2)

UnitIV

Introduction to 8085 & 8086 Microprocessor: 8085 microprocessorReview(briefdetailonly),8086 Architecture –Block Diagram, register organization 8086, Flag register of8086 andits functions, Pin diagram of 8086, Minimummode& Maximum mode operation of8086, Interruptsin 8086, Addressingmodes of8086.

LearningOutcomes:

- To understand the concepts of 8085, 8086 Microprocessor (L2).
- To understand the addressing modes of 8086 Microprocessor (L2).

UnitV

Instruction Set of 8086 Microprocessor: Instruction set of 8086,Assemblerdirectives, Procedures and Macros,Simple programs involving arithmetic,logical,branchinstructions,Ascending, DescendingandBlockmoveprograms,String ManipulationInstructions.

Introduction to 8051 Microcontrollers: Overview of 8051 microcontroller, Architecture, Register set of 8051, Memory organization, Addressingmodes & instruction set of 8051, Simple programs.

LearningOutcomes:

- Distinguish and analyze between Microprocessor and Microcontrollers.(L4)
- Understand the concepts of 8051 microcontroller.(L2)

- Apply knowledge and demonstrate programming proficiency using various addressing modes and instruction sets of 8086 & 8051 (L3)

TextBooks:

1. M. Morris Mano, Michael D. Ciletti, Digital Design, Pearson Education, 5th Edition, 2013
2. Advanced microprocessors and peripherals - A.K. Ray and K.M. Bhurchandani, TMH, 2nd edition, 2006

References:

1. Switching Theory and Logic Design – A. Anand Kumar, PHI learning Pvt. Ltd. 2013.
2. N. Senthil Kumar, M. Saravanan, S. Jeevanathan, Microprocessor and Microcontrollers, Oxford Publishers, 2010.

Course Outcomes:

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

CO1: To understand the concept of Logic circuits and analyze various Boolean algebra functions.

CO2: To understand the concept of Combinational Logic and Sequential Logic Circuits.

CO3: To create combinational circuits using PLD's.

CO4: To understand and Analyze the counters,

CO5: To understand the concepts of 8085, 8086 Microprocessor and 8051 Microcontroller.

CO6: Apply knowledge and demonstrate programming proficiency using various addressing modes and instruction sets of 8086 & 8051

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Sem

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(BA20AHS301) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Objectives:

The objective of this course is to equip the student with the basic inputs of Managerial Economics and Economic Environment of business and to impart analytical skills in helping them take sound financial decisions for achieving higher organizational productivity.

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.

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.

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.

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).

UNIT V

CAPITAL AND CAPITAL BUDGETING

Concept of Capital - Over and Undercapitalization – Remedial Measures - Sources of Short 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)

TEXT BOOKS:

1. Managerial Economics 3/e, Ahuja H.L, S.Chand, 2013.
2. 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

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Sem

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(BA20AHS302) BUSINESS ENVIRONMENT

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

An Overview of Business Environment:-

Type of Environment- internal, external, micro and macro environment- Competitive structure of industries, environmental analysis and strategic management- Managing diversity- Scope of business, characteristics of business- Objectives and the uses of study- Process and limitations of environmental analysis.

UNIT-II

Economic Environment:

Nature of Economic Environment- Economic factors-growth strategy, basic economic system, economic planning, Economic policies- new industrial policy, FEMA, monetary and fiscal policies- Consumer Protection Act and Competition Law. Liberalization, Privatization and Globalization of Indian Economy,- Trends and Issues.

UNIT-III

Socio-Cultural Environment:-

Nature and impact of culture on business, culture and globalization, social responsibilities of Business, social audit, business ethics and corporate governance, Demographic environment population size, migration and ethnic aspects, birth rate, death rate and age structure

UNIT-IV

Political Environment:-

Functions of state- economic roles of government- government and legal environment- The constitutional environment, rationale and extent of state intervention.

UNIT-V

Natural and Technological Environment:

Innovation, technological leadership and followership, sources of technological dynamics, impact of technology on globalization, transfer of technology, time lags in technology introduction, Status of technology in India; Management of technology; Features and Impact of technology.

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.
- Rangarajan, C.A.; Perspective in Economics, S.Chand & Sons, New Delhi
- Cherunilam, Francis; Business Environment - Text and Cases, Himalaya Publishing House.
- Aswathappa, K.; Essentials of Business Environment, Himalaya Publishing House, New Delhi.

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B. Tech IV Sem

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(BA20AHS303) ORGANIZATIONAL BEHAVIOUR

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 Organization Behaviour:-

Introduction to organization, organization and managers, manager's roles and skills, behaviour at work, introduction to organization behaviour, major behavioral science disciplines contributing to OB, challenges and opportunities managers have in applying OB concepts, OB model (including motivation models) and levels of OB model

UNIT-II

Individual behaviour:

Introduction to individual behaviour, values, attitudes, job satisfaction, personality, perception and individual decision making, learning, motivation at work, managing emotions and stress (Meaning-Definition Stress and job performance relationship Approaches to stress management (Coping with stress)

UNIT-III

Interpersonal behaviour:-

Interpersonal Behaviour, Johari Window, Transactional Analysis- ego states, types of transactions, life positions, applications of T.A., managerial interpersonal styles..

UNIT-IV

Group behaviour:-

Introduction to group behaviour, foundations of group behaviour, concept of group and group dynamics, types of groups, formal and informal groups, theories of group formation, group norms, group cohesiveness, group decision making, inter group behaviour, concept of team vs. group, types of teams, building and managing effective teams, leadership theories and styles, power and politics, conflict and negotiation.

UNIT-V

Organisational behaviour:

Foundations of organization structure, organization design, organization culture, organization change, managing across cultures, human resource management policies and practices, diversity at work.

Textbooks:

- Pardeshi, P. C., Organizational Behaviour & Principles & Practice Of Management, Nirali publication

References:

- Robbins, S. P/ Judge, T. A/ Sanghi, S., Organizational Behavior, Pearson Publication
- Aswathappa, K., Organisational Behaviour– Text and Problem, Himalaya Publication

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IVSem

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(CS20APC402) OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

(CSE, CSM&IT)

Course Objectives

- To introduce the concepts of Java.
- To Practice object-oriented programs and build java applications.
- To implement java programs for establishing interfaces.
- To implement sample programs for developing reusable software components.
- To establish database connectivity in java and implement GUI applications.

List of Experiments

Week 1:

- Read the marks of a student in 4 subjects and find grade.
- Program to check a number is Armstrong or not.
- Program to display prime numbers from m to n.

Week 2:

- Define a class Rectangle with data member's length and width. Write methods to find perimeter and area of a rectangle. (class and object)
- Create a class Account with data members name, accno and balance. Use appropriate methods to perform various operations like deposit, withdraw, balance Check.
- Create a class Student with appropriate data and methods using constructor.

Week 3:

- Create overloaded methods to find volume of Sphere, Cylinder & Cone.
- To sort given list of elements in ascending order.
- Read two matrices of size $m \times n$, $p \times q$, perform the multiplication of matrices.

Week 4:

- Check a string is palindrome or not.
- Given a string and an int n, return a string made of n repetitions of the last n characters of the string.

- You may assume that n is between 0 and the length of the string, inclusive. Write a Java program.

repeatEnd("Hello",3)→"llollo

repeatEnd("Hello",2)→"lolo"

repeatEnd("Hello", 1) → "o"

- Read array of City names and Sort in dictionary order.(Ascending order).

Week 5:

- Write Java program on use of inheritance, preventing inheritance using final, abstract classes.
- Write Java program on dynamic binding, differentiating method overloading and overriding

Week 6:

- Write a Java program to implement user defined exception handling.
- Write java program that inputs 5 numbers, each between 10 and 100 inclusive. As each number is read display it only if it's not a duplicate of any number already read. Display the complete set of unique values input after the user enters each new value.
- Write a Java program that creates a user interface to perform integer division. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 and Num2 were not integers, the program would throw a Number Format Exception. If Num2 were zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.

Week 7:

- Implement the concept of producer consumer problem using thread synchronization.
- Write a Java program that creates three threads. First thread displays —Good Morningll every one second, the second thread displays —Helloll every two seconds and the third thread displays —Welcomell every three seconds.

Week 8:

- Use an Array List to manage Employee objects for insertion, display and remove.
- Use HashSet methods to perform operations on collection of data.

Week 9:

- Implement Mouse Listener and Mouse Motion Listener to handle various mouse events.
- Implement Key Listener to handle key events.
- Create a Simple login window to validate a user with name and password.

Week 10:

- Create a JTable to display various fields of Student data like RollNo, Name, Branch ,Year, Percentage etc.
- Write a java program to Create and Read data using JDBC

At the end of the course, students will be able to

- Recognize the Java programming environment (L3).
- Select appropriate programming construct to solve a problem (L2).
- Develop efficient programs using multithreading (L5).
- Design reliable programs using Java exception handling features (L3).
- Extend the programming functionality supported by Java (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.
3. Y. Daniel Liang, "Introduction to Java programming", Pearson Education.
4. 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 IV Sem

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(IT20APC402) OPERATING SYSTEMS LAB

(CSE, CSM&IT)

Course Objectives:

- To familiarize students with the architecture of OS.
- To provide necessary skills for developing and debugging CPU Scheduling algorithms.
- To explore the process management and scheduling and memory management.
- To explain the working of an OS as a resource manager, file system manager, process manager, memory manager, and page replacement tool.
- To provide insights into system calls, file systems and deadlock handling.

List of Experiments

1. Simulate the following CPU scheduling algorithms
 - a) Round Robin b) SJF c) FCFS d) Priority
2. Implement dynamic priority scheduling algorithm.
3. Assume that there are five jobs with different weights ranging from 1 to 5. Implement round robin algorithm with time slice equivalent to weight.
4. Implement priority scheduling algorithm. While executing, no process should wait for more than 10 seconds. If waiting time is more than 10 seconds, that process has to be executed for at least 1 second before waiting again.
5. Control the number of ports opened by the operating system with
 - a) Semaphore b) Monitors.
6. Simulate how parent and child processes use shared memory and address space.
7. Simulate sleeping barber problem.
8. Simulate dining philosopher's problem.
9. Simulate producer and consumer problem using threads.

10. Implement the following memory allocation methods for fixed partition a) First fit b) Worst fit c) Best fit
11. Simulate the following page replacement algorithms
a) FIFO b) LRU c) LFU etc.,
12. Simulate Paging Technique of memory management
13. Simulate Bankers Algorithm for Dead Lock avoidance and prevention.
14. Simulate following file allocation strategies
a) Sequential b) Indexed c) Linked
15. Simulate all File Organization Techniques
a) Single level directory b) Two level c) Hierarchical d) DAG

Course Outcomes:

At the end of the course, students will be able to:

- Trace different CPU Scheduling algorithm. (L2)
- Implement Bankers Algorithms to Avoid and prevent the Dead Lock. (L3)
- Evaluate Page replacement algorithms. (L5)
- Illustrate the file organization techniques. (L4)
- Illustrate shared memory process. (L4)
- Design new scheduling algorithms. (L6)

Reference Books:

1. Peter B. Galvin, Greg Gagne "Operating System Concepts", Abraham Silberchatz, Eighth Edition, John Wiley.
2. Stallings "Operating Systems: Internals and Design Principles", Sixth Edition– 2009, Pearson Education
3. Andrew S Tanenbaum, "Modern Operating Systems", Second Edition, PHI.
4. S.Haldar, A.A.Aravind, "Operating Systems", Pearson Education.
4. B.L.Stuart, "Principles of Operating Systems", Cengage learning, India Edition.2013-2014
6. A.S.Godbole, "Operating Systems", Second Edition, TMH.

Online Learning Resources/Virtual Labs:

- <https://www.cse.iitb.ac.in/~mythili/os/>
- <http://peterindia.net/OperatingSystems.htm>

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IVSem

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(EC20AES302)DIGITAL ELECTRONICS & MICROPROCESSORSLAB
(CSE,CSM&IT)

CourseObjectives:

- To understand and analyze the concepts ofLogic Gatesand Boolean functions.
- To understand and analyze CombinationalLogicand SequentialLogic Circuits .
- To understand and analyze the logic circuits using Programmable Logic Devices.
- Apply knowledge and demonstrate programming proficiency using various addressing modes and instruction sets of 8086 & 8051.

ListofExperiments:

Note:Minimum of12 experiments shallbe conducted fromboththe sections:

Hardware: DIGITAL ELECTRONICS (Any 6 Experiments):

1. Realization of NOT, AND, OR, EX-OR gates with only Universal gates.
2. Karnaugh map Reductionand Logic CircuitImplementation.
3. Verificationof DeMorgan's Laws.
4. Implementation ofHalf-Adder and Half-Subtractor.
5. Implementation ofFull-Adder and Full-Subtractor.
6. Four Bit Binary Adder
7. Implementation of 4*1 Multiplexer and 8*1 Multiplexer.
8. Verification of state tables of D flip-flop , JK flip-flop,T flip-flop.

Software: MICROPROCESSORS & MICROCONTROLLERS (Any 6 Experiments)

- 1 .Programs using arithmetic and logical operations
2. Programs for code conversions.
3. ASCII Arithmetic Addition and Subtraction.
4. Searching for an element in an Array.

5. Sorting in Ascending and Descending Orders.
6. Finding Largest and Smallest elements from an array.
7. Reversing a string.
8. String Comparison
9. Block Move.
10. Arithmetic and logical operations using 8051,
11. Sorting in Ascending and Descending Orders using 8051,

Course Outcomes:

After Completion of this course, the student will be able to:

- Analyze the concepts of Logic Gates and Boolean functions.
- Analyze Combinational Logic and Sequential Logic Circuits.
- Analyze the logic circuits using Programmable Logic Devices.
- Apply knowledge and demonstrate programming proficiency using various addressing modes and instruction sets of 8086 & 8051.

Equipment Required:

1. Hardware kits.
2. TASM
3. 8051 kits.
4. Personal computer with necessary peripherals

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(AUTONOMOUS)

B. Tech IV Sem

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(IT20ASC401) EXPLORATORY DATA ANALYSIS WITH R

(CSE, CSM&IT) (Skill Oriented Course)

Course Objectives:

- Understand the R Programming Language.
- Exposure on Solving of data science problems.
- Understand The Regression Model

List of Experiments:

1: INTRODUCTION TO COMPUTING

- a. Installation of R
- b. The basics of R syntax, workspace
- c. Matrices and lists
- d. Subsetting
- e. System-defined functions; the help system
- f. Errors and warnings; coherence of the workspace

2: GETTING USED TO R: DESCRIBING DATA

- a. Viewing and manipulating Data
- b. Plotting data
- c. Reading the data from console, file (.csv) local disk and web
- d. Working with larger datasets

3: SHAPE OF DATA AND DESCRIBING RELATIONSHIPS

- a. Tables, charts and plots.
- b. Univariate data, measures of central tendency, frequency distributions, variation, and Shape.
- c. Multivariate data, relationships between a categorical and a continuous variable,
- d. Relationship between two continuous variables – covariance, correlation coefficients, comparing multiple correlations.

- e. Visualization methods – categorical and continuous variables, two categorical variables, two continuous variables.

4: PROBABILITY DISTRIBUTIONS

- a. Sampling from distributions – Binomial distribution, normal distribution
- b. tTest, zTest, Chi Square test
- c. Density functions
- d. Data Visualization using ggplot – Box plot, histograms, scatter plotter, line chart, bar chart, heat maps.

5: EXPLORATORY DATA ANALYSIS

- a. Demonstrate the range, summary, mean, variance, median, standard deviation, histogram, box plot, scatter plot using population dataset.

6: TESTING HYPOTHESES

- a. Null hypothesis significance testing
- b. Testing the mean of one sample
- c. Testing two means

7: PREDICTING CONTINUOUS VARIABLES

- a. Linear models
- b. Simple linear regression
- c. Multiple regression
- d. Bias-variance trade-off – cross-validation

8: CORRELATION

- a. How to calculate the correlation between two variables.
- b. How to make scatter plots.
- c. Use the scatter plot to investigate the relationship between two variables

9: TESTS OF HYPOTHESES

- a. Perform tests of hypotheses about the mean when the variance is known.
- b. Compute the p-value.
- c. Explore the connection between the critical region, the test statistic, and the p-value

10: ESTIMATING A LINEAR RELATIONSHIP

Demonstration on a Statistical Model for a Linear Relationship

- a. Least Squares Estimates

- b. The R Function Im
- c. 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

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(CS20AMC401)DESIGN THINKING FOR INNOVATION (Mandatory Course)

(CSE,CSM&IT)

Course Objectives:

- To familiarize product design process
- To introduce the basics of design thinking
- To bring awareness on idea generation
- To familiarize the role of design thinking in services design

Unit -I

Introduction to design, product development process, product planning, Innovation in product development, characteristics of successful product development.

Design Thinking: Introduction, Defining design thinking, Principles, the process.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand design and development process. (L2)
- Understand Design thinking concept and its uses. (L2)
- Learn Principles of design thinking.(L3)

Unit –II

Stages in design thinking, Benefits of Design thinking, design thinking and innovation, case studies.

Immersion: Preliminary immersion, In Depth immersion.

Learning Outcomes:

At the end of this unit, the student will be able to

- Familiarize with design thinking stages.(L2)
- Differentiate design thinking and innovation.(L3)
- Identify the problems in the immersion stage (L4)

Unit-III

Analysis and Synthesis: Insight, Affinity diagram, Conceptual Map, Guiding criteria, Empathy map.

Idea generation: Introduction, techniques, Conventional methods, Brainstorming, Gallery method, Delphi method, Synectics, etc, Select ideas from ideation methods, case studies.

Learning Outcomes:

At the end of this unit, the student will be able to

- Analyze possibilities of the problem through analysis and synthesis process.(L4)
- Understand different analysis and synthesis techniques.(L2)
- Apply different ideation techniques for designing solutions. (L3)

Unit-IV

Prototyping: Paper prototyping, Volumetric model, Staging, Storyboard, Service prototyping. Design Thinking in Information Technology, Design thinking in Business process model, Design thinking for agile software development, TILES toolkit, Cloud implementation.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand different prototyping techniques.(L2)
- Know the role of design thinking in information technology field.(L2)
- To distinguish traditional software development model and agile model.(L3)

Unit V

Design thinking for service design: How to design a service, Principles of service design, Benefits of service design, Service blueprint, Design strategy, organization, principles for information design, principles of technology for service design.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand different prototyping techniques.(L2)
- Know the role of design thinking in information technology field.(L2)
- To distinguish traditional software development model and agile model.(L3)

Course Outcomes:

Student will be able to

- Generate and develop different design ideas.(L4)

- Appreciate the innovation and benefits of design thinking.(L3)
- Experience the design thinking process in IT and agile software development.(L2)
- Understand design techniques related to variety of software services.(L2)

Reference Books:

- Christoph Meinel and Larry Leifer, "Design Thinking", Springer, 2011
- Aders Riise Maehlum, "Extending the TILES Toolkit" from Ideation to Prototyping
- Maurício Vianna, Ysmar Vianna, Brenda Lucena and Beatriz Russo," Design thinking : Business innovation", MJV Technologies and innovation press, 2011.
- Tim Brown, "Change by Design: Design Thinking Transforms organizations and inspires innovations", Harper Collins publication, 2009
- <http://www.algarytm.com/it-executives-guide-to-design-thinking:e-book>.
- Marc stickdorn and Jacob Schneider, "This is Service Design Thinking", Wiely, 2011
- Pahl and Vietz, "Engineering Design", Springer, 2007

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech IV Sem

L T P C

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(MA20AMC401) ENGINEERING MATHEMATICS
(Common to All Branches of LE Students)

Course Objectives:

1. This course will illuminate the students in the concepts of calculus and linear algebra.
2. 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

3. 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 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 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. Rajnish Verma, 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)

B. Tech III Year I Semester

B. Tech III-I Sem

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(AM20APC501) ARTIFICIAL INTELLIGENCE

Course Objectives:

This course is designed to:

- Define Artificial Intelligence and establish the cultural background for study
- Understand various learning algorithms
- Explore the searching and optimization techniques for problem solving
- Provide basic knowledge on Natural Language Processing and Robotics

Unit – I:

Introduction: What is AI, Foundations of AI, History of AI, The State of Art.

Intelligent Agents: Agents and Environments, Good Behavior: The Concept of Rationality, The Nature of Environments, The Structure of Agents.

Learning Outcomes:

At the end of the unit, students will be able to:

- Recognize the importance of Artificial Intelligence (L1)
- Identify how intelligent agent is related to its environment (L2)
- Build an Intelligent agent (L3)

Unit – II:

Solving Problems by searching: Problem Solving Agents, Example problems, Searching for Solutions, Uninformed Search Strategies, Informed search strategies, Heuristic Functions, Beyond Classical Search: Local Search Algorithms and Optimization Problems, Local Search in Continuous Spaces, Searching with Nondeterministic Actions, Searching with partial observations, online search agents and unknown environments.

Learning Outcomes:

At the end of the unit, students will be able to:

- Explain how an agent can formulate an appropriate view of the problem it faces. (L2)
- Solve the problems by systematically generating new states (L2)

- Derive new representations about the world using process of inference (L5)

Unit – III:

Natural Language for Communication: Phrase structure grammars, Syntactic Analysis, Augmented Grammars and semantic Interpretation, Machine Translation, Speech Recognition Perception: Image Formation, Early Image Processing Operations, Object Recognition by appearance, Reconstructing the 3D World, Object Recognition from Structural information Using Vision.

Learning Outcomes:

At the end of the unit, students will be able to:

- Develop programs that translate from one language to another, or recognize spoken words.(L6)
- Explain the techniques that provide robust object recognition in restricted context.(L2)

Unit-IV:

Robotics: Introduction, Robot Hardware, Robotic Perception, planning to move, planning uncertain movements, Moving, Robotic software architectures, application domains Philosophical foundations: Weak AI, Strong AI, Ethics and Risks of AI, Agent Components, Agent Architectures, Are we going in the right direction, What if AI does succeed.

Learning Outcomes:

At the end of the unit, students will be able to:

- Explain the role of Robot in various applications. (L2)
- List the main philosophical issues in AI. (L1)

Unit-V:

Uncertainty: Acting under Uncertainty, Basic Probability Notation, The axioms of Probability, Inference using Full joint Distribution, Temporal Models and Hidden Markov Models.

Learning Outcomes:

At the end of the unit, students will be able to:

- Explain about Uncertainty(L2)
- Explain the techniques of Full joint Distribution and Temporals(L2)

Course outcomes:

Upon completion of the course, the students should be able to:

- Apply searching techniques for solving a problem (L3)
- Design Intelligent Agents (L6)
- Develop Natural Language Interface for Machines (L6)
- Design mini robots (L6)
- Summarize past, present and future of Artificial Intelligence (L5)

Textbooks:

1. Stuart J. Russell, Peter Norvig, "Artificial Intelligence A Modern Approach", 3rd Edition, Pearson Education, 2019.

References:

1. Nilsson, Nils J., and Nils Johan Nilsson. Artificial intelligence: a new synthesis. Morgan Kaufmann, 1998.
2. Johnson, Benny G., Fred Phillips, and Linda G. Chase. "An intelligent tutoring system for the accounting cycle: Enhancing textbook homework with artificial intelligence." Journal of Accounting Education 27.1 (2009): 30-39.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech III-I Sem

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(AM20APC503) DATA WAREHOUSING AND DATA MINING

Course Objectives:

- To understand data warehouse concepts, architecture, business analysis and tools
- To understand data pre-processing and data visualization techniques
- To study algorithms for finding hidden and interesting patterns in data
- To understand and apply various classification and clustering techniques using tools.

UNIT-1

DATA WAREHOUSING, BUSINESS ANALYSIS AND ON-LINE ANALYTICAL PROCESSING (OLAP)

Basic Concepts - Data Warehousing Components – Building a Data Warehouse – Database Architectures for Parallel Processing – Parallel DBMS Vendors - Multidimensional Data Model – Data Warehouse Schemas for Decision Support, Concept Hierarchies -Characteristics of OLAP Systems – Typical OLAP Operations, OLAP and OLTP.

Learning Outcomes:

At the end of the unit, students will be able to:

- Identify the component of Data warehouse (L1)
- Create the architecture of Data warehouse (L6)
- Apply different types of OLAP operations (L3)

UNIT-II

DATA MINING – Introduction to Data Mining Systems – Knowledge Discovery Process – Data Mining Techniques – Issues – applications- Data Objects and attribute types, Statistical description of data, Data Preprocessing – Cleaning, Integration, Reduction,

Transformation and discretization, Data Visualization, Data similarity and dissimilarity measures.

Learning Outcomes:

At the end of the unit, students will be able to:

- Summarize the data processing steps (L2)
- Apply data cleaning process (L3)

UNIT-III

DATA MINING - FREQUENT PATTERN ANALYSIS Mining Frequent Patterns, Associations and Correlations – Mining Methods- Pattern Evaluation Method – Pattern Mining in Multilevel, Multi-Dimensional Space – Constraint Based Frequent Pattern Mining, Classification using Frequent Patterns

Learning Outcomes:

At the end of the unit, students will be able to:

- Understand Association Rules(L2)
- Apply different Mining Methods (L3)
- Review Classification using Frequent Patterns (L2)

UNIT-IV

Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines -- Lazy Learners – Model Evaluation and Selection-Techniques to improve Classification Accuracy.

Clustering Techniques – Cluster analysis-Partitioning Methods - Hierarchical Methods – Density Based Methods - Grid Based Methods – Evaluation of clustering – Clustering high dimensional data- Clustering with constraints.

Learning Outcomes:

At the end of the unit, students will be able to:

- Creating Decision Tree (L6)
- Evaluate Classification techniques (L5)

UNIT-V

Regression: Types of Regression: Linear Regression, Logistic Regression, Random Forest, Lasso Regression, Ridge Regression, Polynomial Regression, Application of Regressions

Learning Outcomes:

At the end of the unit, students will be able to:

- understand different regression Methods

Course Outcomes:

Upon completion of the course, the students should be able to:

- Design a Data warehouse system and perform business analysis with OLAP tools.
- Apply suitable pre-processing and visualization techniques for data analysis
- Apply frequent pattern and association rule mining techniques for data analysis
- Apply appropriate classification and clustering techniques for data analysis

TEXT BOOK:

1. Jiawei Han and Micheline Kamber, —Data Mining Concepts and TechniquesI, Third Edition, Elsevier, 2012.

REFERENCES:

1. Alex Berson and Stephen J.Smith, —Data Warehousing, Data Mining & OLAPI, Tata McGraw – Hill Edition, 35th Reprint 2016.
2. K.P. Soman, Shyam Diwakar and V. Ajay, —Insight into Data Mining Theory and Practicel, Eastern Economy Edition, Prentice Hall of India, 2006.
3. Ian H.Witten and Eibe Frank, —Data Mining: Practical Machine Learning Tools and TechniquesI, Elsevier, Second Edition.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech III-I Sem

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(AM20APC504) FORMAL LANGUAGES AND COMPILER DESIGN

Course Objectives:

- Introduce the student to the concepts of Theory of computation in computerscience.
- The students should acquire insights into the relationship among formal languages, formal grammars and automata.
- Classify machines by their power to recognize languages
- Understand the relationship between languages and their grammars.

UNIT – I

Formal Language and Regular Expressions: Languages, Definition Languages regular expressions, Finite Automata – DFA, NFA. Conversion of regular expression to NFA, NFA to DFA. Applications of Finite Automata to lexical analysis, lex tools.

Learning Outcomes:

At the end of the unit, students will be able to:

- Recognize the importance of Artificial Intelligence (L1)
- Identify how FA is related to its environment (L2)
- Build an DFA and NFA (L3)

UNIT II

Context Free grammars and parsing: Context free grammars, derivation, parse trees, ambiguity LL(K) grammars and LL(1) parsing Bottom up parsing, handle pruning, LR Grammar Parsing, LALR parsing, parsing ambiguous grammars, YACC programming specification.

Learning Outcomes:

At the end of the unit, students will be able to:

- Solve the problems of Parsers (L2)
- Understand the application of finite state machines, recursive descent, production rules, parsing, and language semantics(L1)

UNIT – III

Semantics: Syntax directed translation, S-attributed and L-attributed Grammars, Intermediate code – abstract syntax tree, translation of simple Statements and control flow statements. Context Sensitive features – Chomsky hierarchy of languages and recognizers. Type checking, type conversions, equivalence of type expressions, overloading of functions and operations.

Learning Outcomes:

At the end of the unit, students will be able to:

- Understand the Syntax Tree, Type Expressions and Type checking(L1)

UNIT – IV

Symbol table, Storage organization, storage allocation strategies scope access to local names, parameters, language facilities for dynamic storage allocation. Code optimization Principal sources of optimization, optimization of basic blocks, peephole optimization, flow graphs, optimization techniques

Learning Outcomes:

At the end of the unit, students will be able to:

- Understand the concepts of Storage allocation and optimization techniques(L1)
- Classify various storage allocation strategies and explain various data structures used in symbol tables(L3)

UNIT – V

Code generation: Machine dependent code generation, object codeForms, generic code generation algorithm, Register allocation and assignment. Using DAG representation of Block.

Learning Outcomes:

At the end of the unit, students will be able to:

- Summarize various optimization techniques used for dataflow analysis and generate machine code from the source code of a novel language(L3).

Course outcomes:

Upon completion of this course, the student should be able to:

- Explain deterministic and non-deterministic machines.
- Comprehend the hierarchy of problems arising in the computersciences.
- Design a deterministic finite-state machine to accept a specifiedlanguage.
- Explain how a compiler can be constructed for a simple context-free language.
- Determine a language's location in the Chomsky hierarchy (regularsets, Context-free,context-sensitive, and recursively enumerable languages).

Text Books:

1. John E. Hopcroft, Rajeev M & J D Ullman: "Introduction toAutomata Theory Languages &Computation", 3rd Edition, PearsonEducation, 2007.
2. Aho, Ullman, Ravisethi: "Compilers Principles, Techniques andTools", 2nd Edition, Pearson Education, 2009.

References:

1. Tremblay J P, Sorenson G P: "The Theory & Practice of Compilerwriting", 1st Edition, BSP publication, 2010.
2. Appel W & Andrew G M: "Modern Compiler Implementation inC", 1st Edition, Cambridge University Press, 2003.

3. Louden: "Compiler Construction, Principles & Practice", 1st Edition, Thomson Press, 2006.
4. Sipser Michael: "Introduction to Theory of computation", 1st Edition, Thomson, 2009

SRIVENKATESWARA COLLEGE OF ENGINEERING (Autonomous)

B.Tech- V Sem

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(CE20AOE501) Basics of Civil Engineering

Course Objectives:

- Understanding Relevance of Civil Engineering in the overall infrastructural development of the country
- Categorize various Types of buildings, selection of site for buildings
- Obtain knowledge about various techniques adopted in Importance, objectives and principles of surveying
- Become aware of various methods of Modern construction materials
- Understand the Building Construction in various methods

UNIT-I

General Introduction to Civil Engineering: Relevance of Civil Engineering in the overall infrastructural development of the country. Responsibility of an engineer in ensuring the

safety of built environment. Brief introduction to major disciplines of Civil Engineering like Transportation Engineering, Structural Engineering, Geo-technical Engineering, Water Resources Engineering and Environmental Engineering.

Learning Outcomes:

After completion of this unit, students should

- Able to know various specialisations in Civil Engineering
- Responsibility of an engineer in ensuring the safety of built environment

UNIT-II

Introduction to buildings: Types of buildings, selection of site for buildings, components of a residential building and their functions.

Building rules and regulations: Relevance of NBC, KBR & CRZ norms (brief discussion only).

Building area: Plinth area, built up area, floor area, carpet area and floor area ratio for a building as per KBR.

Learning Outcomes:

After completion of this unit, students should

- Able to know various types of buildings.
- Able to know various types building regulations and rules

UNIT-III

Surveying: Importance, objectives and principles.

Construction materials, Conventional construction materials: types, properties and uses of building materials: bricks, stones, cement, sand and timber

Cement concrete: Constituent materials, properties and types.

Steel: Steel sections and steel reinforcements, types and uses.

Learning Outcomes:

After completion of this unit, students should

- Able to know importance of Surveying.
- Able to know various materials used for construction.

UNIT-IV

Modern construction materials:- Architectural glass, ceramics, Plastics, composite materials, thermal and acoustic insulating materials, decorative panels, waterproofing

materials. Modern uses of gypsum, pre-fabricated building components (brief discussion only).

Learning Outcomes:

After completion of this unit, students should

- Able to know importance new construction materials.
- Able to know various materials used for construction.

UNIT-V

Building Construction: Foundations: Bearing capacity of soil (definition only), functions of foundations, types – shallow and deep (brief discussion only). Load bearing and framed structures.

Brick masonry: - Header and stretcher bond, English bond & Flemish bond random rubble masonry.

Roofs and floors: - Functions, types; flooring materials (brief discussion only).

Learning Outcomes:

After completion of this unit, students should

- Able to know different types of foundations
- Able to know various masonry bonds.

Course Outcomes:

After studying this course, students will be able to:

- Understand various Civil Engineering in the overall infrastructural development
- Identify various types of buildings
- Understand the process of management of surveying
- Apply various Modern construction materials
- Obtain awareness on various Modern construction materials

Text Books:

1. Rangwala, S. C., Essentials of Civil Engineering, Charotar Publishing House 2015
2. McKay, W.B. and McKay, J. K., Building Construction, Volumes 1 to 4, Pearson India Education Services edition 2019

Reference Books:

1. G Shanmugam, M S Palanichamy, Basic Civil and Mechanical Engineering, McGraw Hill Education; First edition, 2018

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- V SemL T P C

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(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.

(EE20AOE501) INTRODUCTION TO CONTROL SYSTEMS

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, 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 -

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)

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- Phase margin and Gain margin-Stability Analysis.

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)
- 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 -, 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 state 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 Farid Golnaraghi, "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 and 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, 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

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(ME20AOE502) SOLAR AND WIND ENERGY SYSTEMS

Prerequisites: Power Plant Engineering

Course Objectives:

- Familiarize with basics of solar radiation, available solar energy and its measurement.
- Familiarize with solar collectors, construction and operation of solar collectors.
- Understand solar energy conversion systems, applications and power generation.
- Familiarize the wind energy sources assessment
- Explain basics of designing aerofoil

UNIT – 1:

Solar radiation and collectors: Solar angles – Sun path diagrams – Radiation - extra terrestrial characteristics - measurement and estimation on horizontal and tilted surfaces - flat plate collector thermal analysis - testing methods-evacuated tubular collectors - concentrator collectors – classification - design and performance parameters - tracking systems - compound parabolic concentrators - parabolic trough concentrators - concentrators with point focus - Heliostats – performance of the collectors.

Solar thermal technologies: Principle of working, types, design and operation of - Solar heating and cooling systems - Thermal Energy storage systems – Solar Desalination – Solar cooker : domestic, community – Solar pond – Solar drying.

Learning Outcomes:

At the end of this unit, the student will be able to

- Explain the basic concepts of solar radiation and solar collectors (L2)
- Develop sun path diagrams (L3)
- Explain the concepts of tracking systems (L2)
- Discuss the working principles of solar thermal technologies (L6)
- Develop design and operation of solar heating and cooling systems (L3)
- Explain the principles of thermal storage systems (L2).

UNIT – 2:

Solar PV fundamentals: Semiconductor – properties - energy levels - basic equations of semiconductor devices physics. Solar cells - p-n junction: homo and hetero junctions - metal-semiconductor interface - dark and illumination characteristics - figure of merits of solar cell - efficiency limits - variation of efficiency with band-gap and temperature - efficiency measurements - high efficiency cells – Solar thermo-photovoltaics.

SPV system design and applications: Solar cell array system analysis and performance prediction- Shadow analysis: reliability - solar cell array design concepts - PV system design - design process and optimization - detailed array design - storage autonomy - voltage regulation - maximum tracking - centralized and decentralized SPV systems - stand alone - hybrid and grid connected system - System installation - operation and maintenances - field experience - PV market analysis and economics of SPV systems.

Learning Outcomes:

At the end of this unit, the student will be able to

- Explain the properties of a semiconductor (L2)
- Apply the principles of solar thermo photovoltaics (L3)
- Outline the applications of SPV system (L2)
- Analyze the performance of a solar cell array system (L4)
- Utilize centralized and decentralized SPV systems (L3)

UNIT – 3:

Introduction: Historical Perspectives on Wind Turbines- Indian Energy Scenario - Global Energy Scenario - Introduction to Indian Wind Industry - Wind Energy potential of India and Global Wind Installations.

Basics of Wind Resource Assessment: Power in the wind –Wind Characteristics - Measurement of wind using anemometers (cup anemometer, propeller anemometer, pressure plate anemometer, pressure tube anemometer, sonic anemometer and other remote wind speed sensing techniques) –Turbulence-Wind Power Density –Average wind speed calculation - Statistical models for wind data analysis (Weibull and Rayleigh distribution). Energy estimation of wind regimes – Wind Rose, Wind Monitoring Station Siting and Instrumentation.

Learning Outcomes:

At the end of this unit, the student will be able to

- Recall historical perspective of wind turbines(L1)
- Relate Indian and global energy requirements(L1)
- Interpret power in the wind (L2)
- Classify different wind speed measuring instruments(L2)
- Apply different statistical models for wind data analysis (L3)

UNIT – 4:

Wind Energy Conversion Systems: Types - Components of Modern Wind Turbine (HAWT and VAWT) - Fixed and Variable Speed operations - Power Control (Passive stall, Active pitch, Passive pitch and Active stall) - Electrical aspects of wind turbine, Safety of wind turbines.

Learning Outcomes:

At the end of this unit, the student will be able to

- Utilize different wind parameters for design of rotor (L3)
- Make use of power curve for energy estimation (L3)
- List different components of modern wind turbine (L1)
- Explain how to control the power of a wind turbine (L2)
- Name different safety measures of wind turbine (L1)

UNIT – 5:

Wind Farm Design and Health (Condition) Monitoring: Planning of wind farm, Site selection, Micro siting, Grid Integration, Power evacuation, Wind Farm Feasibility Studies, Preparation of DPR, Environmental Benefits and Impacts.

Small Wind Turbines: Water pumping wind mills, offshore wind energy, Wind turbine testing, future developments.

Learning Outcomes:

At the end of this unit, the student will be able to

- Plan the wind farm(L3)
- Analyze the feasibility of wind farm(L4)
- List the environmental benefits and impacts (L1)
- Explain about small wind turbines(L2)

Textbooks:

1. Goswami D.Y., Kreider, J. F. and Francis., "Principles of Solar Engineering', Taylor and Francis, 2000.
2. Chetan Singh Solanki, "Solar Photovoltaics – Fundamentals, Technologies and Applications", PHI Learning Private limited, 2011.

Reference Books:

1. Sukhatme S.P.,. Nayak.J.P, 'Solar Energy – Principle of Thermal Storage and collection", Tata McGraw Hill, 2008.
2. Sathyajith Mathew, Wind Energy Fundamentals, Resource Analysis and Economics, Springer Publications, (2006).
3. Wei Tong, Wind Power Generation and Wind Turbine Design, WIT Press,(2010)
4. Wind Power, Revised Edition: Renewable Energy for Home, Farm, and Business, Paul Gipe, 2004, Chelsea Green Publishing.
5. A.R. Jha, Wind Turbine Technology, CRC Press, (2010).

Course Outcomes:

At the end of the course, the student will be able to

- **Explain** the basic concepts of solar radiation and solar collectors (L2)
- **Develop** sun path diagrams (L3)
- **Explain** the properties of a semiconductor (L2)
- **Apply** the principles of solar thermo photovoltaics (L3)
- **Utilize** different wind parameters for design of rotor (L3)
- **Make** use of power curve for energy estimation (L3)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.TechV- Sem

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(AM20APE501) COMPUTER NETWORKS (Professional Elective-I)

Course objectives:

This course is designed to

- Understand the basic concepts of Computer Networks.
- Introduce the layered approach for design of computer networks
- Familiarize with the applications of Internet
- Explore the network protocols used in Internet environment
- Explain the format of headers of IP, TCP and UDP
- Elucidate the design issues for a computer network

UNIT-I

Computer Networks and the Internet: What is the Internet?, The Network Edge, The Network Core, Delay, Loss, and Throughput in Packet-Switched Networks, Protocol Layers and their Service Models, Networks under attack, History of Computer Networking and the Internet.

Learning outcomes:

At the end of the Unit, students will be able to:

- Enumerate the hardware components of a computer network (L1)
- List the layers of a Computer Network (L1)
- Identify the performance metrics of a computer network (L3)

UNIT- II:

The Layer: Links, Access Networks, and LANs Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols Introduction to the Link Layer, Error-Detection and -Correction Techniques, Multiple Access Links and Protocols, Switched Local Area Networks Link Virtualization: A Network as a Link Layer, Data Centre Networking, Retrospective: A Day in the Life of a Web Page Request.

Learning outcomes:

At the end of the Unit, students will be able to:

- Compare medium access protocols (L4)
- Classify the computer networks (L2)
- Design a Data Centre for an organization (L6)

UNIT-III

The Network Layer: Routing Algorithms, Internetworking, The Network Layer in The Internet.

Learning outcomes:

At the end of the Unit, students will be able to:

- Compare routing algorithms (L4)
- Design routing algorithms (L6)
- Extend the existing routing protocols (L2)

UNIT-IV

Transport Layer: Connectionless Transport: UDP the Internet Transport Protocols: TCP, Congestion Control.

Learning outcomes:

At the end of the Unit, students will be able to:

- Design Congestion control algorithms (L6)
- Select the appropriate transport protocol for an application (L3)
- Identify the transport layer services (L3)

UNIT-V

Principles of Network Applications: The Web and HTTP, Electronic Mail in the Internet, DNS—The Internet's Directory Service, Peer-to-Peer Applications Video Streaming and Content Distribution Networks.

Learning outcomes:

At the end of the Unit, students will be able to:

- Design new applications of a computer network (L6)
- Analyze the application protocols (L4)
- Extend the existing applications (L2)

Course Outcomes

Students will be able to :

1. Identify the software and hardware components of a Computer network (L3)
2. Develop new routing, and congestion control algorithms (L3)
3. Assess critically the existing routing protocols (L5)
4. Explain the functionality of each layer of a computer network (L2)
5. Choose the appropriate transport protocol based on the application requirements (L3)

TEXT BOOKS:

4. Andrew S.Tanenbaum, David j.wetherall, "Computer Networks", 5th Edition, PEARSON.
5. James F. Kurose, Keith W. Ross, "Computer Networking: A Top-Down Approach", 6th edition, Pearson, 2019.

REFERENCE BOOKS:

1. Forouzan, "Datacommunications and Networking", 5th Edition, McGraw Hill Publication.

2.Youlu Zheng, Shakil Akthar, "Networks for Computer Scientists and Engineers",
Oxford Publishers, 2016

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B.TechV Sem

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(AM20APE502) DIGITAL IMAGE PROCESSING

Course Objective:

- The objective of this course is to provide the knowledge of image processing and pattern recognition and apply these concepts in image processing and recognition applications of having commercial values in industry and business management.

Unit 1:

Introduction: Digital Image Processing

Digital image representation, Digital image processing: Problems and applications, Elements of visual perception, Sampling and quantization, some basic relationships like Neighbors, Connectivity, Distance, Measures between pixels, Visual Perception

Learning Outcomes:

- Learnt about represent the Digital image
- Learnt about the Elements of visual representation.

Unit II:

Image Enhancement in Spatial Domain

Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic and Logic operations, Basics of Spatial Filters, Smoothing and Sharpening Spatial Filters, Combining Spatial Enhancement Methods

Learning Outcomes:

- Learnt different types of operations.
- Learnt different types of filters

Unit III:

Image Enhancement in the Frequency Domain

Introduction to Fourier Transform and the frequency Domain, Computing and Visualizing the 2D DFT, Smoothing and Sharpening using Frequency Domain Filters, Hadamard transform, Haar transform and Discrete Cosine transform, Fast Fourier Transform

Learning Outcomes:

- Learnt Fourier Transform and the frequency Domain
- Learnt different types of Transforms

Unit IV:

Image Restoration

The Image Degradation / Restoration Process, Noise Model based Restoration, Spatial filtering, Periodic Noise Reduction by Frequency Domain Filtering, Inverse filtering, Wiener filtering, Geometric Mean Filter **Color Processing:** Color Fundamentals, Color Models, Pseudo color based Image Processing, Color transformations, Smoothing and Sharpening operations

Learning Outcomes:

- Learnt different types of restoration process.
- Learnt different types of color processing.

Unit V:

Image Compression

Coding, Inter pixel and Psychovisual Redundancy, Image Compression models, Lossless and Lossy Compressions. **Morphological Image Processing** :Logic Operations involving binary images, Dilation and Erosion, Opening and Closing, The Hit-or-Miss Transformation **Image Segmentation**: Detection of Discontinuities, Edge linking and boundary detection, Thresholding, Region Based Segmentation

Learning Outcomes:

- Learnt coding and compression models.
- Learnt Morphological Image Processing .

Course Outcomes:

1.Thorough understanding of theoretical foundation of fundamental Digital Image manipulation and processing steps like acquisition; preprocessing; segmentation; Fourier domain processingSkills on exploration and appropriate use of image processing methods / tools for business and management applications

Text Book:

1. Rafael C. Gonzalez & Richard E. Woods, "Digital Image Processing", PHI (2010).

Reference Books:

- 1.K. Jain, "Fundamental of Digital Image processing", PHI (2011).
- 2.P. Monique and M. Dekker, "Fundamentals of Pattern recognition", CRC (2007).
- 3.M. James, "Pattern recognition", BSP (2008).

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B.TechV Sem

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(AM20APE503)No SQL DATABASES

Course Objectives:

- Introduce No SQL and use of four types of NoSQL Databases
- Outline the three different styles of aggregate-oriented data models and how they differ.
- Understand the detailed architecture, define objects, load data, query data and performance tune Column-oriented NoSQL databases
- Improve programmer productivity by using a database that better matches an application's needs.

UNIT I

Introduction to NoSQL:

Definition and Introduction, Sorted Ordered Column

OrientedStores,Key/ValueStores,DocumentDatabases,GraphDatabases,ExaminingTwoSimple Examples, Location Preferences Store, Car Make and Model Database, WorkingWithLanguage Bindings.

LearningOutcomes:

At the end of the unit, students will be able to:

- Understand the fundamentals of NoSQL (L2)
- Examine the concepts with two simple examples (L5)

UNIT II

Interacting with NoSQL:

If NoSql Then What, Language Bindings For NoSQL DataStores, Performing Crud Operations, Creating Records, Accessing Data, Updating And Deleting Data

LearningOutcomes:

At the end of the unit, students will be able to:

- Understand language bindings for NoSQL DataStores (L2)
- Explain how to perform various operations on Data (L2)

UNIT III

NoSQL Storage Architecture: Working With Column-

Oriented Databases, Hbase Distributed Storage Architecture, Document Store Internals, Understanding Key/Value Stores in Memo cached and Redis, Eventually Consistent Non-Relational Databases.

LearningOutcomes:

At the end of the unit, students will be able to:

- Demonstrate working with Column-Oriented Databases (L2)
- Understand Key Value stores (L1).

UNIT IV

NoSQL Stores:

Similarities Between Sql And MongoDB Query Features, Accessing Data From Column-Oriented Databases Like Hbase, Querying Redis Data Stores,

Changing Document Databases, Schema Evolution In Column-Oriented Databases, Hbase Data Import And Export, Data Evolution In Key/Value Stores.

Learning Outcomes:

At the end of the unit, students will be able to:

- List the similarities between SQL and MongoDB query features (L1)
- Explore accessing data from column-oriented databases like Hbase (L5)
- Illustrate Hbase data import and export (L2)
- Demonstrate schema evolution in column-oriented databases (L2)

UNIT V

Indexing and Ordering Data Sets :

Essential Concepts Behind A Database Index, Indexing And Ordering In MongoDB, Creating and Using Indexes In MongoDB, Indexing And Ordering In CouchDB, Indexing In Apache Cassandra.

Learning Outcomes:

At the end of the unit, students will be able to:

- Learn essential concepts behind a database index (L1)
- Compare indexing and ordering in MongoDB, CouchDB and Apache Cassandra (L4)

Course Outcomes:

After the completion of the course, student will be able to

- Identify type of NoSQL database to implement business requirements (L3)
- Apply NoSQL data modeling from application specific queries (L3)
- Demonstrate Atomic Aggregates and de-normalization as data modeling techniques to optimize query processing (L2)
- Improve data access performance via some combination of handling larger data volumes, reducing latency, and improving throughput (L6)
- Separate parts of applications into services which allows you to introduce NoSQL into an existing application (L6)

TextBooks:

- 1) Pramod Sadalage and Martin Fowler, NoSQL Distilled, Addison-Wesley Professional, 2012.
- 2) Dan McCreary and Ann Kelly, Making Sense of NoSQL, Manning Publications, 2013

References:

- 1) Shashank Tiwari, Professional NoSQL, Wrox Press, Wiley, 2011, ISBN: 978-0-470-94224-6
- 2) Gaurav Vaish, Getting Started with NoSQL, Pact Publishing, 2013.

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B.Tech V Sem

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(AM20APC502) ARTIFICIAL INTELLIGENCE AND DATA MINING TOOLS LAB

Course Outcomes (CO):

- Able to learn different logic programming languages
- Able to apply and analyze various problem-solving techniques on artificial intelligence problems.
- Acquire skill to identify the given problem and design the rule based systems.
- Develop better understanding to represent various real life problem domains using logic based techniques and use this to perform inference or planning.
- Understand the working knowledge in Lisp and demonstrate that for solving the artificial intelligent problems.

List of Programs

- Write simple fact for the statements using PROLOG.
- Write predicates One converts centigrade temperatures to Fahrenheit, the other checks if a temperature is below freezing.
- Write a program to solve the Monkey Banana problem.
- Write a program to solve 4-Queen problem.
- Write a program to implement Hill Climbing Algorithms.
- Demonstration of preprocessing on dataset student.arff
- Demonstration of Association rule Process on any dataset by using apriori algorithm
- Demonstration of classification rule process on any dataset by using naïve bayes algorithm
- Demonstration of clustering rule process on any dataset.
- Demonstrate performing Regression on dataset.

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B.TechV Sem

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(AM20APC505)COMPILER DESIGN LAB

Course Outcomes

1. Able to use lex and yacc tools for developing a scanner and a parser.
2. Able to design and implement LL and LR parsers.

List of Programs

1. Write a C program to implement the design of a Lexical analyzer to recognize the tokens defined by the given grammar.

2. Implement the lexical analyzer using JLex, flex or other lexicalAnalyzer generating tools.
3. Implement Predictive parsing algorithm
4. Write a C program to generate three address code.
5. Implement SLR(1) Parsing algorithm
6. Design LALR bottom up parser for the given language

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B.Tech V SemL TPC

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**(EG20ASC301)SOFTSKILLS
SOC – I**

Course Objectives

- To develop awareness in students of the relevance and importance of soft skills
- To provide students with interactive practice sessions to make them internalize soft skills
- To develop Time management, Positive thinking & Decision making skills
- To enable to manage stress effectively
- To enable them to develop employability skills.

UNIT– I

INTRODUCTION

Definition – Scope – Importance- – Methods of improving soft skills – Limits- Analysis – Interpersonal and intrapersonal skills - Verbal and Non-verbal skills.

Learning Outcomes:

At the end of the module, the learners will be able to

- Understand the importance of soft skills
- Identify the methods of improving soft skills
- Analyze various soft skills in different situations
- Distinguish various soft skills
- Apply various soft skills in day to day life and in workplace

UNIT – II

INTRAPERSONAL SKILLS

Knowing self/temperaments/traits - Johari windows – quotient skills(IQ, EQ, SQ), creativity, decision-making- Attitude – Confidence Building - Positive Thinking –Time Management – Goal setting.

Learning Outcomes:

At the end of the module, the learners will be able to

- Understand self and its temperament.
- Apply various techniques to know the self.
- Develop positive thinking
- Develop creative thinking and decision-making skills
- Apply self-knowing tools in day to day and professional life.

UNIT – III

INTERPERSONALSKILLS

Leadership Skills – Negotiation skills -- Team-building – Crisis Management – Event Management –Ethics and Etiquettes.

Learning Outcomes:

At the end of the module, the learners will be able to

- Understand the importance of interpersonal skills
- Analyze various tactics in negotiation skills.
- Develop team building spirit.
- Develop crisis management

- Apply interpersonal skills through etiquettes.

UNIT – IV

VERBALSKILLS

Importance of verbal skills in corporate climate, Listening skills –Mother Tongue Influence (MTI) - Speaking skills – Public speaking - Oral presentations - Writing skills –E-mail etiquettes – Memos – Indianism

Learning Outcomes:

At the end of the module, the learners will be able to

- Understand the importance of verbal skills in corporate climate.
- Explain the need of listening skills.
- Explore MTI and suggest remedies to avoid it.
- Interpret various contexts of speaking.
- Apply verbal skills in personal and professional life.

UNIT – V

NON-VERBAL SKILLS

Importance of body language in corporate culture – body language-Facial expressions – eye contact – posturegestures – Proxemics – Haptics – Dress Code – Paralanguage –Tone, pitch, pause& selection of words.

Learning Outcomes:

At the end of the module, the learners will be able to

- Comprehend the importance of non-verbal communication.
- Expound the need of facial expressions, postures and gestures.
- Analyze proxemics,haptics etc.
- Understand the importance of dress code.
- Apply various techniques to use para language.

Course Outcomes

- Recognize the importance of verbal and non verbal skills
- Develop the interpersonal and intrapersonal skills
- Apply the knowledge in setting the SMART goals and achieve the set goals
- Analyze difficult situations and solve the problems in stress-free environment

- Create trust among people and develop employability skills

Text Books

1. Meenakshi Raman & Shalini Upadhyay "Soft Skills", Cengage Learning, 2018.
2. S. Balasubramaniam, "Soft Skills for Interpersonal Communication", Orient Black Swan, 2017.

References

1. Barun K. Mitra, "Personality Development and Soft Skills", –OXFORD Higher Education 2018.
2. Alka Wadkar, "Life Skills for Success ", Sage Publications 2016.
3. Robert M Sheffield, "Developing Soft Skills", Pearson, 2010.
4. Diana Booher, "Communicate With Confidence", Tata McGrawhill, 2012.

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B. Tech VI
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(BA20AMC501) MANDATORY COURSE: 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.

- To understand the central-state relation in financial and administrative control

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-Lok Sabha-Rajya Sabha - 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 -ZillaParishath - Elected officials and their roles - CEO, ZillaParishath -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

- Understand the local Administration
- Compare and contrast district administration's role and importance
- Analyze the role of Mayor and elected representatives of Municipalities
- Learn about the role of Zilla Parishath block level organization

UNIT-V

Election Commission-Election Commission-Role of Chief Election Commissioner and Election
 Commissionerate -State Election Commission -Functions of Commissions for the welfare
 of SC/ST/OBC and Women

Learning Outcomes:-

After completion of this unit student will

- Know the role of Election Commission
- Contrast and compare the role of Chief Election commissioner and Commissionerate
- Analyze the role of state election commission
- Evaluate various commissions viz SC/ST/OBC and women

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:

1. J.A. Siwach, "Dynamics of Indian Government & Politics".
2. H.M. Sreevai, "Constitutional Law of India", 4th edition in 3 volumes (Universal Law Publication)
3. J.C. Johari, "Indian Government and Politics", Hans India
4. M.V. Pylee, "Indian Constitution", Durga Das Basu, Human Rights in Constitutional Law, Prentice-Hall of India Pvt. Ltd. New Delhi

References:

1. J.A. Siwach, "Dynamics of Indian Government & Politics".
2. H.M. Sreevai, "Constitutional Law of India", 4th edition in 3 volumes (Universal Law Publication)
3. J.C. Johari, "Indian Government and Politics", Hans India
4. M.V. Pylee, "Indian Constitution", Durga Das Basu, Human Rights in Constitutional Law, Prentice-Hall of India Pvt. Ltd. New Delhi

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 ,TIRUPATHI (AUTONOMOUS)

BTech V Sem

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(CH20AMC301) BIOLOGY FOR ENGINEERS (Mandatory Non-Credit Course - V)

Course Objectives: To provide basic understanding about life and life Process. Animal and plant systems. To understand what biomolecules are, their structures and functions. Application of certain biomolecules 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.

Unit 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 reclassified. (L3)

UnitII:IntroductiontoBiomolecules

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.

UnitOutcomes:

After completing this unit, the student will be able to

Understand what are biomolecules? their role in living cells, their structure, function and how they are produced. (L1)

Interpret the relationship between the structure and function of nucleic acids. (L2)

Summarize the application of enzymes in industry. (L3)

Understand what is fermentation and its application of fermentation in industry. (L4)

UnitIII:HumanPhysiology

Nutrition: Nutrients or food substances. Digestive system, Respiratory system, (aerobic and anaerobic Respiration). Respiratory organs, respiratory cycle. Excretory system.

UnitOutcomes:

After completing this unit, the student will be able to

Understand what nutrients are (L1)

Understand the mechanism and process of important human functions (L2 & L3)

UnitIV:IntroductiontoMolecularBiologyandrecombinantDNATechnology

Prokaryotic gene and Eukaryotic gene structure. DNA replication, Transcription and Translation. rDNA technology. Introduction to gene cloning.

UnitOutcomes:

After completing this unit, the student will be able to

Understand and explain about gene structure and replication in prokaryotes

an

dEukaryotes (L1)

How genetic material is replicated and also understand how RNA and proteins are synthesized. (L2)

Understand about recombinant DNA technology and its application in different fields. (L3)

Explain what is cloning. (L4)

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.

Unit Outcomes:

After completing this unit, the student will be able to Understand.

How biology is applied for production of useful products for mankind. (L1)

What are biosensors, biochip etc. (L2)

Understand transgenic plants and animals and their production (L3)

Course Outcomes:

After studying the course, the student will be able to:

Explain about cells and their structure and function. Different types of cells and basics for classification of living Organisms.

Explain about biomolecules, their structure and function and their role in the living organisms. How biomolecules are useful in Industry.

Briefly about human physiology.

Explain about genetic material, DNA, genes and RNA how they replicate, pass and preserve vital information in living Organisms.

Know about application of biological Principles in different technologies for the production of medicines and Pharmaceutical molecules through transgenic microbes, plants and animals.

Textbooks:

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 Turner, A. McTernan, A. Bates & M. White, Instant Notes – Molecular Biology – 2014

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B. Tech

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(IT20AMC501) PROBLEMSOLVINGAND PROGRAMMING FOR LE
(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.

Unit1

Introduction to Problem Solving: Problem solving Aspect, Problem identification, Problem understanding, Algorithm development, Solution planning, flowcharts, flow algorithm.

Overview of C: History of C, C Language elements, Basic structure of C programs, variables and data types, C Tokens, Operators and Expressions, Type Conversions.

Learning Outcomes: The students will be able to

- 1) Develop solution through problem understanding and decomposition (L6).
- 2) Develop basic flowcharts for performing input and output and computations (L3).
- 3) Solve Numerical Problems using Flow algorithm (L3).
- 4) Use C basic concepts to write simple C programs (L3).

Unit2

Control Statements: Selection Statements- If and Switch Statements

Iterative Statements: For, While and Do- While Statements, Break and Continue Statements.

Learning Outcomes: The students will be able to

- 1) Implement C program using Conditional statements (L2).
- 2) Implement C program using Iterative statements (L2).

Unit3

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

- 1) Writing Structured programs using Functions (L5).
- 2) Apply arrays concepts on real time applications (L6).

Unit4

Pointers: Declaration and Initialization of pointer variables, Pointer arithmetic, Pointers and arrays,

Pointertopointer,Arrayofpointers,Pointersandfunctions,Dynamicmemoryallocation.

Strings:IntroductiontoStrings,Stringhandlingfunctions,Preprocessors.

LearningOutcomes:Thestudentswillbeableto

- 1)UsepointerstowritecPrograms(L3).Understandtheconceptsofpreprocessors(L2).
- 3)ApplyDynamicMemoryAllocationconceptsonrealtimeapplications(L6).

Unit5

Structures: Introduction,Nested structures, Array ofstructures, Structuresand functions, Unions.**Filesin C:**UsingFilesinC, Readdata from files,Writingdata to files,Random accessto files(records, CommandlineArguments

LearningOutcomes:Thestudentswillbeableto

- 1) Use the conceptsofstructuresandunionstowritecprograms(L3).
- 2) ApplyvariousoperationsonFiles(L6).

TextBooks:

1. ReemaThareja,ProgramminginC,OxfordUniversityPress,AICTEEdition,2018.
2. R.G.Dromey,“HowtoSolveitbyComputer”.2014,Pearson.

ReferenceBooks:

1. JeriR.Hanly,ElloB.Koffman,ProblemSolvingandProgramDesigninC,5/e,Pearson
2. B.A.ForouzanandR.F.Gilberg,ComputerScience:AStructuredProgrammingApproachUsingC,3/e,Cengage Learning,2007.
3. BrianWKernighanandDennisMRitchie,TheCProgrammingLanguage,SecondEdition,PrenticeHall Publication.
4. PaulDeitel,HarveyDeitel-CHowtoProgramwithanintroductiontoC++,EighthEdition,

CourseOutcomes

- Solvecomputationalproblems(L3).
- SelectthefeaturesofClanguageappropriateforsolvingaproblem(L4)
- Designcomputerprogramsforrealworldproblems(L6)
- Organizethedatawhichismoreappropriatedforsolvingaproblem(L6).

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.TechVI Sem

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(AM20APC601) BIG DATA ANALYTICS

Course Objectives:

1. To understand the need of Big Data, challenges and different analytical architectures

2. Installation and understanding of Hadoop Architecture and its ecosystems
3. To understand the concepts of distributed file system and Map Reduce programming
4. To understand Big Data with Advanced architectures like spark.

Unit-I

Introduction Big Data and Hadoop Frame work

Data Storage and Analysis - Characteristics of Big Data – Big Data Analytics - Typical Analytical Architecture – Requirement for new analytical architecture – Challenges in Big Data Analytics – Need of big data frameworks, Installation of Hadoop in Virtual Environment, Introduction to Hadoop ecosystems, Business Intelligence vs. Data Analytics.

Hadoop Framework: Hadoop – Requirement of Hadoop Framework, Design principle of Hadoop –Comparison with other system, Hadoop Components, Hadoop Daemon's, Overview of Hadoop- comparing SQLdatabases and Hadoop, Distributed File System: HDFS, Design of HDFS writing files to HDFS Reading files from HDFS.

Learning Outcomes:

At the end of the unit, students will be able to:

- Identify the characteristics of datasets. (L3)
- Compare trivial data and big data for various applications. (L4)
- Choose and implement various ways of selecting suitable model parameters.
- Understand and apply scaling up Hadoop techniques and associated technologies. (L2)
- Estimate suitable test data. (L5)
- Analyze the procedure of storing, retrieving and writing data in HDFS environment. (L3)

Unit-II

MapReduce Programming

Developing MapReduce Program Anatomy of MapReduce Code - Simple Map Reduce Program- counting thing, Map Reduce types and formats, MapReduce features, Combiner optimization, Map side join, Reduce Side Join, Secondary sorting, Pipelining MapReduce jobs.

Learning Outcomes:

At the end of the unit, students will be able to:

- Explore the Anatomy of MapReduce. (L5)
- Illustrate various input and output formats of MapReduce. (L2)
- List various MapReduce types. (L1)

Unit-III

Hadoop Environment:Setting up a Hadoop Cluster, Cluster specification, Cluster Setup and Installation, Hadoop Configuration, Security

Hadoop Ecosystems:Introduction to Hadoop ecosystem technologies: Serialization: AVRO, Co-ordination: Zookeeper, Databases: HBase, Hive, Scripting language: Pig, Streaming: Flink, Storm.

Learning Outcomes:

At the end of the unit, students will be able to:

- Show the cluster setup and installation. (L2)
- Demonstrate the Configure the Hadoop. (L2)
- Compare Hadoop with various Databases. (L5)

Unit-IV

NoSQL Databases. Definition of the Four Types of NoSQL Database, The Value of Relational Databases, Getting at Persistent Data, Concurrency, Integration, Impedance Mismatch, Application and Integration Databases, Attack of the Clusters, The Emergence of NoSQL, Key Points.

Learning Outcomes:

At the end of the unit, the student will be able to

- Explain different types of NoSQL Databases.(L2)
- Illustrate the Emergence of NoSQL.(L2)
- Outline the application and Integration of NoSQL Databases.(L2)

Unit-V

Spark Framework

Overview of Spark – Hadoop vs Spark – Cluster Design – Cluster Management – performance, Application Programming interface(API): Spark Context, Resilient Distributed Datasets, Creating RDD,RDD Operations, Saving RDD - Lazy Operation – Spark Jobs-spark ML library.

Case Study: Data Analysis with Spark Shell

Writing Spark Application - Spark Programming in Scala, Python, R, Java - Application Execution.

Learning Outcomes:

- At the end of the unit, students will be able to:
- Explain the frameworks of Spark. (L2)
- Compare Hadoop and Spark(L4)
- Learn how to build an Spark application.(L1)

Course Outcomes:

- Understand and apply scaling up Hadoop techniques and associated technologies. (L2)
- Explore the Anatomy of MapReduce. (L5)
- Illustrate the Emergence of NoSQL.(L2)
- Compare Hadoop and Spark(L4)
- Explain the frameworks of Spark. (L2)

Text Books:

1. TomWhite, "Hadoop:TheDefinitiveGuide", O'Reilly, 4th Edition, 2015.
2. Donald Miner, Adam Shook, "Map Reduce Design Pattern", O'Reilly, 2012
3. Mike Frampton, "Mastering Apache Spark", Packt Publishing, 2015.
4. Reference:
5. Nick Pentreath, Machine Learning with Spark, Packt Publishing, 2015.
6. Mohammed Guller, Big Data Analytics with Spark, Apress, 2015.

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B.TechVI Sem

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(AM20APC603) MACHINE LEARNING

Course Objectives:

This course is designed to:

- Understand the basic theory underlying machine learning
- Formulate machine learning problems corresponding to different applications.
- Illustrate a range of machine learning algorithms along with their strengths and weaknesses
- Apply machine learning algorithms to solve problems of moderate complexity.
- Understand how Machine Learning imbibes the philosophy of Human learning.

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.

Learning Outcomes:

At the end of the unit, students will be able to:

Understand Bias and Variance(L1)

Learn the basics of learning problems with hypothesis and version spaces(L1)

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.

Learning Outcomes:

At the end of the unit, students will be able to:

- Understand how to evaluate models generated from data(L1)

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.

Learning Outcomes:

At the end of the unit, students will be able to:

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, Perception, multilayer networks and the back propagation algorithm;

Learning Outcomes:

At the end of the unit, students will be able to:

- Understand the Support Vector Machine and Artificial Neural Networks algorithms(L1)

UNIT V

Ensembles: Introduction, Bagging and boosting, Random forest, Clustering: Introduction, K-mean clustering, agglomerative hierarchical clustering, Python exercise on k-mean clustering.

Learning Outcomes:

At the end of the unit, students will be able to:

- Understand the Ensemble and clustering algorithms(L1)
- Apply Clustering Techniques to real world problems (L3)

Course Outcomes:

- Learn the basics of learning problems with hypothesis and version spaces(L2)
- Understand the features of machine learning to apply on real world problems(L1)
- Understand how to evaluate models generated from data(L1)
- Understand the Ensemble and clustering algorithms(L1)
- Apply Clustering Techniques to real world problems (L3)
- Understand how to evaluate models generated from data(L1)

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

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B.TechVI Sem

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(AM20APC605) NATURAL LANGUAGE PROCESSING

Course Objectives:

This course is designed to:

- Explain and apply fundamental algorithms and techniques in the area

- of natural language processing(NLP)
- Discuss approaches to syntax and semantics in NLP.
- Examine current methods for statistical approaches to machine translation.
- Explore machine learning techniques used in NLP.

UNIT I:

Introduction to Natural language

The Study of Language, Applications of NLP, Evaluating Language Understanding Systems, Different Levels of Language Analysis, Representations and Understanding, Organization of Natural language Understanding Systems, Linguistic Background: An outline of English Syntax.

Learning Outcomes:

At the end of the module, students will be able to:

- Classify various NLP Applications (L2)
- Apply the logic by using Python Programming(L3)
- List the AI Languages (L1)
- Outline the Linguistic Background (L2)

Unit II:

Grammars and Parsing

Grammars and Parsing-Top-Down and Bottom- Up Parsers, Transition Network Grammars, Feature Systems and Augmented Grammars, Morphological Analysis and the Lexicon, Parsing with Features, Augmented Transition Networks, Bayes Rule, Shan non game, Entropy and Cross Entropy.

Learning Outcomes:

At the end of the module, students will be able to:

- Demonstrate the Top- Down and Bottom-Up Parsing techniques (L2)
- Apply Bayes Rule, Shannon game, Entropy and Cross Entropy. (L3).
- Develop game playing strategies using Shannon game. (L3)

UNIT III:

Grammars for Natural Language

Grammars for Natural Language, Movement Phenomenon in Language, Handling questions in Context Free Grammars, Hold Mechanisms in ATNs, Gap Threading, Human Preferences in Parsing, Shift Reduce Parsers, Deterministic

Parsers.

Learning Outcomes:

At the end of the module, students will be able to:

- Classify Grammars for Natural Language (L2)
- Explain Hold Mechanisms in ATNs. (L2)
- Explain Human Preferences in Parsing. (L2)

UNIT IV:

Semantic Interpretation

Semantic & Logical form, Word senses & ambiguity, The basic logical form language, Encoding ambiguity in the logical Form, Verbs & States in logical form, Thematic roles, Speech acts & embedded sentences, Defining semantics structure model theory. Language Modeling Introduction, n-Gram Models, Language model Evaluation, Parameter Estimation, Language Model Adaption, Types of Language Models, Language-Specific Modeling Problems ,Multilingual and Cross lingual Language Modeling.

Learning Outcomes:

At the end of the module, students will be able to:

- Distinguish Language model Evaluation (L4)
- List the types of Language Models (L1)

UNIT V:

Machine Translation

Survey: Introduction, Problems of Machine Translation, Is Machine Translation Possible, Brief History, Possible Approaches, Current Status. Anusaraka or Language Accessor: Background, Cutting the GordianKnot, The Problem, Structure of Anusaraka System, User Interface, Linguistic Area, Givingup Agreement in Anusarsaka Output, Language Bridges.

Multilingual Information Retrieval

Introduction, Document Preprocessing, Monolingual Information Retrieval, CLIR, MLIR, Evaluation in Information Retrieval, Tools, Software and Resources. Multilingual Automatic Summarization

Introduction, Approaches to Summarization, Evaluation, How to Build a Summarizer, Competitions and Datasets.

Learning Outcomes:

At the end of the module, students will be able to:

- Apply Machine Translation techniques. (L3)
- Elaborate Multilingual Information Retrieval and Multilingual Automatic Summarization. (L6)

Course Outcomes:

At the end of the module, students will be able to:

- Build NLP applications using Python. (L6)
- Apply various Parsing techniques, Bayes Rule, Shannon game, Entropy and Cross Entropy. (L3)
- Explain the fundamentals of CFG and parsers and mechanisms in ATN's. (L2)
- Apply Semantic Interpretation and Language Modeling..(L3)
- Interpret Machine Translation and multilingual Information Retrieval systems and Automatic Summarization.(L2)

TEXTBOOKS:

1. James Allen, Natural language Understanding, 2nd Edition, 2003, Pearson Education.
2. Multilingual Natural Language Processing Applications: From Theory To Practice-Daniel M. Bikel and Imed Zitouni, Pearson Publications.
3. Natural Language Processing, A Panini an perspective, Akshar Bharathi, Vineetchaitanya, Prentice-Hall of India.

REFERENCESBOOKS:

1. Charniack, Eugene, Statistical Language Learning, MIT Press, 1993.
2. Jurafsky, Dan and Martin, James, Speech and Language Processing, 2nd Edition, Prentice Hall, 2008.
3. Manning, Christopher and Henrich, Schutze, Foundations of Statistical Natural Language Processing, MIT Press, 1999.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

**LTPC
3003**

B.TechVI Sem

(AM20APE601) CLOUD COMPUTING Professional Elective – II

Course Objectives:

This course is designed to:

- Define cloud services and models
- Demonstrate design the architecture for new cloud application.
- Explain how to re-architect the existing application for the cloud.

Unit-I:

Introduction to Cloud Computing, Characteristics of Cloud Computing, Cloud Models, Cloud Services Examples, Cloud based services and Applications, Cloud Concepts and Technologies, Virtualization, Load Balancing, Scalability and Elasticity, Deployment, Replication, Monitoring, Software defined networking, Network function virtualization, Map Reduce, Identity and Access Management, Service Level Agreements, Billing.

Learning Outcomes

At the end of the unit, students will be able to:

- Outline the Cloud characteristics and models.(L2)
- Classify different models, different technologies in cloud.(L2)

Unit-II:

Cloud Services and Platforms: Compute Services, Storage Services, Database Services, Application Services, Content Delivery Services, Analytics Services, Deployment and Management Services, Identity and Access Management Services, Open Source Private Cloud Software, Apache Hadoop, Hadoop MapReduce Job Execution, Hadoop Schedulers, Hadoop Cluster Setup.

Learning Outcomes:

At the end of the unit, students will be able to:

- Summarize the Services and Platform of cloud.(L2)
- Demonstrate Hadoop Cluster Setup.(L2)

Unit-III:

Cloud Application Design: Design Considerations, Reference Architectures, Cloud Application Design Methodologies, Data Storage Approaches.

Multimedia Cloud: Introduction, Case Study: Live Video Streaming App, Streaming Protocols, and Case Study: Video Trans coding APP.

Learning Outcomes:

At the end of the unit, students will be able to:

- Design and build cloud applications.(L6)
- Describe the multimedia cloud. (L2)

Unit-IV:

Python for Amazon Web Services, Python for Google Cloud Platform, Python for Windows Azure, Python for MapReduce, Python Packages of Interest, Python Web Application Framework – Django, Designing a RESTful Web API.

Learning Outcomes:

At the end of the unit, students will be able to:

- Select different cloud services from different vendors (L2)
- Utilize Python language to access cloud services (L3)

Unit-V:

Cloud Application Development in Python, Design Approaches, Image Processing APP, Document Storage App, Map Reduce App, Social Media Analytics App, Cloud Application Benchmarking and Tuning, Cloud Security, Cloud Computing for Education.

Learning Outcomes:

At the end of the unit, students will be able to:

Investigate different Cloud applications. (L4)

Design cloud applications using Python. (L6)

Course Outcomes:

Upon completion of the course, the students should be able to:

- Outline the procedure for Cloud deployment (L2)
- Distinguish different cloud service models and deployment models (L4)
- Compare different cloud services. (L5)
- Design applications for an organization which use cloud environment. (L6)

Textbooks:

1. Arshadeep Bhaga, Vijay Madisetti, "Cloud Computing A Hands-on Approach", Universities Press, 2018.

References:

1. Chris Hay, Brian Prince, "Azure in Action" Manning Publications [ISBN:9781935182481], 2010.
2. Henry Li, "Introducing Windows Azure" Apress; 1st edition [ISBN:978-14302-2469-3], 2009.

SRI VENKATESWARA COLLEGE OF ENGINEERING (AUTONOMOUS)

**LTPC
3003**

B.TechVI Sem

(AM20APE602) COMPUTER APPLICATIONS USING PROGRAMMING TOOLS Professional Elective-II

CourseObjectives:

- Able to know about “The necessity of Software & their applications in Food Industries”
- Able to Implement the Programs in ‘C’ to perform various operations that are related to Food Industries.

UNIT – I

Computerization, Importance of Computerization in food industry and IT applications in food industries. Computer operating environments and information system for various types of food industries. Introduction to Bar charts and Pie charts & the procedure to develop bar charts and pie charts on given Data.

Learning Outcomes:

At the end of unit, students will be able to understand the following

- Computerization, Importance of Computerization in food industry and IT applications in food industries.
- Computer operating environments and information system for various types of food industries.
- Introduction to Barcharts and Piecharts & the procedure to develop barcharts and piecharts on given Data.

UNIT – II

Introduction to Software & Programming Languages, Properties, Differences of an Algorithm and Flowcharts, Advantages and disadvantages of Flowcharts & Algorithms. Introduction, Fundamentals & advantages of 'C'. Steps in learning 'C' (Character set, Identifiers, Keywords) Steps in learning 'C' (Data types, Constants, Variables, Escape sequences).

Learning Outcomes:

At the end of unit, students will be able to understand the following

- Introduction to Software & Programming Languages, Properties, Differences of an Algorithm and Flowcharts
- Advantages and disadvantages of Flowcharts & Algorithms. Introduction, Fundamentals & advantages of 'C'.
- Steps in learning 'C' (Character set, Identifiers, Keywords)
- Steps in learning 'C' (Data types, Constants, Variables, Escape sequences).

UNIT – III

Steps in learning 'C' (Operators, Statements) Steps in learning 'C' (Header Files, Input & Output functions: Formatted I/O functions, Unformatted I/O functions). Basic Structure of a simple 'C' program. Decision Making/Control Statements. Branching, Concept of Looping & Looping statements.

Learning Outcomes:

At the end of unit, students will be able to understand the following

- Steps in learning 'C' (Operators, Statements)
- Steps in learning 'C' (Header Files, Input & Output functions: Formatted I/O functions, Unformatted I/O functions).
- Basic Structure of a simple 'C' program. Decision Making/Control Statements.
- Branching, Concept of Looping & Looping statements.

UNIT – IV

Concept of Functions (Defining a function & Function Prototypes, Types of functions: Library functions & User defined functions. Concept of various types of User Defined Functions (i.e., About 4 types). Concept of Arrays & Types of Arrays (Single, Double and Multi-Dimensional Arrays). Concept of a String Library Functions.

Learning Outcomes:

At the end of unit, students will be able to understand the following

- Concept of Functions (Defining a function & Function Prototypes, Types of functions: Library functions & User defined functions.
- Concept of various types of User Defined Functions (i.e., About 4 types).
- Concept of Arrays & Types of Arrays (Single, Double and Multi-Dimensional Arrays).
- Concept of a String Library Functions.

UNIT – V

Concept of Pointers, Structures & Unions. Introduction to Data Structures, Types of

Data Structures (Primary & Secondary Data Structures) Concept of Linked Lists, Types of Linked Lists & Basic operations on linked Lists. Concept of Stacks & Operations on Stacks (PUSH & POP Operations) Concept of Queues and types of Queues Operations on a Queue (ENQUEUE & DEQUEUE Operations)

Learning Outcomes:

At the end of unit, students will be able to understand the following

- Concept of Pointers, Structures & Unions. Introduction to Data Structures, Types of Data Structures (Primary & Secondary Data Structures)
- Concept of Linked Lists, Types of Linked Lists & Basic operations on linked Lists.
- Concept of Stacks & Operations on Stacks (PUSH & POP Operations)
- Concept of Queues and types of Queues Operations on a Queue (ENQUEUE & Dequeue Operations)

Course Outcomes:

By the end of the course, the students will be able to:

- know about the various steps which are related to computer and Software and their application in Food Industries
- know about the various steps which are necessary to implement the programs in 'C'

TEXT BOOKS

1. Yeswanth Kanethkar, Let us 'C'
2. Balaguruswamy E., "Computer Programming in 'C'"
3. Mark Allen Waise, "Data Structures"

REFERENCES

1. M. S. Excel 2000, Microsoft Corporation
2. M. S. Office – Microsoft Corporation
3. Verton M. V. "Computer concepts for Agri Business", AVIPub. Corp., West Port, USA.

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B.TechVI Sem

**(AM20APE603)SOFTWARE PROJECT MANAGEMENT
Professional Elective -II**

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Course Objectives:

The course should enable the student

- Teach the specific roles within a software organization as related to project and processmanagement.
- Describe the principles, techniques, methods & tools for model-based management ofsoftware projects, assurance of product quality and process adherence (quality assurance),as well as experience-based creation & improvement of models (process management).

- Introduce the basic infrastructure competences (e.g., process modelling and measurement).
- Explain the basic steps of project planning, project management, quality assurance, and process management and their relationships.

UNIT I

Conventional Software Management: The waterfall model, conventional software Management performance. Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

Learning Outcomes:

At the end of the Unit, student should be able to:

- Understand basic steps to build software. (L2).
- Estimate the cost of software by using cost estimation models (L5).
- Compute the size of software by using SLOC and function points (L3).

UNIT II

Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections. The old way and the new: The principles of conventional software engineering, principles of modern software management, transitioning to an iterative process.

Learning Outcomes:

At the end of the Unit, student should be able to:

- Analyze software estimation and to reduce the size of software (L4).
- Illustrate the principles for improving the team effectiveness (L2).
- Estimate costs and schedules, and overall productivity using a smaller team (L5).
- Choose the practices for conventional software engineering (L1).
- Understand Principles of modern software management (L2).

UNIT III

Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases.

Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts. Model based software architectures: A Management perspective and technical perspective.

Learning Outcomes:

At the end of the Unit, student should be able to:

- Select life cycle model based on requirements, users (L3).
- Can organized is tint sets of artifacts (L3).
- Develop and justify the artifacts for the product (L6).

UNIT IV

Work Flows of the process: Software process workflows, Inter Trans workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic status assessments. Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Interaction planning process, Pragmatic planning. Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations. Process Automation: Automation Building Blocks, the Project Environment

Learning Outcomes:

At the end of the Unit, student should be able to:

- Organize the hierarchy for work breakdown structures (L3).
- Select general guidelines for iterations in planning process (L3).
- Discuss default roles in software line of business organization (L6).
- Identify discrete states for project environment artifacts (L3).

UNIT V

Project Control and Process instrumentation: The server care Metrics, Management indicators, quality indicators, life cycle expectations pragmatic Software Metrics, Metrics automation.

Tailoring the Process: Process discriminates, Example. Future Software Project Management: Modern Project Profiles Next generation Software economics, modern Process transitions.

Case Study: The Command Center Processing and Display System-Replacement (CCPDS-R)

Learning Outcomes:

At the end of the Unit, student should be able to:

- Determine quality of software products using software metrics (L4).
- Measure change traffic over time (L5).
- Apply software economics for modern projects (L3).

- Analyze the command center processing (L4).

Course Outcomes:

At the end of the course students will be able to:

- Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project. (L1)
- Compare and differentiate organization structures and project structures. (L4)
- Implement a project to manage project schedule, expenses and resources with the application of suitable project management tools. (L3)
- Design software projects (L6)

Text Books:

1. Software Project Management, Walker Royce, Pearson Education.
2. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, Tata Mc-Graw Hill.

Reference Books:

1. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006.
2. Head First PMP, Jennifer Greene & Andrew Stellman, O'Reilly, 2007.
3. Software Engineering Project Management, Richard H. Thayer & Edward Yourdon, Second edition, Wiley India, 2004.
4. Agile Project Management, Jim Highsmith, Pearson education, 2004.
5. The art of Project management, Scott Berkun, O'Reilly, 2005.
6. Software Project Management in Practice, Pankaj Jalote, Pearson Education, 2002

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B.Tech- VI Sem

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(ME20AOE501) INTRODUCTION TO 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

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(EE20AOE503) RENEWABLE ENERGY RESOURCES (OPEN ELECTIVE)

Course Objectives:

4. Familiarize with basics of solar radiation, available solar energy and its measurement & Familiarize with solar collectors, construction and operation of solar collectors.
5. Understand solar energy conversion systems, applications and power generation & Familiarize the wind energy sources assessment
 - To explain concept of various forms of renewable energy
6. To outline division aspects and utilization of renewable energy sources for both domestics and industrial applications
7. To analyse the environmental and cost economics of using renewable energy sources compared to fossil fuels

Unit -1:

Principles of Solar Radiation : Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on tilted surface, instruments for measuring solar radiation and sun shine, solar radiation data.

Unit -2:

Solar Energy Collection & Storage :

Solar Energy Collection: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

Solar Energy Storage and Applications :

Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications solar heating technique, solar distillation and drying, photovoltaic energy conversion

Unit -3:

Wind Energy & Bio-Mass :

Wind Energy : Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

Bio-Mass : Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C. Engine operation and economic aspects.

Unit -4:

Geothermal Energy & Ocean Energy:

Geothermal Energy : Resources, types of wells, methods of harnessing the energy, potential in India.

Ocean Energy : OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

Unit -5:

Direct Energy Conversion:

Direct Energy Conversion: Need for DEC, Carnot cycle, limitations, principles of DEC. Thermo-electric generators, Seebeck, Peltier and Joule Thomson effects, Figure of merit, materials, applications, MHD generators, principles, dissociation and ionization, hall effect, magnetic flux, MHD accelerator, MHD Engine, power generation systems, electron gas dynamic conversion, economic aspects. Fuel cells, principles, faraday's law's, thermodynamic aspects, selection of fuels and operating conditions.

Text Books:

1. Tiwari and Ghosal, Renewable energy resources, Narosa Publishing House-2004.
2. G.D. Rai, Non-Conventional Energy Sources, Khanna Publications-1988.

Reference Books:

1. Twidell & Weir, Renewable Energy Sources, Routledge; 3-e, 2015.
2. Sukhatme S.P.,. Nayak.J.P, 'Solar Energy – Principle of Thermal Storage and collection", Tata McGraw Hill, 2008.

3. Sathyajith Mathew, Wind Energy Fundamentals, Resource Analysis and Economics, Springer Publications, (2006).
4. Wei Tong, Wind Power Generation and Wind Turbine Design, WIT Press, (2010.)
5. Wind Power, Revised Edition: Renewable Energy for Home, Farm, and Business, Paul Gipe, 2004, Chelsea Green Publishing

Course Outcomes:

At the end of the course, the student will be able to

CO1: Explain the basic concepts of solar radiation and solar collectors

CO2: Develop the Bio - Energy Concepts

CO3: Explain the geothermal Energy ,Tidal and Wave Energy

CO4: Apply the principles of electrical technology to develop MHD power generator & Utilize different wind parameters for design of rotor

CO5: Make use of power curve for energy estimation and fuel cell Technology

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B. Tech- VI SemL T P C

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(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.

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B.Tech-VI Sem

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(CE20AOE603) Water Resources Planning & Management

CourseObjectives:

This course

- Demonstrates Principles of Watershed Management
- Explains River basin Watershed Management Practices
- Imparts knowledge on conservation of water and its reuses
- Teaches the sustainable watershed approach
- Inculcates the knowledge of rainwater harvesting and GIS applications.

UNIT –I

Principles of Watershed Management: Basics concepts, Hydrology and water availability, Surface water, Groundwater, Conjunctive use, Human influences in the water resources system, Water demand, Integrated water resources system.

UNIT – II

River basin Watershed Management Practices in Arid and Semi-arid Regions, Watershed management through wells, Management of water supply - Case studies.

UNIT – III

Conservation of Water: Perspective on recycle and reuse, Waste water reclamation
Social Aspects of Watershed Management: Community participation, Private sector participation, Institutional issues, Socio-economy, Integrated development, Water legislation and implementations.

UNIT –IV

Sustainable Watershed Approach: Sustainable integrated watershed management, natural resources management, agricultural practices, integrated farming, Soil erosion and conservation.

UNIT – V

Water Harvesting: Rainwater management - conservation, storage and effective utilization of rainwater, Structures for rainwater harvesting, roof catchment system, check dams, Geographical Information System and Remote Sensing in Watershed Management.

CourseOutcomes (CO):

At the end of this course, the students will be able to:

- Know the basic principles of watershed management.
- Know the river basin management practices
- Understand better different approaches for conservation of water.
- Identify sustainable watershed approach for resources management, prevention of soil erosion etc.,
- Different methods of rainwater harvesting management systems and role of GIS.

Textbooks:

1. Murthy, J.V.S., "Watershed Management in India", Wiley Eastern, New Delhi, 1994.

Reference Books:

1. Murty, J.V.S., "Watershed Management", New Age Intl., New Delhi 1998.
2. Allam, G.I.Y., "Decision Support System for Integrated Watershed Management", Colorado State University, 1994.
3. Vir Singh, R., "Watershed Planning and Management", Yash Publishing House, Bikaner, 2000.
4. American Society of Civil Engineers, Watershed Management, American Soc. of Civil Engineers, New York, 1975

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B.TechVI Sem

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(AM20APC602)BIG DATA ANALYTICS LAB

COURSE OBJECTIVES

The course should enable the students to:

- Optimize business decisions and create competitive advantage with Big data analytics
 - Practice java concepts required for developing map reduce programs.
 - Impart the architectural concepts of Hadoop and introducing map reduce paradigm.
 - Practice programming tools PIG and HIVE in Hadoop eco system.
 - Implement best practices for Hadoop development.
1. Perform setting up and Installing Hadoop in its three operating modes. i. Standalone. ii. Pseudo distributed. iii. Fully distributed. b. Use web based tools to monitor your Hadoop setup.
 2. To Understand Overall programming architecture of MapReduce API. Implement MapReduce Programming
 3. To implement the following file management tasks in Hadoop: i. Adding files and directories ii. Retrieving files iii. Deleting files Hint: A typical Hadoop workflow creates data files (such as log files) elsewhere and copies them into HDFS using one of the above command line utilities.
 4. Store the basic information about students such as roll no. and name using various collection types Map.
 5. Implement matrix multiplication with Hadoop Map Reduce
 6. To run a Grep program on Hadoop to understand MapReduce Paradigm: To count words in a given file, To view the output file, and To calculate execution time.
 7. Installation of SPARK framework with or without Hadoop framework.
 8. To study about the Hive commands using HQL (DDL and DML).

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B.Tech III-II Sem

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(AM20APC604) MACHINE LEARNING LAB

Course Outcomes:

- Understand the mathematical and statistical prospectives of machine learning algorithms through python programming.
 - Design and evaluate the unsupervised models through python in built functions.
 - Evaluate the machine learning models pre-processed through various feature engineering algorithms by python programming.
 - Design and apply various reinforcement algorithms to solve real time complex problems.
-
1. Basic exercises on Python Machine Learning Packages such as Numpy, Pandas and matplotlib.
 2. Given a dataset. Write a program to compute the Covariance, Correlation between a pair of attributes. Extend the program to compute the Covariance Matrix and Correlation Matrix.
 3. Given a set of sample points in N dimensional feature space. Write a program to fit the points with a hyper plane using Linear Regression. Calculate sum of residual error.
 4. Write a program that provides option to compute different distance measures between two points in the N dimensional feature space. Consider some sample datasets for computing distances among sample points.
 5. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
 6. Write a program to implement k-Nearest Neighbor algorithm to classify the iris data set. Print both correct and wrong predictions. Python ML library classes can be used for this problem.
 7. Write a program to implement feature reduction using Principle Component Analysis

8. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
9. Given a dataset for classification task. Write a program to implement Support Vector Machine and estimate its test performance.
10. Write a program to implement perceptrons for different learning tasks.
11. Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.
12. Write a program to implement K means clustering algorithm. Select your own dataset to test the program. Demonstrate the nature of output with varying value of K.

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(AM20APC606) NATURAL LANGUAGE PROCESSING LAB

Course Objectives:

- To Develop algorithm for Semantics and Sentiment analysis using NLP.
- Train the students and researchers from basics to advanced NLP tools and techniques.
- To develop an Research ambience for product development and patenting.
- To transfer the novel technology to the industries for the benefit of society.
- Organize open scientific and technological competitions in the field of natural language processing.

1. Preprocessing of text (Tokenization, Filtration, Script Validation, StopWord Removal, Stemming)
2. Morphological Analysis
3. N-gram model
4. POS tagging
5. Chunking
6. Named Entity Recognition
7. Case Study based on Information Retrieval.
8. Virtual Lab on N-gram

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(AM20ASC601) FULL STACK DEVELOPMENT-I (Skill Oriented Course)

Course Outcomes:

At the end of the course, student will be

- Study and Implement WebPages using Basic and Advanced HTML.
 - Differentiate between functionalities of Basic CSS and Advanced CSS.
 - Implement basic JavaScript.
 - Design Webpages using Ajax, jQuery, PHP, PHP Advanced.
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1. Explore Basic HTML Tags and Elements.
 2. Familiarize with JS, and CSS, Animation using sample webpage.
 3. Design a Webpage using advance HTML Form tags input-date, time, number, email, HTML5 Header And Footer, spell check and editable areas
 4. Design a Webpage Demonstrating Drag and Drop Functionality.
 5. Implement program demonstrating Local Storage and session storage.
 6. Design a Webpage using Basic CSS Tags. Demonstrate Inline, Internal and External Style sheets using advanced CSS.
 7. Design signup form to validate username, password, and phone numbers etc using Java script. Write a program to demonstrate Event Handling using JavaScript.(Minimum 3Events)
 8. Design a Form using HTML and CSS and accept the data from it and insert it into Database using PHP.
 9. Create a form with a text box asking to enter your favorite city with a submit button when the user enters the city and clicks the submit button another PHP page should be opened displaying "Welcome to the city".
 10. Change a Content of webpage using AJAX. Perform Different Operations using JQUERY Selectors.

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(BA20AMC502)INTELLECTUAL PROPERTY RIGHTS

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 Copyright – Rights Afforded by Copyright Law – Copyright Ownership – Transfer and Duration – Right to Prepare Derivative Works – Rights of Distribution – Rights of performers – Copyright 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.

Textbooks:

1. Deborah E. Bouchoux: "Intellectual Property". Cengage learning, New Delhi
2. Kompal Bansal & Parishit Bansal "Fundamentals of IPR for Engineers", BS Publications (Press)
3. Cyber Law. Texts & Cases, South-Western's Special Topics Collections

References:

1. Prabhuddha Ganguli: "Intellectual Property Rights" Tata Mc-Graw – Hill, New Delhi
2. Richard Stim: "Intellectual Property", Cengage Learning, New Delhi.
3. R. Radha Krishnan, S. Balasubramanian: "Intellectual Property Rights", Excel Books. New Delhi.

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B.Tech VI Sem

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(AM20AMC601)AI TOOLS TECHNIQUES & APPLICATIONS

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 Visualization Line 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)

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.

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

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(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

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..

Course Outcomes (CO):

- Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of HCF, LCM Factors and Simplification.
- Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of Pipes, Alligation or Mixture.
- Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of Table, Bar Graphs and Pie Chart.
- Analyze the techniques in Syllogism.
- Analyze the techniques in Calendar, Clocks and Number Series Analogy concepts.

Textbooks:

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, AbhijitGuha, 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.

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B.Tech –VISem

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(BA20AMC502)INTELLECTUAL PROPERTY RIGHTS

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

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UNIT III

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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.

Textbooks:

4. Deborah E. Bouchoux: "Intellectual Property". Cengage learning, New Delhi
5. Kompal Bansal & Parishit Bansal "Fundamentals of IPR for Engineers", BS Publications (Press)
6. Cyber Law. Texts & Cases, South-Western's Special Topics Collections

References:

4. Prabhuddha Ganguli: "Intellectual Property Rights" Tata Mc-Graw – Hill, New Delhi
5. Richard Stim: "Intellectual Property", Cengage Learning, New Delhi.
6. R. Radha Krishnan, S. Balasubramanian: "Intellectual Property Rights", Excel Books. New Delhi.

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BTech VII Sem

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(AM20APE701) Intelligent Information Retrieval System

Course Objectives:

- Demonstrate genesis and diversity of information retrieval situations for text and hyper media
- Describe hands-on experience store, and retrieve information from www using semantic approach
- Analyze the performance of information retrieval using advanced techniques such as classification, clustering, and filtering over multimedia

Unit I

Introduction – Goals and History of IR – The Impact of the Web on IR – The Role of Artificial Intelligence (AI) in IR – Basic IR Models – Boolean and Vector Space Retrieval Models -Ranked Retrieval – Text similarity metrics – TF-IDF (term frequency/inverse document frequency) Weighting – Cosine Similarity.

Unit II

Metrics

Experimental Evaluation of IR – Performance metrics Recall, Precision and F measure – Evaluations on Benchmark Text Collections, Query Expansion

UNIT-III

Text Representation – Word Statistics – Zipf's Law – Porter Stemmer – Morphology – Index Term Selection using Thesauri -Metadata and Markup Languages – Web Search Engines – Spidering – Metacrawlers – Directed Spidering – Link Analysis Shopping Agents.

UNIT-IV

Text Categorization- Rocchio, nearest neighbor, and naive Bayes. Applications to information filtering and organization. Using naive Bayes text classification for ad hoc retrieval. Improved smoothing for document retrieval.

UNIT-V

Text Clustering-Clustering algorithms: agglomerative clustering; k-means; expectation maximization (EM). Applications to web search and information organization.

Course Outcomes:

By the end of this course the student should:

- Understand the theoretical basis behind the standard models of IR.
- Understand the Experimental evaluation of IR.
- To be able to implement ,Text Representation.
- To be able to implement Text Categorization.
- To be Familiar with clustering algorithms.

Text books:

- 1 David A. Grossman, Ophir Frieder, Information Retrieval – Algorithms and Heuristics, Springer, 2nd Edition(Distributed by Universal Press), 2004
- 2.Introduction to information retrieval by Christopher Manning,Prabhakar,Raghavan and Hinrich Schutze, Cambridge University Press,2009
- 3.. Richard K. Belew, "Finding Out About: A Cognitive Perspective on Search Engine Technology and the WWW", Cambridge University Press, 2001.

Reference Books:

- 1.Gerald J Kowalski, Mark T Maybury Information Storage and Retrieval Systems: Theory and Implementation, Springer, 2004.
2. SoumenChakrabarti, Mining the Web : Discovering Knowledge from Hypertext Data, Morgan – Kaufmann Publishers, 2002.
3. Christopher D Manning, PrabhakarRaghavan, HinrichSchutze, An Introduction to Information Retrieval By Cambridge University Press, England, 2009.
4. C. J. van Rijsbergen , "Information Retrieval".

SRI VENKATESWARA COLLEGE OF ENGINEERING
(Autonomous)

(AM20APE702) INTERNET OF THINGS**Course objectives:**

- Understand the basics of Internet of Things and protocols.
- Discuss the requirement of IOT technology
- Introduce some of the application areas where IOT can be applied.
- Understand the vision of IOT from a global perspective, understand its applications, determine its market perspective using gateways, devices and data management

UNIT - I:**Introduction to IOT**

Definition and Characteristics of IOT, physical design of IOT, IOT protocols, IOT communication models, IOT Communication APIs, Communication protocols, Embedded Systems, IOT Levels and Templates.

Learning Outcomes:

At the end of the unit, students will be able to:

UNIT - II:

Prototyping IOT Objects using Microprocessor/Microcontroller Working principles of sensors and actuators, setting up the board-Programming for IOT, Reading from Sensors, Communication: communication through Bluetooth, Wi-Fi.

Learning Outcomes:

At the end of the unit, students will be able to:

UNIT - III:**IOT Architecture and Protocols**

Architecture Reference Model- Introduction, Reference Model and architecture, IOT reference Model, Protocols-6Low PAN, RPL, COAP, MQTT, IOT frame works-Thing Speak.

Learning Outcomes:

At the end of the unit, students will be able to:

UNIT - IV:**Device Discovery and Cloud Services for IOT**

Device discovery capabilities- Registering a device, Deregister a device, Introduction to Cloud Storage models and communication APIs Web-Server, Web server for IOT.

Learning Outcomes:

At the end of the unit, students will be able to:

UNIT V:**UAV IOT**

Introduction to Unmanned Aerial Vehicles/Drones, Drone Types, Applications: Defense, Civil, Environmental Monitoring; UAV elements and sensors- Arms, motors, Electronic Speed Controller (ESC), GPS, IMU, Ultra sonic sensors; UAV Software –Arudpilot, Mission Planner, Internet of Drones(IOD)- Case study Flyt Base.

Learning Outcomes:

At the end of the unit, students will be able to:

Course Outcomes:

After completion of the course, students will be able to

- Understand general concepts of Internet of Things.
- Apply design concept to IOT solutions
- Analyze various M2M and IoT architectures
- Evaluate design issues in IOT applications
- Create IOT solutions using sensors, actuators and Devices

Textbooks:

1. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on- Approach)", 1st Edition, VPT, 2014.
2. Handbook of unmanned aerial vehicles, K Valavanis; George J Vachtsevanos, New York, Springer, Boston, Massachusetts: Credo

Reference, 2016.

ReferenceBooks:

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.
2. Arshdeep Bahga, Vijay Madisetti - Internet of Things: A Hands-On Approach, Universities JNTUAB.Tech.R20 Regulations Press, 2014.
3. The Internet of Things, Enabling technologies and use cases – Pethuru Raj, Anupama C. Raman, CRC Press.
4. Francis da Costa, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013
5. Cuno Pfister, Getting Started with the Internet of Things, O' Reilly Media, 2011, ISBN:978-1-4493-9357-1
6. DGCARPAS Guidance Manual, Revision 3–2020
7. Building Your Own Drones: A Beginners' Guide to Drones, UAVs, and ROVs, John Baichtal Online Learning Resources:
 1. <https://www.arduino.cc/>
 2. <https://www.raspberrypi.org/>
 3. <https://nptel.ac.in/courses/106105166/5>
<https://nptel.ac.in/courses/108108098/4>

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech IV-I Sem

L	T	P	C
3	0	0	3

(AM20APE703) RECOMMENDER SYSTEMS

Course Objectives:

- Understand the basic concepts of recommender systems

- Solve mathematical optimization problems pertain to recommender systems
- Carry out performance evaluation of recommender systems based on various metrics
- Implement machine-learning and data-mining algorithms in recommender systems data sets.
- Design and implement a simple recommender system.
- Learn about advanced topics and current applications of recommender systems in other real time applications such as mobile computing.

Unit-I:

Introduction: Recommender system functions, Linear Algebra notation: Matrix addition, Multiplication, transposition, and inverses; covariance matrices, Understanding ratings, Applications of recommendation systems, Issues with recommender system.

Learning Outcomes:

At the end of the unit, students will be able to:

Unit-II

Collaborative Filtering: User-based nearest neighbor recommendation, Item-based nearest neighbor recommendation, Model based and pre-processing based approaches, Attacks on collaborative recommender systems.

Learning Outcomes:

At the end of the unit, students will be able to:

Unit-III

Content-based recommendation: High level architecture of content-based systems, Advantages and drawbacks of content based filtering, Item profiles, Discovering features of documents, Obtaining item features from tags, Representing item profiles, Methods for learning user profiles, Similarity based retrieval, Classification algorithms.

Learning Outcomes:

At the end of the unit, students will be able to:

Unit-IV

Knowledge based recommendation: Knowledge representation and reasoning, Constraint based recommenders, Case based recommenders. Hybrid approaches: Opportunities for hybridization, Monolithic hybridization design: Feature combination, Feature augmentation, Parallelized hybridization design: Weighted, Switching, Mixed, Pipelined hybridization design: Cascade Meta-level, Limitations of hybridization strategies. Evaluating Recommender System: Introduction, General properties of evaluation research, Evaluation designs, Evaluation on historical datasets, Error metrics, Decision-Support metrics, User-Centered metrics.

Learning Outcomes:

At the end of the unit, students will be able to:

Unit-V

Recommender Systems and communities: Communities, collaboration and recommender systems in personalized web search, Social tagging recommender systems, Trust and recommendations, Group recommender systems.

Learning Outcomes:

At the end of the unit, students will be able to:

Course Outcomes:

Recommended Books:

1. Jannach D., Zanker M. and FelFering A., Recommender Systems: An Introduction, Cambridge University Press(2011), 1st ed.
2. Ricci F., Rokach L., Shapira D., Kantor B.P., Recommender Systems Handbook, Springer(2011), 1st ed.
3. Manouselis N., Drachsler H., Verbert K., Duval E., Recommender Systems For Learning, Springer (2013), 1st ed.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech IV-I Sem

L	T	P	C
3	0	0	3

(AM20APE704) BLOCK CHAIN TECHNOLOGY Professional Elective -IV

Course Objectives:

Understand the philosophy of Block chain and the cutting edge technology behind its functions Illustrate how to setup Ethereum tools Explain the key vocabulary and concepts used in Block chain for Business

UNIT-I

Block chain concepts: Block chain, Block chain application example: Escrow, Block chain stack, from web 2.0 to the next generation decentralized web, domain specific Block chain application, Block chain benefits and challenges.

Block chain application templates: Block chain application components, design methodology for Block chain applications, Block chain applications templates

Learning Outcomes:

After completing this Unit, students will be able to

- Outline the benefits and challenges of Block chain (L2)
- Design the Block chain applications (L6)

UNIT-II

Setting up Ethereum development tools: Ethereum clients, Ethereum languages, Test RPC, Mist Ethereum wallet, meta mask, web3 JavaScript API, truffle.

Ethereum Accounts: Ethereum Accounts, keypairs, working with EOA Accounts, working with contract accounts.

Learning Outcomes:

After completing this Unit, students will be able to

- Illustrate the use of Ethereum development tools(L2)
- Create Ethereum accounts and work with them (L6)

UNIT-III

Smart contracts: Smart contract, structure of a contract, setting up and interacting with a contract using Get client, setting up and interacting with a contract using Mist Wallet

Learning Outcomes:

After completing this Unit, students will be able to

- Make use of smart contracts(L3)
- Distinguish setting up and interacting with a contract using Get a client and Mist Wallet.(L4)

UNIT-IV

Smart contracts (continued): Smart contract examples, Smart contract patterns.

Decentralized Applications: implementing Dapps, case studies,

Learning Outcomes:

After completing this Unit, students will be able to

- Illustrate the Smart contract examples and patterns(L2)
- Develop Decentralized applications.(L6)

UNIT-V

Mining:Consensus on Block chain network, mining, Block validation, state storage in Ethereum.

Learning Outcomes:

After completing this Unit, students will be able to

- Define Consensus on Block chain network(L1)
- Demonstrate State Storage in Ethereum(L2)

Course outcomes:

Upon completion of the course, the students should be able to:

- Create customized blockchain solutions (L6)
- Make use of the specific mechanics of Ethereum(L3)
- Experiment with Smart contracts (L3)
- Develop Enterprise applications using Blockchain(L6)

Text book:

1. Arshadeepbahga, Vijay madiseti, "Blockchain Applications A hands-on approach", VPT2017.

2. *Chandramouli Subramanian*, Asha A George, Abhilash K A and Meena Karthikeyan,
"Blockchain Technology", Universty Press, 2021

REFERENCE BOOKS:

1."The Basics of Bitcoins and Blockchains" An Introduction to Cryptocurrencies and the Technology that Powers Them, Antony Levis.

2.The Blockchain Developer: A Practical Guide for Designing, Implementing, Publishing, Testing, and Securing Distributed Blockchain-based Projects 1st ed. Edition

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B.Tech IV-I Sem

L	T	P	C
3	0	0	3

(AM20APE705)Data Visualization

Professional Elective -IV

Course Objectives:

1. Provide background to understand various aspects of Data Visualization
2. Discuss various principles of visualizing heterogeneous types of data

Unit-I

Visual Queries: Process of Seeing, the Act of Perception, Design Implications, Distributed Cognition, Visual Search Strategies

Data and Visualization: Data Type, Coordinate Systems, Scale

Learning Outcomes:

At the end of the unit, students will be able to:

Unit-II

Visualization Design: Amount, Distribution, Proportion, Trends, Time Series, Geospatial Narratives: Telling Stories with Data, Sequencing, Visualization Rhetoric, text visualization

Learning Outcomes:

At the end of the unit, students will be able to:

Unit-III

Mapping and Cartography: The Cartogram, Value-by-Area mapping
Optimal Space Usage: Aspect Ratio Selection, Geometry & Aesthetics, Wilkinson's Algorithm and its extension

Learning Outcomes:

At the end of the unit, students will be able to:

Unit-IV

Networks: Scalable, Versatile and Simple Constrained Graph Layout, Visualization of Adjacency, Multiple Network Analysis and Visualization, Visualizing Online Social Networks

Learning Outcomes:

At the end of the unit, students will be able to:

Unit-V

Animation and Color: Trend Visualization, Transitions in Statistical Data Graphics, Graphs with Radial Layout, Cartoons, Color and Information, Info graphics

Learning Outcomes:

At the end of the unit, students will be able to:

Course Outcomes

The students are expected to have the ability to:

1. Present data with visual representations for the target audience, task, and data
2. Analyze, critique, and revise data visualizations
3. Apply appropriate design principles in the creation of presentations and visualizations

Textbook

1. Tufte, E., (2001), The Visual Display of Quantitative Information, 2nd Edition, Graphics Press
2. Tufte, E., (1990), Envisioning Information, Graphics Press

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B.Tech IV-I Sem

L	T	P	C
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(AM20APE706) ETHICAL HACKING Professional Elective -IV

Course Objectives:

- The aim of the course is to introduce the methodologies and framework of ethical hacking for enhancing the security.
- The course includes-Impacts of Hacking; Types of Hackers; Information Security Models; Information Security Program; Business Perspective; Planning a Controlled Attack; Framework of Steps (Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation, Deliverable and Integration)

UNIT – I :

Introduction:Hacking Impacts, The Hacker Framework: Planning the test, Sound Operations, Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation, Final Analysis, Deliverable, Integration Information Security Models: Computer Security, Network Security, Service Security, Application Security, Security Architecture Information Security Program: The Process of Information Security, Component Parts of Information Security Program, Risk Analysis and Ethical Hacking

Learning Outcomes:

At the end of the unit, students will be able to:

UNIT – II :

The Business Perspective:Business Objectives, Security Policy, Previous Test Results, Business Challenges Planning for a Controlled Attack: Inherent Limitations, Imposed Limitations, Timing is Everything, Attack Type, Source Point, Required Knowledge, Multi-Phased Attacks, Teaming and Attack Structure, Engagement Planner, The Right Security Consultant, The Tester, Logistics, Intermediates, Law Enforcement.

Learning Outcomes:

At the end of the unit, students will be able to:

UNIT – III :

Preparing for a Hack: Technical Preparation, Managing the Engagement Reconnaissance: Social Engineering, Physical Security, Internet Reconnaissance

Learning Outcomes:

At the end of the unit, students will be able to:

UNIT – IV :

Enumeration: Enumeration Techniques, Soft Objective, Looking Around or Attack, Elements of Enumeration, Preparing for the Next Phase Exploitation: Intuitive Testing, Evasion, Threads and Groups, Operating Systems, Password Crackers, RootKits, applications, Wardialing, Network, Services and Areas of Concern

Learning Outcomes:

At the end of the unit, students will be able to:

UNIT -V :

Deliverable: The Deliverable, The Document, Overall Structure, Aligning Findings, Presentation Integration: Integrating the Results, Integration Summary, Mitigation, Defense Planning, Incident Management, Security Policy, Conclusion

Learning Outcomes:

At the end of the unit, students will be able to:

Course Outcomes:

- Gain the knowledge of the use and availability of tools to support an ethical hack
- Gain the knowledge of interpreting the results of a controlled attack
- Understand the role of politics, inherent and imposed limitations and metrics for planning of a test
- Comprehend the dangers associated with penetration testing

TEXT BOOK

- James S. Tiller, "The Ethical Hack: A Framework for Business Value Penetration Testing", Auerbach Publications, CRC Press

REFERENCE BOOKS

- EC-Council, "Ethical Hacking and Countermeasures Attack Phases", Cengage Learning
- Michael Simpson, Kent Backman, James Corley, "Hands-On Ethical Hacking and Network Defense", Cengage Learning

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B.Tech IV-I Sem

L	T	P	C
3	0	0	3

(AM20APE707) AGILE METHODOLOGIES Professional Elective-V

This course is designed to:

- Master the art of agile development.
- Understand how an iterative, incremental development process
Leads to faster delivery of more useful software.
- Elucidate the essence of agile development methods
- Explain the principles and practices of extreme programming

UNIT - I:

Why Agile? , How to be Agile, Understanding XP, Values and Principles,
Improve the Process, Eliminate Waste, Deliver Value.

Learning Outcomes:

After completing this Unit, students will be able to

- Appraise the importance of Agile and the philosophy
behind being Agile(L5)
- Interpret the questions that helps to eliminate waste from
the process and increase ones agility(L2)

UNIT - II:

Practicing XP- honking, Pair Programming, Energized Work, Informative
Workspace, Root Cause Analysis, Retrospectives, Collaborating, Sit Together,
Real Customer Involvement, Ubiquitous Language, Stand-
Up Meetings, Coding Standards, Iteration Demo, Reporting.

Learning Outcomes:

After completing this Unit, students will be able to

- Apply practices to excel as mindful developers(L3)
- Illustrate the eight practices to help a team and its stakeholders coll

aborate efficiently and effectively(L2)

UNIT - III:

Releasing-Done Done, No Bugs, Version Control, Ten-Minute Build, Continuous Integration, Collective Code Ownership, Documentation.

Learning Outcomes:

After completing this Unit, students will be able to

- Examine pushing software into production(L4)
- Explain the importance of documentation in ensuring the long-term maintainability of the product at appropriate times.(L2)

UNIT - IV:

Planning-Vision, Release Planning, Risk Management, Iteration Planning, Stories, Estimating.

Learning Outcomes:

After completing this Unit, students will be able to

- List the eight practices that allows to control the chaos of endless possibility (L1)

UNIT - V:

Developing-Incremental Requirements, Customer Tests, Test- Driven Development, Refactoring, Incremental Design and Architecture, Spike Solutions, Performance Optimization.

Learning Outcomes:

After completing this Unit, students will be able to

- Outline the practices that keep the code clean and allow the entire team to contribute to development. (L2)

Course outcomes:

Upon completion of the course, the students should be able to:

- Adopt Extreme Programming(L1)
Create own agile method by customizing XP to a particular situation (L6)

Text Books:

1. James Shore and Shane Warden, "The Art of Agile Development ", O' REILLY, 2007.

References:

1. Robert C. Martin, "Agile Software Development, Principles, Patterns, and Practices", PHI, 2002.
2. Angel Medinilla, "Agile Management: Leadership in an Agile Environment", Springer, 2012.
3. Bhuvan Unhelkar, "The Art of Agile Practice: Composite Approach for Projects and Organizations ", CRC Press.
4. Jim Highsmith, "Agile Project Management ", Pearson education, 2004.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.TechVII Sem

L	T	P	C
3	0	0	3

(AM20APE708) DEEP LEARNING Professional Elective-V

Course Objectives:

This course is designed to:

- Demonstrate the major technology trends driving Deep Learning
- Build, train and apply fully connected deep neural networks
- Implement efficient (vectorized) neural networks
- Analyze the key parameters and hyperparameters in a neural network's architecture

UNIT- I

Linear Algebra: Scalars, Vectors, Matrices and Tensors, Matrix operations, types of matrices, Norms, Eigen decomposition, Singular Value Decomposition, Principal Components Analysis. Probability and Information Theory: Random Variables, Probability Distributions, Marginal Probability, Conditional Probability, Expectation, Variance and Covariance, Bayes' Rule, Information Theory. Numerical Computation: Overflow and Underflow, Gradient-Based Optimization, Constrained Optimization, Linear Least Squares.

Learning Outcomes:

After completing this Unit, students will be able to:

- Understand linear algebra in the deep learning context(L2)
- Utilize probability and information theory in machine /deep learning applications(L3)

UNIT -II

Machine Learning: Basics and Under fitting, Hyper parameters and Validation Sets, Estimators, Bias and Variance, Maximum Likelihood, Bayesian Statistics, Supervised and Unsupervised Learning, Stochastic Gradient Descent, Challenges Motivating Deep Learning. Deep Feed forward Networks: Learning XOR, Gradient-Based Learning ,Hidden Units, Architecture Design, Back-Propagation and other Differentiation Algorithms.

Learning Outcomes:

After completing this Unit, students will be able to:

- Illustrate machine learning basics leads to deep learning(L2)
- Contrast upper and unsupervised learning(L2)

UNIT - III

Regularization for Deep Learning: Parameter Norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under-Constrained Problems, Dataset Augmentation, Noise Robustness, Semi-Supervised Learning, Multi-Task Learning, Early Stopping, Parameter Tying and Parameter Sharing, Sparse Representations, Bagging and Other Ensemble Methods, Dropout, Adversarial Training, Tangent Distance, Tangent Prop and Manifold Tangent Classifier. Optimization for Training **Deep Models:** Pure Optimization, Challenges in Neural Network Optimization, Basic Algorithms, Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates, Approximate Second-Order Methods, Optimization Strategies and Meta-Algorithms.

Learning Outcomes:

After completing this Unit, students will be able to:

- Evaluate Regularization Problems for Deep learning(L5)
- Apply optimization for Training Deep Learning models(L3)

UNIT - IV

Convolutional Networks: The Convolution Operation, Pooling, Convolution, Basic Convolution Functions, Structured Outputs, Data Types, Efficient Convolution Algorithms, Random or Unsupervised Features, Basis for Convolutional Networks.

Learning Outcomes:

After completing this Unit, students will be able to:

- Appraise Basic Convolution Functions(L5)
- Develop Efficient Convolution Algorithms(L3)
-

UNIT - V

Sequence Modeling: Recurrent and Recursive Nets: Unfolding Computational Graphs,

Recurrent Neural Networks, Bidirectional RNNs, Encoder-Decoder Sequence-to-Sequence Architectures, Deep Recurrent Networks, Recursive Neural Networks, Echo State Networks, LSTM, Gated RNNs, Optimization for Long-Term Dependencies, Auto encoders, Deep Generative Models.

Learning Outcomes:

After completing this Unit, students will be able to:

- Illustrate Recurrent and Recursive Neural Networks(L2)
- Apply Auto encoders and Deep Generative Models(L3)

Text Books:

1.Deep Learning (Adaptive Computation and Machine Learning series) by Ian Goodfellow, Yoshua Bengio, Aaron Courville, Francis Bach

Reference Books:

1.Deep Learning for Natural Language Processing: Applications of Deep Neural Networks to Machine Learning Tasks by Pearson Learn IT

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.TechVII Sem

L	T	P	C
3	0	0	3

(AM20APE709) DESIGN PATTERNS

Professional Elective-V

Course Objectives:

1. Understand the concept of Design patterns and its importance .
2. Understand the behavioral knowledge of the problem and solutions.
3. Relate the Creational, Structural , behavioral Design patterns.
4. Apply the suitable design patterns to refine the basic design for given context.

UNIT - I

Introduction: What Is a Design Pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

Learning Outcomes:

At the end of the unit, students will be able to:

- Understand the concepts of Design Patterns(L1).
- Explore the concepts of how design patterns solves the design problems(L2).

UNIT - II

A Case Study: Designing a Document Editor: Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation.

Learning Outcomes:

At the end of the unit, students will be able to:

- Understand Document Structure and Formatting (L1).

UNIT - III

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton.

Learning Outcomes:

At the end of the unit, students will be able to:

- Identify the basic issues in reusable design (L4)
- Recognize the basic design patterns (L2)

UNIT - IV

Structural Patterns: Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy.

Learning Outcomes:

At the end of the unit, students will be able to:

UNIT – V

Behavioral Patterns: Chain of Responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer, Strategy, Template Method, Visitor.

Learning Outcomes:

At the end of the unit, students will be able to:

- Apply structural patterns to solve design problems.
- Construct design solutions by using behavioral patterns

Course Outcomes:

- Identify the appropriate design patterns to solve object oriented design problems(L1).
- Develop design solutions using creational patterns(L3).
- Apply structural patterns to solve design problems (L3).
- Construct design solutions by using behavioral patterns(L4).

Text Books :

1. Design Patterns By Erich Gamma, Pearson Education
2. Design Patterns Explained By Alan Shalloway, Pearson Education..
3. Meta Patterns designed by Wolf gang , Pearson.

References :

1. Head First Design Patterns By Eric Freeman-Oreilly-spd
2. JAVA Enterprise Design Patterns Vol-III By Mark Grand ,Wiley DreamTech.
3. Pattern"s in JAVA Vol-I By Mark Grand ,Wiley DreamTech.
4. Pattern"s in JAVA Vol-II By Mark Grand ,Wiley DreamTech.

(CE20AOE701) Air Pollution and Quality Control

Course Objectives:

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 Pr Inc 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.

(EE20AOE603) OPTIMIZATION TECHNIQUES THROUGH MATLAB
(OPEN ELECTIVE)

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, Fletcher- 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

(ME20AOE602) POWER GENERATION TECHNOLOGIES

Pre-requisite: Thermal Engineering & Basic Mechanical Engineering

Course Objectives:

- Familiarize the sources of energy, power plant economics and environmental aspects.
- Outline the working components of different power plant.
- Explain renewable energy sources; characteristics, working principle, classify types, layouts, and plant operations.
- Impart types of nuclear power plants, and outline working principle and advantages and hazards.

UNIT – 1:

Introduction to the Sources of Energy Resources and Development of Power in India. Layouts of Steam, Hydel, MHD, and Nuclear Power Plants - Selection.

Power Plant Economics and Environmental Considerations: Capital Cost, Investment of Fixed Charges, Operating Costs, General Arrangement of Power Distribution, Definitions of Connected Load, Load Factor, Diversity Factor - Pollution Standards - Methods of Pollution Control.

Learning Outcomes:

At the end of this unit, the student will be able to

- Outline sources of energy, compare and selection of power plants. (L2)
- Explain cost factors, load and power distribution factors. (L2)
- Select tariff based on load and demand factors. (L3)
- Summarize the impact of power plant on the environment, pollution mitigation and regulations. (L2)

UNIT – 2:

Steam Power Plant: Introduction to Boilers- Modern High Pressure and Supercritical Boilers - Waste Heat Recovery, Fluidized Bed Boilers., Fuel and Handling Equipments, Types of Coals, Coal Handling, Choice of Handling Equipment, Coal Storage, Ash Handling Systems.

Combustion Process: Properties of Coal - Overfeed and Under Feed Fuel Beds, Types of Stokers, Pulverized Fuel Burning System and Its Components, Combustion Needs and Draught System, Cyclone Furnace, Design and Construction, Dust Collectors, Cooling Towers And Heat Rejection.

Learning Outcomes:

At the end of this unit, the student will be able to

- Demonstrate latest high-pressure boilers, power plant cycles and their improvements. (L2)
- Explain various types of coals, coal handling operations (L2)
- Outline and compare types of feeders, stokers, combustion systems. (L2)
- Illustrate draught, dust collector, furnace, cooling tower and heat rejection systems. (L2)
- Evaluate pollution levels from power plants, pollution control methods, and application of pollution recorders. (L4)

UNIT – 3:

Diesel Power Plant: Diesel Power Plant, Construction, Plant lay out with auxiliaries, fuel storage.

Gas Turbine Plant: Introduction - Classification - Construction - Layout with Auxiliaries - Principles of Working Closed and Open Cycle Gas Turbines. Advantages And Disadvantages Combined Cycle Power Plants.

Learning Outcomes:

At the end of this unit, the student will be able to

- Explain working principle and compare types of diesel power plant. (L2)
- Outline the diesel power plant layout with its supporting equipment. (L2)
- Illustrate the working principle of open cycle and closed cycle gas turbine. (L2)
- Demonstrate combined cycle power plants with benefits and shortcomings. (L2)

UNIT – 4:

Hydro Electric Power Plant: Waterpower - Hydrological Cycle / Flow Measurement - Drainage Area Characteristics - Hydrographs - Storage and Pondage - Classification of Dams and Spill Ways.

Hydro Projects And Plant: Classification - Typical Layouts - Plant Auxiliaries - Plant Operation Pumped Storage Plants.

Learning Outcomes:

At the end of this unit, the student will be able to

- Explain hydrological cycle, infer flow measurements from hydrographs. (L2)
- Summarize working principle of hydroelectric power plant. (L2)
- Illustrate typical layout of hydroelectric power plant, and its auxiliary equipment's. (L2)

UNIT – 5:

Power from Non-Conventional Sources: Utilization of Solar Collectors- Working Principle, Wind Energy - Types of Turbines -Tidal Energy. MHD power Generation.

Nuclear Reactors : Nuclear Fuel - Nuclear Fission- Types of Nuclear reactors - Radiation Hazards and Shielding - Radioactive Waste Disposal.

Learning Outcomes

At the end of this unit, the student will be able to

- Familiarize the source of Renewable sources in India (L2)
- Principle of nuclear power plants, nuclear fuels, and reactor operations. (L2)
- Outline the various types of nuclear reactors, their applications, and limitations. (L2)
- Summarize the hazards of nuclear reactors and significance of nuclear waste disposal. (L2)

Textbooks:

1. P.K. Nag, "Power Plant Engineering", 3rd edition, TMH, 2013.
2. Wakil, "Power plant technology", M.M.EI TMH Publications.

Reference Books:

1. Rajput, "A Text Book of Power Plant Engineering: 4th edition, Laxmi Publications, 2012.
3. Ramalingam, "Power plant Engineering", Scietech Publishers, 2013
4. P.C. Sharma, "Power Plant Engineering", S.K. Kataria Publications, 2012.
5. Arora and S.Domakundwar, "A course in Power Plant Engineering", Dhanpat Rai & Co (p).

Course Outcomes:

At the end of this course, the student will be able to

- **Outline** sources of energy, power plant economics, and environmental aspects. (L2)
- **Explain** power plant economics and environmental considerations. (L2)
- **Describe** working components of a steam power plant. (L2)
- **Illustrate** the working mechanism of gas turbine power plants. (L2)
- **Summarize** types of renewable energy sources and their working principle. (L2)

Demonstrate the working principle of nuclear power plants. (L4)

SRI VENKATESWARA COLLEGE OF ENGINEERING
(Autonomous)

(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", 3rd Edition, 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.,

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B.Tech- VII Sem

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(EE20AOE701) EMBEDDED SYSTEMS (OPEN ELECTIVE)

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.

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B.Tech- VII Sem

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(EC20AOE705)INTRODUCTION TO IMAGE PROCESSING

Course Objectives:

1. To introduce fundamentals of Image Processing
2. To expose various relationships between pixels
3. To describe various intensity transformations in spatial domains.
4. To describe various spatial and frequency domains filters.
5. To disseminate 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 gray 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.

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(CE20AOE705)Low Cost Housing Techniques

Course Objectives:

- The objective of the course is to:
- Have comprehensive knowledge of planning, design, evaluation, construction and financing of housing projects.
- Focuses on cost effective construction materials and methods.
- Enable students to identify low cost housing techniques.
- Have knowledge on alternative building materials for low cost housing.
- Give the knowledge on principles of sustainable housing policies and programmes.
- Enable students in a position to adopt the suitable techniques in rural and disaster prone areas.

UNIT –I

Introduction to Housing scenario

Definition of Basic Terms – House, Home, Household, Apartments, Multi storied Buildings, Special Buildings, Objectives and Strategies of National Housing Policies including Slum Housing Policy. Status of urban housing - Status of Rural Housing

Learning Outcomes:

At the end of the unit student can

- Understand the basics of housing and housing programmes.
- Get knowledge on slum housing policies and slum improvement.

UNIT – II

Development and adoption of low cost housing technology

Introduction - Adoption of innovative cost effective construction techniques - Adoption of precast elements - Adopting of total prefabrication of mass housing in India- General remarks on pre-cast roofing/flooring systems - Fly ash gypsum thick for masonry -

Stone Block masonry - Adoption of precast R.C. plank and join system for roof/floor in the building.

Learning Outcomes:

At the end of the unit student can

- Gain Knowledge about the usage of various low cost housing techniques.
- Adopt the suitable techniques in rural and urban housing.
- Understand the adoption of innovative cost effective construction techniques

UNIT – III

Alternative building materials for low cost housing

Introduction - Substitute for scarce materials – Ferrocement - Gypsum boards - Timber substitutions - Industrial wastes - Agricultural wastes

Low cost Infrastructure services:

Introduce - Present status - Technological options - Low cost sanitation - Domestic wall - Water supply, energy.

Learning Outcomes:

At the end of the unit student can

- Understand the various types of alternative building materials like ferrocement, gypsum boards.
- Gain knowledge about the alternative building materials for low cost housing.
- Understand the low cost infrastructure services and water supply.

UNIT –IV

Rural Housing:

Introduction traditional practice of rural housing continuous - Mud Housing technology - Mud roofs - Characteristics of mud - Fire treatment for thatch roof - Soil stabilization - Rural Housing programs.

Learning Outcomes:

At the end of the unit student can

- Understand the rural housing and rural housing programs.
- Gain the knowledge about mud housing technology and mud roofs.

UNIT – V

Housing in Disaster prone areas:

Introduction – Earthquake - Damages to houses - Traditional prone areas - Type of Damages and Railways of non-engineered buildings - Repair and restore action of earthquake Damaged non-engineered buildings recommendations for future constructions.

Learning Outcomes:

At the end of the unit student can

- Get knowledge about disasters like earthquakes, floods, cyclones.
- Understand the types of damages on non-engineering buildings.
- Get knowledge about Repair and restore action on damaged non-engineered buildings.
- Analyse the safety requirements and strengthening measures of disaster prone area.

Course Outcomes (CO):

On the completion of the course, students will be able to:

- Understand the planning, design, evaluation, construction and financing of housing projects with cost effective housing techniques.
- Have knowledge on living condition of slum, slum housing policies, and slum improvement.
- Know the usage of various low cost housing techniques.
- Understand about alternative building materials for low cost housing and Rural housing.
- Adopt the suitable techniques in rural and disaster prone areas by using locally available materials.

Textbooks:

1. A.K.Lal "Hand book of Low Cost Housing" – New Age International publishers.
2. G.C. Mathur "Low cost Housing".
3. A.G. Madhava Rao, D.S. Ramachandra Murthy & G. Annamalai "Modern trends in housing in developing countries".

Reference Books:

1. Rajib Shaw "Disaster Management", Universities Press, India.
2. Tushar Bhattacharya "Disaster Science and Management", TMH Publications.
3. Neville A.M. "Properties of Concrete" – Pitman Publishing Limited, London.

4. Kiado, Rudhai.G "Light Weight Concrete", – Publishing home of Hungarian Academy of Sciences 1963.

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B.Tech - VII Sem

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(ME20AOE702) ROBOTICS IN INDUSTRIAL USAGE

(Open Elective – IV)

Course Objectives:

The course should enable the students to:

- I. Develop the knowledge in various robot structures and their workspace.
- II. Develop the skills in performing kinematics analysis of robot systems.
- III. Provide the knowledge of the dynamics associated with the operation of robotic systems.
- IV. Provide the knowledge and analysis skills associated with trajectory planning.
- V. Understand material handling and robot applications in industries.

UNIT– 1:

INTRODUCTION TO ROBOTICS: Introduction: Automation and robotic, an overview of robotics, classification by coordinate system and control systems; Components of the industrial robotics: Degrees of freedom, end effectors: Mechanical gripper, magnetic, vacuum cup and other types of grippers, general consideration on gripper selection and design.

Learning Outcomes:

1. Differentiate between automation and robotics.
2. Classify robots and describe its anatomy
3. Classify various grippers

UNIT – 2:

MOTION ANALYSIS AND KINEMATICS: Motion analysis: Basic rotation matrices, composite rotation matrices, Euler angles, equivalent angle and axis, homogeneous transformation, problems; Manipulator kinematics: D-H notations, joint coordinates and world coordinates, forward and inverse kinematics, problems.

Learning Outcomes

1. Discuss about motion analysis of robot.

2. Understand methods for calculating the kinematics and inverse kinematics of a robot manipulator.
3. Describe D-H notations, joint coordinates and. world coordinates
4. Discuss about homogeneous transformation.

UNIT – 3:

Differential kinematics: Differential kinematics of planar and spherical manipulators, Jacobians problems. Robot dynamics: Lagrange, Euler formulations, Newton-Euler formulations, problems on planar two link manipulators

1. Describe the differential kinematics of planar manipulators.
2. Illustrate Lagrange-Euler formulation.
3. Discuss jacobian and robot dynamics. 4. Illustrate Newton-Euler formulation.

UNIT – 4:

Trajectory planning: Joint space scheme, cubic polynomial fit, avoidance of obstacles, types of motion: Slew motion, joint interpolated motion, straight line motion, problems, Robot actuators and feedback components; Actuators: pneumatic and hydraulic actuators.

Learning Outcomes:

1. Describe joint space scheme.
2. Illustrate cubic polynomial fit.
3. Classify types of motion.

UNIT – 5:

Electric actuators: DC servo motors, stepper motors, feedback components: position sensors, potentiometers, resolvers and encoders, velocity sensors, tactile sensor; Robot application in manufacturing: Material handling, assembly and inspection

Learning Outcome:

1. Explain actuators and classify them.
2. Illustrate various robot applications in manufacturing.
3. Discuss the role of robots in material handling.
4. Explain work cell design.
5. Discuss the role of robots in assembly and inspection

Textbooks:

1. Groover M. P, "Industrial Robotics", TataMcGraw-Hill, 1 st Edition, 2013.
2. J.J Criag, "Introduction to Robotic Mechanics and Control", Pearson, 3rd Edition, 2013.

Reference Books:

1. Richard D. Klafter, "Robotic Engineering", Prentice Hall, 1st Edition, 2013.
2. Fu K S, "Robotics", McGraw-Hill, 1st Edition, 2013.

Course Outcomes:

At the end of the course, the student will be able to:

CO1 Understand characteristic features of robots and usage of different grippers for industrial applications.

CO2 Understand direct and inverse kinematics of robot structure.

CO3 Illustrate Differential Kinematics of planar and spherical manipulators.

CO4 Understand classification of robot actuators and trajectory planning.

CO5 Remember material handling and applications in manufacturing.

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B. Tech VII
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(BA20AHS701) BUSINESS ETHICS AND CORPORATE GOVERNANCE

Course Objectives:

- To make the student understand the principles of business's ethics
- To enable them in knowing the ethics in management
- To facilitate the student to role incorporate culture
- Impart knowledge about the fair trade practices
- Encourage the student in knowing them about the corporate governance

UNIT-I

BUSINESS ETHICS AND CORPORATE GOVERNANCE – Introduction – Meaning – Nature and Scope – Loyalty and Ethical Behavior, Values across Cultures; Business Ethics – Ethical Practices in Management .Types of Ethics – Characteristics – Factors influencing ,Business Ethics – Importance of Business Ethics – Arguments for and against business ethics Basics of business ethics Corporate Social Responsibility – Issues of Management – Crisis Management

Learning Outcomes:

After completion of this unit student will

- Understand the meaning of loyalty and ethical Behavior
- Explain various types of Ethics
- Know about the factors influencing business ethics
- Understand the corporate social responsibility of management

UNIT-II

ETHICS IN MANAGEMENT – Introduction – Ethics in HRM – Marketing Ethics – Ethical aspects of Financial Management-Technology Ethics and Professional ethics. The Ethical Value System – Universalism, Utilitarianism, Distributive Justice, Social Contracts, Individual Freedom of Choice, Professional Codes; Culture and Ethics – Ethical Values in different Cultures, Culture and Individual Ethics.

Learning Outcomes:

After completion of this unit student will

- Understand the meaning of Marketing Ethics
- Analyze Differentiate between Technical ethics and professional ethics
- Know about the ethical value system
- Understand the Code and culture
-

UNIT-III

ROLE OF CORPORATE CULTURE IN BUSINESS– Meaning– Functions– Impact of corporate culture–cross cultural issues in ethics, Emotional Honesty – Virtue of humility– Promote happiness–karma yoga – proactive – flexibility and purity of mind. The Ethical Value System–Universalism, Utilitarianism, Distributive Justice, Social Contracts, Individual Freedom of Choice, Professional Codes; Culture and Ethics – Ethical Values in different Cultures, Culture and Individual Ethics.

Learning Outcomes:

After completion of this unit student will

- Understand the corporate culture in business
- Analyze Ethical Value System Know about the ethical value system
- Know Universalism, Utilitarianism, Distributive Justice
- Differentiate Ethical Values in different Cultures

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.

Learning Outcomes:

After completion of this unit student will

- Understand Law and Ethics
- Analyze Social Responsibilities of Business

- Know Environmental Protection and Fair Trade Practices
- Implementing National Safeguarding Health and well-being of Customers

UNIT-V

Organisational Behaviour – Organizing Process – Departmentation Types – Decentralization – Making Organizing Effective – Organisational culture- Types of culture – Organisational Culture Vs Organizational climate – Conflict management – Change Management.

Learning Outcomes:

After completion of this unit student will

- Understand corporate governance code
- Analyze role of auditors, board of directors and shareholders
- Know accounting and regulatory framework
- Implementing corporate social responsibility

Course Outcomes:

- At the end of the course, students will be able to
- Understand business ethics and ethical practices in management.
- Understand the role of ethics in management
- Apply the knowledge in cross cultural ethics
- Analyze law and ethics
- Evaluate corporate governance

Textbooks:

- Murthy CSV: "Business Ethics and Corporate Governance", HPH
- Bholanath Dutta, S.K. Podder – "Corporation Governance", VBH.

References:

- Dr. K. Nirmala, Karunakara Reddy: "Business Ethics and Corporate Governance", HPH

- H.R.Machiraju: "Corporate Governance"
- K.Venkataramana, "Corporate Governance", SHBP.
- N.M.Khandelwal: "Indian Ethos and Values for Managers"

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B. Tech- VII Sem
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(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 HRM in 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 - Elton Mayo's Human relations - Systems Theory - Organisational Designs - Line organization - Line & Staff Organization-Functional Organization-Matrix Organization-Project Organization-Committee form 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 Procedure and Stores Management-Marketing Management-Concept-Meaning- Nature-Functions of 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, Pearson Education, New Delhi, 2012.

References:

- Koontz & Weihrich, "Essentials of Management", 6th edition, TMH, 2005.
- Thomas N. Duening & John M. Ivancevich, "Management Principles and Guidelines", Biztantra.

- Kanishka Bedi, "Production and Operations Management", Oxford University Press, 2004.
- Samuel C. Certo, "Modern Management", 9th edition, PHI, 2005

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B. Tech- V Sem

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(BA20AHS706) STRATEGICMANAGEMENT

Course Objectives:

- To introduce the concepts of strategic management and understand its nature in Competitive and organization all and scape
- To provide an understanding of internal and external analysis of a firm/individual
- To provide understanding of strategy formulation process and framework
- Impart knowledge of corporate culture
- Encourage the student in understanding SWOT analysis BCG Matrix

UNIT-I

Introduction of Strategic Management: meaning, nature, importance and relevance. The Strategic Management Process: – Corporate, Business and Functional Levels of strategy. Vision, mission and purpose –Business definition, objectives and goals – Stakeholders in business and their roles in strategic management Balance score card.

Learning Outcomes:

After completion of this unit student will

- Understand the meaning and importance of strategic management
- Explain Strategic Management Process and Corporate, Business
- Know about the Business definition, objectives and goals
- Understand Stakeholderstheirrolesinstrategicmanagement

UNIT-II

External and Internal Analysis: The Strategically relevant components of a Company's External Environment Analysis, Industry Analysis - Porter's Five Forces model – Industry driving forces–Key Success Factors. Analyzing a company's resources and competitive position

Learning Outcomes:

After completion of this unit student will

- Understand the components of a Company's environment
- Explain External Environment Analysis, Industry Analysis
- Know how to analyze industry competition through the Porter's Five Forces model
- Analyze Key Success Factors in a company's competitive position

UNIT-III

Competitive Strategies: Generic Competitive Strategies: Low cost, Differentiation, Focus. Grand Strategies: Stability, Growth (Diversification Strategies, Vertical Integration Strategies, Mergers, Acquisition & Takeover Strategies, Strategic Alliances & Collaborative Partnerships), Retrenchment, Outsourcing Strategies. Tailoring strategy to fit specific industry – Life Cycle Analysis – Emerging, Growing, and Mature & Declining Industries.

Learning Outcomes:

After completion of this unit student will

- Understand the Competitive Strategies
- Explain Stability, Growth Mergers, Acquisition & Takeover Strategies
- Know about the Retrenchment, Outsourcing Strategies
- Differentiate Life Cycle Analysis, Mature & Declining Industries

UNIT-IV

Strategy Implementation and control - Strategy implementation; Organization Structure – Matching structure and strategy Behavioral issues in implementation – Corporate culture – Mc Kinsey's 7s Framework. Functional issues – Functional plans and policies – Financial, Marketing, Operations, Personnel, IT.

Learning Outcomes:

After completion of this unit student will

- Understand the Organization Structure
- Explain Matching structure and strategy
- Know about the Corporate culture
- Analyze Functional plans and policies

UNIT-V

Strategy Evaluation: Strategy Evaluation–Operations Control and Strategic Control-Relationship between a Company's Strategy and its Business Model.- SWOT analysis – ValueChainAnalysis –Benchmarking-PortfolioAnalysis: BCGMatrix– GE9 CellModel.

LearningOutcomes:

After completion of this unit student will

- Understandthe OperationsControlandStrategicControl
- ExplainCompany'sStrategyanditsBusinessModel
- KnowabouttheSWOTanalysis

Course Outcomes:

1. Demonstrate an appreciation of areas which are fundamental to the development of successful strategy
2. Outline and critique the major perspectives on the conduct of strategy
3. Explain and use the most common tools of strategic analysis
4. Demonstrate an understanding of, and ability to assess the complexities of strategic decision making
5. Understand functional areas and appreciate the role of functional areas in both the formulation and the implementation of a firm's vision, mission and strategy
6. Integrate strategic thinking into the holistic management of an organization

Textbooks:

- Strategic Management – J.S.Chandan&Nitishsen Gupta, Vikas
- Business Strategy: Managing Uncertainty, Opportunity, and Enterprise by J.C. Spender

References:

- Strategic Management Concepts and Cases, Fred. R David, PHI.

- Strategic Management, Hill, Ireland, Manikuttu, 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, Sukulomash, P.K.Mishra, Vikas

SRI VENKATESWARA COLLEGE OF ENGINEERING

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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

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MBA I Semester

L	T	P	C	
	4	0	0	4

(BA20EPC101) MANAGEMENT & ORGANIZATIONAL BEHAVIOUR

Objective:

To give 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, Hiriappa .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

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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 IT Act, 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.

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MBA I Semester

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(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 EugeneF.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

(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

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MBA I Semester

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(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.

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MBA I Semester

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(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 Haptics: 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

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MBA I Semester

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(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

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MBA I Semester

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(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.

- English language skills for effective written business communication ('s).
- 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.

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MBA I Semester

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(BA20EAC109) PERSONALITY DEVELOPMENT

Objective: The objective of the course is to make students understand the importance of personality and transform the energy to students to take unexplored career paths.

UNIT-I

Personality: Determinants of Personality Development Define Personality, Grooming, Personal Hygiene, Social Effectiveness, Business Etiquettes (Power 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 etiquettes, 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)

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(AUTONOMOUS)

MBA II Semester

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(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), Personnel 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 Management, 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.

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MBA II Semester

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(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.

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MBA II Semester

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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 Research Report: 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

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(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, Tata McGrawhill, ND
- Pandey IM - Financial Management, Vikas, New Delhi.
- JC Varshney, Financial Management, Wisdom, Delhi.
- Brigham and Houston, Fundamentals of Financial Management, Cengage, New Delhi.
- Banerjee, 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 Srivastava: Financial Management and Policy, Himalaya Publication.

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MBA II Semester

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(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), Principle 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, Arthur Yaspan & Lawrence Friedman. Pearson
- Quantitative Analysis For Management/ Barry Render, Ralph M. Stair, Jr and Michael E. Hanna/
- Operations Research / R.Pannerselvam, PHI Publications.

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MBA II Semester

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(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.

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MBA II Semester

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(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, Hossein Bidgoli, Nilanjan Chattopadhyay, 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 & Margrethe H. Olson, Tata McGraw-Hill.

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MBA II Semester

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(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.

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MBA II Semester

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(BA20EAC209) WORLD TRADE ORGANISATION 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

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MBA III Semester

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(BA20EPC301) INNOVATION AND ENTREPRENEURSHIP DEVELOPMENT

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, Poornima M. 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.
- Entrepreneurship- Successfully Launching New Ventures, Barringer, Ireland, Pearson.
- Entrepreneurship, Roy, Oxford.

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MBA III Semester

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(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

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MBA III Semester

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(BA20EPE303) COST AND MANAGEMENT ACCOUNTING (Elective I)

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 - Mohana Rao P, PHI, 2011.
- Cost Management: A strategic Approach - Vaidya S. C, Suveera Gill Macmillan 2010.
- Cost Accounting- Jawaharlal, & Seema Srivastava, 4/e, TMH.
- Accounting & Costing for Management – Sinha P. K, Excel BOOKS, 2010.
- A Textbook of Cost Management- G.V Kesava Rao, D Gopinath, M.G. Krishnamurthy and Anita S. Yadav, Paramount Publishing House,

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MBA III Semester

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(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.

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MBA III Semester

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(BA20EPE305) HUMAN RESOURCE DEVELOPMENT (Elective I)

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

UNIT-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)

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MBA III Semester

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(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

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(BA20EPE307) FINANCIAL INSTITUTIONS AND SERVICES (Elective II)

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 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, Gordon & Natarajan, Himalaya publishers.

References:

- Financial Services and markets, Dr. Punithavathy Pandian, 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, Thirupati, PHI.
- Financial Markets & Services, Vasanthdesai, Himalaya.
- Financial Institutions and Markets, Gupta Agarwal, Kalyani publishers.
- Management of Financial Services, C. Rama Gopal, Vikas.

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MBA III Semester

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(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

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(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 want 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 labour laws -Tripathi. 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

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MBA III Semester

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(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 .

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MBA III Semester

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(BA20EPE311) INVESTMENT AND PORTFOLIO MANAGEMENT (Elective III)

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, Punithavathy Pandian, Vikas

References:

- Investment Analysis and portfolio management, Chandra, Tata McGraw Hill .
- Security Analysis Portfolio Management, Ranganatham & Madhumathi, Pearson Education.
- Security Analysis and Portfolio Management, Sudhindra Bhat, 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, Hiriappa, New Age Publications

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MBA III Semester

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(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)

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(BA20EPE313) PERFORMANCE MANAGEMENT (Elective III)

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

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(BA20EPE314) ENTERPRISE RESOURCE PLANNING (Elective III)

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, Cengage Learnings.
- Enterprise Resource Planning, Mahadeo Jaiswal & Ganesh Vanapalli, Macmillan

References:

- Enterprise Resource Planning, Alexis Leon, TMH.
- Enterprise Resource Systems, Motiwala, Pearson.
- ERP in practice, Jagan Nathan Vaman, Tata Mc.Graw Hill.
- Enterprise Resource Planning and MIS, Venugopal Rao, Excel.
- ERP concepts & Practice, Vinod Kumar Kardar & NK Venkata Kristean, PHI.
- Concepts in ERP, Monk, 2/e Thomson.
- Managerial Issues of ERP, David L. Olson, TMH

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(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)

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(BA20EPE316) ADVERTISING AND SALES PROMOTION MANAGEMENT (Elective IV)

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

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MBA III Semester

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(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.KKoenig.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

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MBA III Semester

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(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

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MBA III Semester

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(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.
- Winston "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.

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MBA III Semester

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(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 issues in 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 and Corporate Governance –A.C. Fernando, Pearson Education.

References:

- “Perspectives in Business Ethics”, Laura P Hartman, Tata McGraw Hill.
- Ethics in management and Indian Ethos, Biswanath Ghosh, 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, Satish Modh, Mcmillan.

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MBA IV Semester

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(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

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(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- business - 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

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MBA IV Semester

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(BA20EPE403) FINANCIAL DERIVATIVES (Elective V)

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. Koteswar: Himalaya

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MBA IV Semester

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(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 monitoring 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 Marketing – Concepts planning and implementation, Bhattacharjee, excel,2009
- Services Marketing, Srinivasan, PHI.
- Services – Marketing, Operations and Management, Jauhari, Dutta, Oxford.
- Marketing of Services, Hoffman, Bateson,Cengage.
- Service sector Management, C.Bhattacharjee, Jaico.

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MBA IV Semester

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(BA20EPE405) ORGANIZATION DEVELOPMENT (Elective V)

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 & Strategies, S. Ramnarayan, T. V. Rao & Kuldeep Singh, Response.

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(BA20EPE406) DATA COMMUNICATION AND NETWORK ANALYSIS (Elective V)

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.

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(BA20EPE407) INTERNATIONAL FINANCIAL MANAGEMENT (Elective VI)

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 Management, Ephriam Clark ,Cengage.

References:

- International Finance , Prakash .G.Apte, TMH
- International Financial Management, T.Siddaiah: Pearson.
- International Financial Management ,M.K.Rastogi
- International Financial Management, S.Eun Choel and Risnick Bruce: TMH.
- International Financial Management, MachiRaju, HPH.
- international finance management, Jeff Madura, Cengage.
- International Financial Management, Sharan 5th Edition, PHI.
- International Financial Management, Madhu Vij: Excel, .
- International Financial Management, V. A Avadhani, Himalaya .

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(BA20EPE408) INTERNATIONAL MARKETING (Elective VI)

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, Prasanth Salwan, TMH.
- International Marketing, Vasudeva PK, excel.
- Global Marketing, Management, Lee, Carter, Oxford.
- International Marketing and Export management, Albaum , Pearson Education.
- Global Marketing, Johansson, TMH.

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MBA IV Semester

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(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

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(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. Prahalad, The New Age of Innovation. TMH.

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(BA20ETS411) SEMINAR (Contemporary Issues on Business)

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.

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(BA20EPW411) PROJECT WORK

Students are required to take up a project work, in which the student can choose any specific problem of Industry or Industry based project work. Alternatively it can be secondary source based or Field based project work. Before the commencement of the project work each student is required to submit a synopsis indicating the objectives, Methodology, Framework for analysis, Action plan with milestones in order to have clarity for the subsequent work. The project should have an internal faculty as guide. The student shall initiate project work immediately after II semester and evaluation shall take place in IV semester

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.