

R16 B.TECH ECM.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
**B.TECH. ELECTRONICS AND COMPUTER ENGINEERING
 III YEAR COURSE STRUCTURE & SYLLABUS (R16)**
Applicable From 2016-17 Admitted Batch
III YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	BM501PC	Principles of Communications	4	0	0	4
2	EC502PC	Linear and Digital IC Applications	4	0	0	4
3	CS503PC	Software Engineering	4	0	0	4
4	SM504MS	Fundamentals of Management	3	0	0	3
5		Open Elective – I	3	0	0	3
6	BM505PC	Communications Lab	0	0	3	2
7	EI506PC	Linear and Digital IC Applications Lab	0	0	3	2
8	CS507PC	Software Engineering Lab	0	0	3	2
9	*MC500HS	Professional Ethics	3	0	0	0
		Total Credits	21	0	9	24

III YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	EM601PC	Computer Networks	4	0	0	4
2	EC602PC	Microprocessors and Microcontrollers	4	0	0	4
3	EC603PC	Digital Signal Processing	4	0	0	4
4		Open Elective-II	3	0	0	3
5		Professional Elective-I	3	0	0	3
6	EM604PC	Computer Networks Lab	0	0	3	2
7	EC605PC	Microprocessors and Microcontrollers Lab	0	0	3	2
8	EN606HS	Advanced English Communications Skills Lab	0	0	3	2
		Total Credits	18	0	9	24

During Summer Vacation between III and IV Years: Industry Oriented Mini Project

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Professional Elective – I

EM611PE	Computer Organization
EM612PE	Database Management Systems
EM613PE	Information Systems
EM614PE	Data Structures

***Open Elective** subjects' syllabus is provided in a separate document.

***Open Elective** – Students should take Open Electives from the List of Open Electives Offered by Other Departments/Branches Only.

Ex: - A Student of Mechanical Engineering can take Open Electives from all other departments/branches except Open Electives offered by Mechanical Engineering Dept.

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PRINCIPLES OF COMMUNICATIONS**B.Tech. III Year I Sem.**
Course Code: BM501PC

L	T	P	C
4	0	0	4

Pre-requisites: Nil**Course Objective:** To provide the basic concepts of communication systems.**Course Outcomes:** On successful completion of the module students will be able to:

- explain the main concepts of analogue and digital communication systems;
- analyze and design an AM and FM modulator/demodulator;
- explain, discuss, and compare different binary digital modulation techniques;
- explain types of noise & effects of noise on communication system

UNIT – I**Introduction:** Block diagram of Electrical communication system, Radio communication : Types of communications, Analog, pulse and digital Types of signals, Noise – Types of noise, sources of noise, calculation of noise in Linear systems, and noise figure.**UNIT - II****Amplitude Modulation:** Need for modulation, Types of Amplitude modulation, AM, DSB SC, SSB SC, Power and BW requirements, generation of AM, DSB SC, SSB SC, Demodulation of AM: Diode detector, Product demodulation for DSB SC & SSB SC.**Angle Modulation:** Frequency & Phase modulations, advantages of FM over AM, Bandwidth consideration, Narrow band and Wide band FM, Comparison of FM & PM.**UNIT - III****Pulse Modulations:** Sampling, Nyquist rate of sampling, Sampling theorem for Band limited signals, PAM, regeneration of base band signal, PWM and PPM, Time Division Multiplexing, Frequency Division Multiplexing, Asynchronous Multiplexing.**UNIT - IV****Digital Communication:** Advantages, Block diagram of PCM, Quantization, effect of quantization, quantization error, Base band digital signal, DM, ADM, ADPCM and comparison.**Digital Modulation:** ASK, FSK, PSK, DPSK, QPSK demodulation, coherent and incoherent reception, Modems.**UNIT - V****Information Theory:** Concept of information, rate of information and entropy, Source coding for optimum rate of information, Coding efficiency, Shannon-Fano and Huffman coding.

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Error control coding: Introduction, Error detection and correction codes, block codes, convolution codes.

TEXT BOOKS:

1. Communication Systems Analog and Digital – R.P. Singh and SD Sapre, TMH, 20th reprint, 2004.
2. Principles of Communications – H. Taub and D. Schilling, TMH, 2003.

REFERENCE BOOKS:

1. Electronic Communication Systems – Kennedy and Davis, TMH, 4th edition, 2004.
2. Communication Systems Engineering – John. G. Proakis and Masoud Salehi, PHI, 2nd Ed. 2004.

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LINEAR AND DIGITAL IC APPLICATIONS**B.Tech. III Year I Sem.**
Course Code: EC502PC

L	T	P	C
4	0	0	4

Pre-requisites: Digital Logic and Pulse Circuits**Course Objectives:**

1. The main objectives of the course are:
2. To introduce the basic building blocks of linear integrated circuits.
3. To teach the linear and non - linear applications of operational amplifiers.
4. To introduce the theory and applications of analog multipliers and PLL.
5. To teach the theory of ADC and DAC.
6. To introduce the concepts of waveform generation and introduce some special function ICs.
7. To understand and implement the working of basic digital circuits

Course Outcomes:

1. On completion of this course, the students will have:
2. A thorough understanding of operational amplifiers with linear integrated circuits.
3. Understanding of the different families of digital integrated circuits and their characteristics.
4. Also students will be able to design circuits using operational amplifiers for various applications.

UNIT - I

Operational Amplifier: Ideal and Practical Op-Amp, Op-Amp Characteristics, DC and AC Characteristics, Features of 741 Op-Amp, Modes of Operation - Inverting, Non-Inverting, Differential, Instrumentation Amplifier, AC Amplifier, Differentiators and Integrators, Comparators, Schmitt Trigger, Introduction to Voltage Regulators, Features of 723 Regulator, Three Terminal Voltage Regulators.

UNIT - II

Op-Amp, IC-555 & IC 565 Applications: Introduction to Active Filters, Characteristics of Band pass, Band reject and All Pass Filters, Analysis of 1st order LPF & HPF Butterworth Filters, Waveform Generators – Triangular, Sawtooth, Square Wave, IC555 Timer - Functional Diagram, Monostable, and Astable Operations, Applications, IC565 PLL - Block Schematic, Description of Individual Blocks, Applications.

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UNIT - III

Data Converters: Introduction, Basic DAC techniques, Different types of DACs-Weighted resistor DAC, R-2R ladder DAC, Inverted R-2R DAC, Different Types of ADCs - Parallel Comparator Type ADC, Counter Type ADC, Successive Approximation ADC and Dual Slope ADC, DAC and ADC Specifications.

UNIT - IV

Digital Integrated Circuits: Classification of Integrated Circuits, Comparison of Various Logic Families Combinational Logic ICs – Specifications and Applications of TTL-74XX & Code Converters, Decoders, Demultiplexers, LED & LCD Decoders with Drivers, Encoders, Priority Encoders, Multiplexers, Demultiplexers, Priority Generators/Checkers, Parallel Binary Adder/Subtractor, Magnitude Comparators.

UNIT - V

Sequential Logic IC's and Memories: Familiarity with commonly available 74XX & CMOS 40XX Series ICs – All Types of Flip-flops, Synchronous Counters, Decade Counters, Shift Registers.

Memories - ROM Architecture, Types of ROMS & Applications, RAM Architecture, Static & Dynamic RAMs.

TEXT BOOKS:

1. Op-Amps & Linear ICs – Ramakanth A. Gayakwad, PHI, 2003.
2. Digital Fundamentals – Floyd and Jain, Pearson Education, 8th Edition, 2005.

REFERENCE BOOKS:

1. Linear Integrated Circuits –D. Roy Chowdhury, New Age International (p) Ltd, 2nd Ed., 2003.
2. Op Amps and Linear Integrated Circuits-Concepts and Applications James M. Fiore, Cengage Learning/ Jaico, 2009.
3. Operational Amplifiers with Linear Integrated Circuits by K.Lal Kishore – Pearson, 2009.
4. Linear Integrated Circuits and Applications – Salivahana, MC GRAW HILL EDUCATION.
5. Modern Digital Electronics – RP Jain – 4/e – MC GRAW HILL EDUCATION, 2010.

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SOFTWARE ENGINEERING**B.Tech. III Year I Sem.**
Course Code: CS503PC

L	T	P	C
4	0	0	4

Course Objectives:

- To understanding of software process models such as waterfall and evolutionary models.
- To understanding of software requirements and SRS document.
- To understanding of different software architectural styles.
- To understanding of software testing approaches such as unit testing and integration testing.
- To understanding on quality control and how to ensure good quality software.

Course Outcomes:

- Ability to identify the minimum requirements for the development of application.
- Ability to develop, maintain, efficient, reliable and cost effective software solutions
- Ability to critically thinking and evaluate assumptions and arguments.

UNIT- I

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, legacy software, Software myths.

A Generic view of process: Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

Process models: The waterfall model, Incremental process models, Evolutionary process models, Specialized process models, The Unified process.

UNIT- II

Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

System models: Context Models, Behavioral models, Data models, Object models, structured methods.

UNIT- III

Design Engineering: Design process and Design quality, Design concepts, the design model, pattern based software design.

Creating an architectural design: software architecture, Data design, Architectural styles and patterns, Architectural Design, assessing alternative architectural designs, mapping data flow into a software architecture.

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Modeling component-level design: Designing class-based components, conducting component-level design, object constraint language, designing conventional components.

Performing User interface design: Golden rules, User interface analysis, and design, interface analysis, interface design steps, Design evaluation.

UNIT- IV

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

Product metrics: Software Quality, Frame work for Product metrics, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

Metrics for Process and Products: Software Measurement, Metrics for software quality.

UNIT- V

Risk management: Reactive vs Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

Quality Management: Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

TEXT BOOKS:

1. Software engineering A practitioner's Approach, Roger S Pressman, sixth edition McGraw Hill International Edition.
2. Software Engineering, Ian Sommerville, seventh edition, Pearson education.

REFERENCE BOOKS:

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Fundamentals of Software Engineering, Rajib Mall, PHI, 2005
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.
6. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition 2006.
7. Software Engineering Foundations, Yingxu Wang, Auerbach Publications, 2008.
8. Software Engineering Principles and Practice, Hans Van Vliet, 3rd edition, John Wiley & Sons Ltd.
9. Software Engineering 3: Domains, Requirements, and Software Design, D. Bjorner, Springer International Edition.
10. Introduction to Software Engineering, R. J. Leach, CRC Press.

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FUNDAMENTALS OF MANAGEMENT**B.Tech. III Year I Sem.****Course Code: SM504MS****L T P C****3 0 0 3**

Course Objective: To understand the Management Concepts, applications of Concepts in Practical aspects of business and development of Managerial Skills.

Course Outcome: The students understand the significance of Management in their Profession. The various Management Functions like Planning, Organizing, Staffing, Leading, Motivation and Control aspects are learnt in this course. The students can explore the Management Practices in their domain area.

UNIT - I

Introduction to Management: Definition, Nature and Scope, Functions, Managerial Roles, Levels of Management, Managerial Skills, Challenges of Management; Evolution of Management- Classical Approach- Scientific and Administrative Management; The Behavioral approach; The Quantitative approach; The Systems Approach; Contingency Approach, IT Approach.

UNIT - II

Planning and Decision Making: General Framework for Planning - Planning Process, Types of Plans, Management by Objectives; Development of Business Strategy. Decision making and Problem Solving - Programmed and Non Programmed Decisions, Steps in Problem Solving and Decision Making; Bounded Rationality and Influences on Decision Making; Group Problem Solving and Decision Making, Creativity and Innovation in Managerial Work.

UNIT - III

Organization and HRM: Principles of Organization: Organizational Design & Organizational Structures; Departmentalization, Delegation; Empowerment, Centralization, Decentralization, Recentralization; Organizational Culture; Organizational Climate and Organizational Change.

Human Resource Management & Business Strategy: Talent Management, Talent Management Models and Strategic Human Resource Planning; Recruitment and Selection; Training and Development; Performance Appraisal.

UNIT - IV

Leading and Motivation: Leadership, Power and Authority, Leadership Styles; Behavioral Leadership, Situational Leadership, Leadership Skills, Leader as Mentor and Coach, Leadership during adversity and Crisis; Handling Employee and Customer Complaints, Team Leadership.

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Motivation - Types of Motivation; Relationship between Motivation, Performance and Engagement, Content Motivational Theories - Needs Hierarchy Theory, Two Factor Theory, Theory X and Theory Y.

UNIT - V

Controlling: Control, Types and Strategies for Control, Steps in Control Process, Budgetary and Non- Budgetary Controls. Characteristics of Effective Controls, Establishing control systems, Control frequency and Methods.

Text Books:

1. Management Fundamentals, Robert N Lussier, 5e, Cengage Learning, 2013.
2. Fundamentals of Management, Stephen P. Robbins, Pearson Education, 2009.

References:

1. Essentials of Management, Koontz Kleihrich, Tata Mc - Graw Hill.
2. Management Essentials, Andrew DuBrin, 9e, Cengage Learning, 2012

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COMMUNICATIONS LAB**B.Tech. III Year I Sem.**
Course Code: BM505PC

L	T	P	C
0	0	3	2

Note:

- Minimum 15 experiments should be conducted:
- All these experiments are to be simulated first either using MATLAB or any other simulation package and then to be realized in hardware

Part-I**Analog Communications:**

1. Amplitude modulation and demodulation.
2. DSB-SC Modulator & Detector
3. SSB-SC Modulator & Detector (Phase Shift Method)
4. Frequency modulation and demodulation.
5. Pre-emphasis & de-emphasis.
6. Time Division Multiplexing & De multiplexing
7. Frequency Division Multiplexing & De multiplexing
8. Pulse Amplitude Modulation & Demodulation
9. Pulse Width Modulation & Demodulation
10. Pulse Position Modulation & Demodulation

Part-II**Digital Communications:**

11. PCM Generation and Detection
12. Differential Pulse Code Modulation
13. Delta Modulation
14. Time Division Multiplexing of 2 Band Limited Signals
15. Frequency Shift Keying: Generation and Detection
16. Phase Shift Keying: Generation and Detection
17. Amplitude Shift Keying: Generation and Detection
18. DPSK :Generation and Detection
19. QPSK : Generation and Detection
20. OFDM: Generation and Detection

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LINEAR AND DIGITAL IC APPLICATIONS LAB**B.Tech. III Year I Sem.****Course Code: EI506PC**

L	T	P	C
0	0	3	2

Note:

To perform any twelve experiments (choosing at least five from each part).

Verify the functionality of the IC in the given application.

PART - I**Linear IC Experiments**

1. OP AMP Applications – Adder, Subtractor, Comparators.
2. Integrator and Differentiator Circuits using IC 741.
3. Active Filter Applications – LPF, HPF (first order)
4. IC 741 Waveform Generators – Sine, Square wave and Triangular waves.
5. IC 555 Timer – Monostable and Astable Multivibrator Circuits.
6. Schmitt Trigger Circuits – using IC 741
7. IC 565 – PLL Applications.
8. Voltage Regulator using IC 723, Three Terminal Voltage Regulators – 7805, 7809, 7912.

PART - II**Digital IC Applications**

1. 3-8 decoder using 74138
2. 4-bit comparator using 7485.
3. 8*1 Multiplexer using 74151 and 2*4 Demultiplexer using 74155.
4. D, JK Flip Flops using 7474, 7483.
5. Decade counter using 7490.
6. UP/DOWN counter using 74163
7. Universal shift registers using 74194/195.
8. RAM (16*4) using 74189 (Read and Write operations).

EQUIPMENT REQUIRED:

1. 20 MHz/ 40 MHz/60 MHz Oscilloscope.
2. 1 MHz Function Generator (Sine, Square, Triangular and TTL).
3. Regulated Power Supply.
4. Multimeter / Volt Meter.

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SOFTWARE ENGINEERING LAB**B.Tech. III Year I Sem.**
Course Code: CS507PC

L	T	P	C
0	0	3	2

Course Objectives:

- To understand the software engineering methodologies involved in the phases for project development.
- To gain knowledge about open source tools used for implementing software engineering methods.
- To exercise developing product-startups implementing software engineering methods.
- Open source Tools: StarUML / UMLGraph / Topcased

Prepare the following documents and develop the software project startup, prototype model, using software engineering methodology for at least two real time scenarios or for the sample experiments.

- Problem Analysis and Project Planning -Thorough study of the problem – Identify Project scope, Objectives and Infrastructure.
- Software Requirement Analysis – Describe the individual Phases/modules of the project and Identify deliverables. Identify functional and non-functional requirements.
- Data Modeling – Use work products – data dictionary.
- Software Designing - Develop use case diagrams and activity diagrams, build and test class diagrams, sequence diagrams and add interface to class diagrams.
- Prototype model – Develop the prototype of the product.

The SRS and prototype model should be submitted for end semester examination.

List of Sample Experiments:

1. Course management system (CMS)

A course management system (CMS) is a collection of software tools providing an online environment for course interactions. A CMS typically includes a variety of online tools and environments, such as:

- An area for faculty posting of class materials such as course syllabus and handouts
- An area for student posting of papers and other assignments
- A grade book where faculty can record grades and each student can view his or her grades
- An integrated email tool allowing participants to send announcement email messages to the entire class or to a subset of the entire class
- A chat tool allowing synchronous communication among class participants

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- A threaded discussion board allowing asynchronous communication among participants

In addition, a CMS is typically integrated with other databases in the university so that students enrolled in a particular course are automatically registered in the CMS as participants in that course.

The Course Management System (CMS) is a web application for department personnel, Academic Senate, and Registrar staff to view, enter, and manage course information formerly submitted via paper.

Departments can use CMS to create new course proposals, submit changes for existing courses, and track the progress of proposals as they move through the stages of online approval.

2. Easy Leave

This project is aimed at developing a web based Leave Management Tool, which is of importance to either an organization or a college.

The **Easy Leave** is an Intranet based application that can be accessed throughout the organization or a specified group/Dept. This system can be used to automate the workflow of leave applications and their approvals. The periodic crediting of leave is also automated. There are features like notifications, cancellation of leave, automatic approval of leave, report generators etc in this Tool.

Functional components of the project:

There are registered people in the system. Some are approvers. An approver can also be a requestor. In an organization, the hierarchy could be Engineers/Managers/Business Managers/Managing Director etc. In a college, it could be Lecturer/Professor/Head of the Department/Dean/Principal etc.

Following is a list of functionalities of the system: A person should be able to

- login to the system through the first page of the application
- change the password after logging into the system
- see his/her eligibility details (like how many days of leave he/she is eligible for etc)
- query the leave balance
- see his/her leave history since the time he/she joined the company/college
- apply for leave, specifying the from and to dates, reason for taking leave, address for communication while on leave and his/her superior's email id
- see his/her current leave applications and the leave applications that are submitted to him/her for approval or cancellation
- approve/reject the leave applications that are submitted to him/her
- withdraw his/her leave application (which has not been approved yet)
- Cancel his/her leave (which has been already approved). This will need to be approved by his/her Superior
- get help about the leave system on how to use the different features of the system

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- As soon as a leave application /cancellation request /withdrawal /approval /rejection /password-change is made by the person, an automatic email should be sent to the person and his superior giving details about the action
- The number of days of leave (as per the assumed leave policy) should be automatically credited to everybody and a notification regarding the same be sent to them automatically
- An automatic leave-approval facility for leave applications which are older than 2 weeks should be there. Notification about the automatic leave approval should be sent to the person as well as his superior

3. E-Bidding

Auctions are among the latest economic institutions in place. They have been used since antiquity to sell a wide variety of goods, and their basic form has remained unchanged. In this dissertation, we explore the efficiency of common auctions when values are interdependent-the value to a particular bidder may depend on information available only to others-and asymmetric. In this setting, it is well known that sealed-bid auctions do not achieve efficient allocations in general since they do not allow the information held by different bidders to be shared.

Typically, in an auction, say of the kind used to sell art, the auctioneer sets a relatively low initial price. This price is then increased until only one bidder is willing to buy the object, and the exact manner in which this is done varies. In my model a bidder who drops out at some price can "reenter" at a higher price.

With the invention of E-commerce technologies over the Internet the opportunity to bid from the comfort of one's own home has seen a change like never seen before. Within the span of a few short years, what may have began as an experimental idea has grown to an immensely popular hobby, and in some cases, a means of livelihood, the Auction Patrol gathers tremendous response every day, all day. With the point and click of the mouse, one may bid on an item they may need or just want, and in moments they find that either they are the top bidder or someone else wants it more, and you're outbid! The excitement of an auction all from the comfort of home is a completely different experience.

Society cannot seem to escape the criminal element in the physical world, and so it is the same with Auction Patrols. This is one area where in a question can be raised as to how safe Auction Patrols.

Proposed system

To generate the quick reports

To make accuracy and efficient calculations

To provide proper information briefly

To provide data security

To provide huge maintenance of records

Flexibility of transactions can be completed in time

4. Electronic Cash counter

This project is mainly developed for the Account Division of a Banking sector to provide better interface of the entire banking transactions. This system is aimed to give a better outlook to the user interfaces and to implement all the banking transactions like:

- Supply of Account Information
- New Account Creations
- Deposits
- Withdraws
- Cheque book issues
- Stop payments
- Transfer of accounts
- Report Generations.

Proposed System:

The development of the new system contains the following activities, which try to automate the entire process keeping in view of the database integration approach.

- User friendliness is provided in the application with various controls.
- The system makes the overall project management much easier and flexible.
- Readily upload the latest updates, allows user to download the alerts by clicking the URL.
- There is no risk of data mismanagement at any level while the project development is under process.
- It provides high level of security with different level of authentication

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PROFESSIONAL ETHICS**B.Tech. III Year I Sem.****Course Code: MC500HS****L T P C****3 0 0 0**

Course Objective: To enable the students to imbibe and internalize the Values and Ethical Behaviour in the personal and Professional lives.

Course Outcome: The students will understand the importance of Values and Ethics in their personal lives and professional careers. The students will learn the rights and responsibilities as an employee, team member and a global citizen.

UNIT - I

Introduction to Professional Ethics: Basic Concepts, Governing Ethics, Personal & Professional Ethics, Ethical Dilemmas, Life Skills, Emotional Intelligence, Thoughts of Ethics, Value Education, Dimensions of Ethics, Profession and professionalism, Professional Associations, Professional Risks, Professional Accountabilities, Professional Success, Ethics and Profession.

UNIT - II

Basic Theories: Basic Ethical Principles, Moral Developments, Deontology, Utilitarianism, Virtue Theory, Rights Theory, Casuist Theory, Moral Absolution, Moral Rationalism, Moral Pluralism, Ethical Egoism, Feminist Consequentialism, Moral Issues, Moral Dilemmas, Moral Autonomy.

UNIT - III

Professional Practices in Engineering: Professions and Norms of Professional Conduct, Norms of Professional Conduct vs. Profession; Responsibilities, Obligations and Moral Values in Professional Ethics, Professional codes of ethics, the limits of predictability and responsibilities of the engineering profession.

Central Responsibilities of Engineers - The Centrality of Responsibilities of Professional Ethics; lessons from 1979 American Airlines DC-10 Crash and Kansas City Hyatt Regency Walkaway Collapse.

UNIT - IV

Work Place Rights & Responsibilities, Ethics in changing domains of Research, Engineers and Managers; Organizational Complaint Procedure, difference of Professional Judgment within the Nuclear Regulatory Commission (NRC), the Hanford Nuclear Reservation.

Ethics in changing domains of research - The US government wide definition of research misconduct, research misconduct distinguished from mistakes and errors, recent history of attention to research misconduct, the emerging emphasis on understanding and fostering responsible conduct, responsible authorship, reviewing & editing.

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UNIT - V

Global issues in Professional Ethics: Introduction – Current Scenario, Technology Globalization of MNCs, International Trade, World Summits, Issues, Business Ethics and Corporate Governance, Sustainable Development Ecosystem, Energy Concerns, Ozone Deflection, Pollution, Ethics in Manufacturing and Marketing, Media Ethics; War Ethics; Bio Ethics, Intellectual Property Rights.

TEXT BOOKS:

1. Professional Ethics: R. Subramanian, Oxford University Press, 2015.
2. Ethics in Engineering Practice & Research, Caroline Whitbeck, 2e, Cambridge University Press 2015.

REFERENCES

1. Engineering Ethics, Concepts Cases: Charles E Harris Jr., Michael S Pritchard , Michael J Rabins, 4e , Cengage learning, 2015.
2. Business Ethics concepts & Cases: Manuel G Velasquez, 6e, PHI, 2008.

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COMPUTER NETWORKS**B.Tech. III Year II Sem.****Course Code: EM601PC****L T P C****4 0 0 4****Pre-requisites:** Nil**Course Objectives:**

- To introduce the fundamental various types of computer networks.
- To demonstrate the TCP/IP and OSI models with merits and demerits.
- To explore the various layers of OSI Model.
- To introduce UDP and TCP Models.
- To have the concept of different routing techniques for data communications.

Course Outcomes:

- Students should understand and explore the basics of Computer Networks and Various Protocols. He/She will be in a position to understand the World Wide Web concepts.
- Students will be in a position to administrate a network and flow of information further he/she can understand easily the concepts of network security, Mobile and ad hoc networks.

UNIT - I**Introduction to Networks:** Internet, Protocols and Standards, The OSI Model, Layers in OSI Model, TCP/IP Suite, Addressing.**Physical Layer:** Multiplexing, Transmission Media, Circuit Switched Networks, Datagram Networks, and Virtual Circuit Networks.**UNIT - II****Data Link Layer:** Introduction, Checksum, Framing, Flow and Error Control, Noiseless Channels, Noisy Channels, Random Access Controlled Access, Channelization, IEEE Standards, Ethernet, Giga-Bit Ethernet, Wireless LANs, SONET-SDH, Frame Relay and ATM.**UNIT - III****Network Layer:** Logical Addressing, Internetworking, Tunneling, Address Mapping, ICMP, IGMP, Forwarding, Routing-Flooding, Bellman & Ford, Disjkstra's routing protocols, RIP, OSPF, BGP,- and Multicast Routing Protocols. Connecting Devices-Passive Hubs, Repeaters, Active Hubs, Bridges, Routers.**UNIT - IV****Transport Layer:** Process to Process Delivery, UDP, TCP and SCTP Protocols, Congestion, Congestion Control, Quality of Service.

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Application Layer: Domain Name Space, DNS in Internet, Electronic Mail, File Transfer Protocol, WWW, HTTP, SNMP, Multi-Media.

UNIT - V

Network Security: Security services, mechanisms and attacks, IPSec, SSL, VPN, Firewall. Bluetooth, Zigbee, IPv4, IPv6.

TEXT BOOKS:

1. Data Communications and Networking – Behrouz A. Forouzan, 4th Edition Mc Graw Hill Education, 2006.
2. Computer Networks -- Andrew S Tanenbaum, 4th Edition, Pearson Education.
3. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, Pearson Education.

REFERENCES:

1. Data communications and Networks by william stallings
2. Data communication and Networks - Bhusan Trivedi, Oxford university press 2016.
3. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.
4. Understanding Communications and Networks, 3rd Edition, W.A.Shay, Cengage Learning.

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MICROPROCESSORS AND MICROCONTROLLERS**B.Tech. III Year II Sem.****Course Code: EC602PC****L T P C****4 0 0 4****Pre-requisites:** Nil.**Course Objectives:**

- To develop an understanding of the operations of microprocessors and micro controllers; machine language programming and interfacing techniques.

Course Outcomes:

- Understands the internal architecture and organization of 8086, 8051 and ARM processors/controllers.
- Understands the interfacing techniques to 8086 and 8051 and can develop assembly language programming to design microprocessor/ micro controller based systems.

UNIT - I

8086 Architecture: 8086 Architecture-Functional diagram, Register Organization, Memory Segmentation, Programming Model, Memory addresses, Physical Memory Organization, Architecture of 8086, Signal descriptions of 8086, interrupts of 8086.

Instruction Set and Assembly Language Programming of 8086: Instruction formats, Addressing modes, Instruction Set, Assembler Directives, Macros, and Simple Programs involving Logical, Branch and Call Instructions, Sorting, String Manipulations.

UNIT - II

Introduction to Microcontrollers: Overview of 8051 Microcontroller, Architecture, I/O Ports, Memory Organization, Addressing Modes and Instruction set of 8051.

8051 Real Time Control: Programming Timer Interrupts, Programming External Hardware Interrupts, Programming the Serial Communication Interrupts, Programming 8051 Timers and Counters

UNIT – III

I/O And Memory Interface: LCD, Keyboard, External Memory RAM, ROM Interface, ADC, DAC Interface to 8051.

Serial Communication and Bus Interface: Serial Communication Standards, Serial Data Transfer Scheme, On board Communication Interfaces-I2C Bus, SPI Bus, UART; External Communication Interfaces-RS232,USB.

UNIT – IV

ARM Architecture: ARM Processor fundamentals, ARM Architecture – Register, CPSR, Pipeline, exceptions and interrupts interrupt vector table, ARM instruction set – Data processing, Branch instructions, load store instructions, Software interrupt instructions,

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Program status register instructions, loading constants, Conditional execution, Introduction to Thumb instructions.

UNIT – V

Advanced ARM Processors: Introduction to CORTEX Processor and its architecture, OMAP Processor and its Architecture.

TEXT BOOKS:

1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandani, MHE, 2nd Edition 2006.
2. The 8051 Microcontroller, Kenneth. J. Ayala, Cengage Learning, 3rd Ed.
3. ARM System Developers guide, Andrew N SLOSS, Dominic SYMES, Chris WRIGHT, Elsevier, 2012

REFERENCE BOOKS:

1. Microprocessors and Interfacing, D. V. Hall, MGH, 2nd Edition 2006.
2. Introduction to Embedded Systems, Shibu K.V, MHE, 2009
3. The 8051 Microcontrollers, Architecture and Programming and Applications -K. Uma Rao, Andhe Pallavi, Pearson, 2009.

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DIGITAL SIGNAL PROCESSING

B.Tech. III Year II Sem.
Course Code: EC603PC

L	T	P	C
4	0	0	4

Course Objectives: This course is an essential course that provides design techniques for processing all type of signals in various fields. The main objectives are:

- To provide background and fundamental material for the analysis and processing of digital signals.
- To familiarize the relationships between continuous-time and discrete time signals and systems.
- To study fundamentals of time, frequency and Z-plane analysis and to discuss the inter-relationships of these analytic method.
- To study the designs and structures of digital (IIR and FIR) filters from analysis to synthesis for a given specifications.
- The impetus is to introduce a few real-world signal processing applications.
- To acquaint in FFT algorithms, Multi-rate signal processing techniques and finite word length effects.

Course Outcomes: On completion of this subject, the student should be able to:

- Perform time, frequency, and Z -transform analysis on signals and systems.
- Understand the inter-relationship between DFT and various transforms.
- Understand the significance of various filter structures and effects of round off errors.
- Design a digital filter for a given specification.
- Understand the fast computation of DFT and appreciate the FFT processing.
- Understand the tradeoffs between normal and multi rate DSP techniques and finite length word effects.

UNIT - I

Introduction: Introduction to Digital Signal Processing: Discrete Time Signals & Sequences, conversion of continuous to discrete signal, Normalized Frequency, Linear Shift Invariant Systems, Stability, and Causality, linear differential equation to difference equation, Linear Constant Coefficient Difference Equations, Frequency Domain Representation of Discrete Time Signals and Systems

Realization of Digital Filters: Applications of Z – Transforms, Solution of Difference Equations of Digital Filters, System Function, Stability Criterion, Frequency Response of Stable Systems, Realization of Digital Filters – Direct, Canonic, Cascade and Parallel Forms.

UNIT - II

Discrete Fourier Transforms: Properties of DFT, Linear Convolution of Sequences using DFT, Computation of DFT: Over-Lap Add Method, Over-Lap Save Method, Relation between DTFT, DFS, DFT and Z-Transform.

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Fast Fourier Transforms: Fast Fourier Transforms (FFT) - Radix-2 Decimation-in-Time and Decimation-in-Frequency FFT Algorithms, Inverse FFT, and FFT with General Radix-N.

UNIT - III

IIR Digital Filters: Analog filter approximations – Butterworth and Chebyshev, Design of IIR Digital Filters from Analog Filters, Step and Impulse Invariant Techniques, Bilinear Transformation Method, Spectral Transformations.

UNIT - IV

FIR Digital Filters: Characteristics of FIR Digital Filters, Frequency Response, Design of FIR Filters: Fourier Method, Digital Filters using Window Techniques, Frequency Sampling Technique, Comparison of IIR & FIR filters.

UNIT - V

Multirate Digital Signal Processing: Introduction, Down Sampling, Decimation, Upsampling, Interpolation, Sampling Rate Conversion, Conversion of Band Pass Signals, Concept of Resampling, Applications of Multi Rate Signal Processing.

Finite Word Length Effects: Limit cycles, Overflow Oscillations, Round-off Noise in IIR Digital Filters, Computational Output Round Off Noise, Methods to Prevent Overflow, Trade Off Between Round Off and Overflow Noise, Measurement of Coefficient Quantization Effects through Pole-Zero Movement, Dead Band Effects.

TEXT BOOKS:

1. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education / PHI, 2007.
2. Discrete Time Signal Processing – A. V. Oppenheim and R.W. Schaffer, PHI, 2009
3. Fundamentals of Digital Signal Processing – Loney Ludeman, John Wiley, 2009

REFERENCES:

1. Digital Signal Processing – Fundamentals and Applications – Li Tan, Elsevier, 2008
2. Fundamentals of Digital Signal Processing using MATLAB – Robert J. Schilling, Sandra L. Harris, Thomson, 2007
3. Digital Signal Processing - A Practical approach, Emmanuel C. Ifeachor and Barrie W. Jervis, 2nd Edition, Pearson Education, 2009

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COMPUTER ORGANIZATION
(Professional Elective – I)**B.Tech. III Year II Sem.**
Course Code: EM611PE

L	T	P	C
3	0	0	3

Course Objectives:

- To understand basic components of computers.
- To understand the architecture of 8086 processor.
- To understand the instruction sets, instruction formats and various addressing modes of 8086.
- To understand the representation of data at the machine level and how computations are performed at machine level.
- To understand the memory organization and I/O organization.
- To understand the parallelism both in terms of single and multiple processors.

Course Outcomes:

- Able to understand the basic components and the design of CPU, ALU and Control Unit.
- Ability to understand memory hierarchy and its impact on computer cost/performance.
- Ability to understand the advantage of instruction level parallelism and pipelining for high performance Processor design.
- Ability to understand the instruction set, instruction formats and addressing modes of 8086.
- Ability to write assembly language programs to solve problems.

UNIT - I

Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.

Basic Computer Organization and Design: Instruction codes, Computer Registers, Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt, Complete Computer Description.

Micro Programmed Control: Control memory, Address sequencing, micro program example, design of control unit.

UNIT - II

Central Processing Unit: The 8086 Processor Architecture, Register organization, Physical memory organization, General Bus Operation, I/O Addressing Capability, Special Processor Activities, Minimum and Maximum mode system and timings.

8086 Instruction Set and Assembler Directives-Machine language instruction formats, Addressing modes, Instruction set of 8086, Assembler directives and operators.

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UNIT - III

Assembly Language Programming with 8086- Machine level programs, Machine coding the programs, Programming with an assembler, Assembly Language example programs. Stack structure of 8086, Interrupts and Interrupt service routines, Interrupt cycle of 8086, Interrupt programming, Passing parameters to procedures, Macros, Timings and Delays.

UNIT - IV

Computer Arithmetic: Introduction, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating - point Arithmetic operations.

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct memory Access, Input –Output Processor (IOP), Intel 8089 IOP.

UNIT - V

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

Multi Processors: Characteristics of Multiprocessors, Interconnection Structures, Inter processor arbitration, Inter processor communication, and synchronization.

TEXT BOOKS:

1. Computer System Architecture, M. Moris Mano, Third Edition, Pearson. **(UNITS-I, IV, V)**
2. Advanced Microprocessors and Peripherals, K M Bhurchandi, A.K Ray ,3rd edition, McGraw Hill India Education Private Ltd. **(UNITS - II, III).**

REFERENCES:

1. Microprocessors and Interfacing, D V Hall, SSSP Rao, 3rd edition, McGraw Hill India Education Private Ltd.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky: Computer Organization, 5th Edition, Tata McGraw Hill, 2002
3. Computer Organization and Architecture, William Stallings, 9th Edition, Pearson.
4. David A. Patterson, John L. Hennessy: Computer Organization and Design – The Hardware / Software Interface ARM Edition, 4th Edition, Elsevier, 2009.

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DATABASE MANAGEMENT SYSTEMS
(Professional Elective – I)**B.Tech. III Year II Sem.**
Course Code: EM612PE

L	T	P	C
3	0	0	3

Course Objectives:

- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- To understand the relational database design principles.
- To become familiar with the basic issues of transaction processing and concurrency control.
- To become familiar with database storage structures and access techniques.

Course Outcomes:

- Demonstrate the basic elements of a relational database management system.
- Ability to identify the data models for relevant problems.
- Ability to design entity relationship model and convert entity relationship diagrams into RDBMS and formulate SQL queries on the data.
- Apply normalization for the development of application software.

UNIT - I

Introduction: Database System Applications, Purpose of Database Systems, View of Data, Database Languages – DDL, DML, Relational Databases, Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Data Mining and Information Retrieval, Specialty Databases, Database Users and Administrators, History of Database Systems.

Introduction to Data base design: Database Design and ER diagrams, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Conceptual Design for Large enterprises.

Relational Model: Introduction to the Relational Model, Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design: ER to Relational, Introduction to Views, Destroying /Altering Tables and Views.

UNIT - II

Relational Algebra and Calculus: Preliminaries, Relational Algebra, Relational calculus – Tuple relational Calculus, Domain relational calculus, Expressive Power of Algebra and calculus.

SQL: Queries, Constraints, Triggers: Form of Basic SQL Query, UNION, INTERSECT, and EXCEPT, Nested Queries, Aggregate Operators, NULL values Complex Integrity Constraints in SQL, Triggers and Active Data bases, Designing Active Databases..

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UNIT - III

Schema Refinement and Normal Forms: Introduction to Schema Refinement, Functional Dependencies - Reasoning about FDs, Normal Forms, Properties of Decompositions, Normalization, Schema Refinement in Database Design, Other Kinds of Dependencies.

UNIT- IV

Transaction Management: Transactions, Transaction Concept, A Simple Transaction Model, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Transaction Isolation and Atomicity Transaction Isolation Levels, Implementation of Isolation Levels.

Concurrency Control: Lock-Based Protocols, Multiple Granularity, Timestamp-Based Protocols, Validation-Based Protocols, Multiversion Schemes.

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, Remote Backup systems.

UNIT- V

Storage and Indexing: Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing, Index Data Structures, Comparison of File Organizations.

Tree-Structured Indexing: Intuition for tree Indexes, Indexed Sequential Access Method (ISAM), B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.

Hash- Based Indexing: Static Hashing, Extendible hashing, Linear Hashing, Extendible vs. Linear Hashing.

TEXT BOOKS:

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, McGraw Hill Education (India) Private Limited, 3rd Edition. (**Part of UNIT-I, UNIT-II, UNIT-III, UNIT-V**)
2. Data base System Concepts, A. Silberschatz, Henry. F. Korth, S. Sudarshan, McGraw Hill Education(India) Private Limited 1, 6th edition.(**Part of UNIT-I, UNIT- IV**)

REFERENCE BOOKS:

1. Database Systems, 6th edition, R Elmasri, Shamkant B.Navathe, Pearson Education.
2. Database System Concepts, Peter Rob & Carlos Coronel, Cengage Learning.
3. Introduction to Database Management, M. L. Gillenson and others, Wiley Student Edition.
4. Database Development and Management, Lee Chao, Auerbach publications, Taylor & Francis Group.
5. Introduction to Database Systems, C. J. Date, Pearson Education.

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INFORMATION SYSTEMS
(Professional Elective - I)**B.Tech. III Year II Sem.**
Course Code: EM613PE

L	T	P	C
3	0	0	3

UNIT - I

Introduction: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital Libraries and Data Warehouses, Information Retrieval System Capabilities - Search, Browse, Miscellaneous.

UNIT - II

Cataloging and Indexing: Objectives, Indexing Process, Automatic Indexing, Information Extraction, Data Structures: Introduction, Stemming Algorithms, Inverted File Structures, N-Gram Data Structure, PAT Data Structure, Signature File Structure, Hypertext Data Structure - Automatic Indexing: Classes of Automatic Indexing, Statistical Indexing, Natural Language, Concept Indexing, Hypertext Linkages.

UNIT - III

Document and Term Clustering: Introduction, Thesaurus Generation, Item Clustering, Hierarchy of Clusters - User Search Techniques: Search Statements and Binding, Similarity Measures and Ranking, Relevance Feedback, Selective

UNIT - IV

Dissemination of Information Search, Weighted Searches of Boolean Systems, Searching the Internet and Hypertext - Information Visualization: Introduction, Cognition and Perception, Information Visualization Technologies.

UNIT - V

Text Search Algorithms: Introduction, Software Text Search Algorithms, Hardware Text Search Systems, Information System Evaluation: Introduction, Measures used in System Evaluation, Measurement Example – TREC Results.

TEXT BOOKS:

1. Information Storage and Retrieval Systems: Theory and Implementation by Kowalski, Gerald, Mark T Maybury, Springer.
2. Modern Information Retrieval by Ricardo Baeza-Yates, Pearson Education, 2007.
3. Information Retrieval: Algorithms and Heuristics by David A Grossman and Ophir Frieder, 2nd Edition, Springer, 2004.

REFERENCES:

1. Information Retrieval Data Structures and Algorithms by William B Frakes, Ricardo Baeza-Yates, Pearson Education, 1992.
2. Information Storage & Retrieval by Robert Korfhage – John Wiley & Sons.
3. Introduction to Information Retrieval by Christopher D. Manning and Prabhakar Raghavan, Cambridge University Press, 2008.

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DATA STRUCTURES
(Professional Elective – I)

B.Tech. III Year II Sem.**Course Code: EM614PE/MT621OE**

L	T	P	C
3	0	0	3

Course Objectives:

- To understand the basic concepts such as Abstract Data Types, Linear and Non Linear Data structures.
- To understand the notations used to analyze the Performance of algorithms.
- To understand the behavior of data structures such as stacks, queues, trees, hash tables, search trees, Graphs and their representations.
- To choose the appropriate data structure for a specified application.
- To understand and analyze various searching and sorting algorithms.
- To write programs in C to solve problems using data structures such as arrays, linked lists, stacks, queues, trees, graphs, hash tables, search trees.

Course Outcomes:

- Learn how to use data structure concepts for realistic problems.
- Ability to identify appropriate data structure for solving computing problems in respective language.
- Ability to solve problems independently and think critically.

UNIT - I

Basic concepts- Algorithm Specification-Introduction, Recursive algorithms, Data Abstraction Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations, Introduction to Linear and Non Linear data structures.

Singly Linked Lists-Operations-Insertion, Deletion, Concatenating singly linked lists, Circularly linked lists-Operations for Circularly linked lists, Doubly Linked Lists-Operations- Insertion, Deletion.

Representation of single, two dimensional arrays, sparse matrices-array and linked representations.

UNIT- II

Stack ADT, definition, operations, array and linked implementations in C, applications-infix to postfix conversion, Postfix expression evaluation, recursion implementation, Queue ADT, definition and operations ,array and linked Implementations in C, Circular queues-Insertion and deletion operations, Deque (Double ended queue)ADT, array and linked implementations in C.

UNIT- III

Trees – Terminology, Representation of Trees, Binary tree ADT, Properties of Binary Trees, Binary Tree Representations-array and linked representations, Binary Tree traversals, Threaded binary trees, Max Priority Queue ADT-implementation-Max Heap-Definition, Insertion into a Max Heap, Deletion from a Max Heap.

Graphs – Introduction, Definition, Terminology, Graph ADT, Graph Representations-Adjacency matrix, Adjacency lists, Graph traversals- DFS and BFS.

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UNIT- IV

Searching- Linear Search, Binary Search, Static Hashing-Introduction, hash tables, hash functions, Overflow Handling.

Sorting-Insertion Sort, Selection Sort, Radix Sort, Quick sort, Heap Sort, Comparison of Sorting methods.

UNIT- V

Search Trees-Binary Search Trees, Definition, Operations- Searching, Insertion and Deletion, AVL Trees-Definition and Examples, Insertion into an AVL Tree ,B-Trees, Definition, B-Tree of order m, operations-Insertion and Searching, Introduction to Red-Black and Splay Trees(Elementary treatment-only Definitions and Examples), Comparison of Search Trees. Pattern matching algorithm- The Knuth-Morris-Pratt algorithm, Tries (examples only).

TEXT BOOKS:

1. Fundamentals of Data structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson-Freed, Universities Press.
2. Data structures A Programming Approach with C, D. S. Kushwaha and A. K. Misra, PHI.

REFERENCE BOOKS:

1. Data structures: A Pseudo code Approach with C, 2nd edition, R. F. Gilberg and B.A. Forouzan, Cengage Learning.
2. Data structures and Algorithm Analysis in C, 2nd edition, M.A.Weiss, Pearson.
3. Data Structures using C, A. M. Tanenbaum, Y. Langsam, M. J. Augenstein, Pearson.
4. Data structures and Program Design in C, 2nd edition, R. Kruse, C. L. Tondo and B. Leung, Pearson.
5. Data Structures and Algorithms made easy in JAVA, 2nd Edition, Narsimha Karumanchi, Career Monk Publications.
6. Data Structures using C, R.Thareja, Oxford University Press.
7. Data Structures, S. Lipschutz, Schaum's Outlines, TMH.
8. Data structures using C, A. K. Sharma, 2nd edition, Pearson.
9. Data Structures using C &C++, R. Shukla, Wiley India.
10. Classic Data Structures, D. Samanta, 2nd edition, PHI.
11. Advanced Data structures, Peter Brass, Cambridge.

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COMPUTER NETWORKS LAB**B.Tech. III Year II Sem.****Course Code: EM604PC****L T P C****0 0 3 2****Course Objectives:**

- To Understand the functionalities of various layers of OSI model
- To understand the operating System functionalities

Course Outcomes:

- Ability to understand the encryption and decryption concepts in Linux environment
- Ability to apply appropriate algorithm for the finding of shortest route.
- Ability to configure the routing table

System/ Software Requirement

- Intel based desktop PCs LAN CONNECTED with minimum of 166 MHZ or faster processor with at least 64 MB RAM and 100 MB free disk space

Computer Networks Lab:

1. Implement the data link layer framing methods such as character, character stuffing, and bit stuffing.
2. Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC CCIP .
3. Implement Dijkstra's algorithm to compute the Shortest path thru a graph.
4. Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table at each node using distance vector routing algorithm
5. Take an example subnet of hosts. Obtain broadcast tree for it.
6. Take a 64 bit playing text and encrypt the same using DES algorithm.
7. Write a program to break the above DES coding
8. Using RSA algorithm encrypts a text data and Decrypt the same.

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MICROPROCESSORS AND MICROCONTROLLERS LAB**B.Tech. III Year II Sem.****Course Code: EC605PC**

L	T	P	C
0	0	3	2

Note: - Minimum of 12 experiments to be conducted.

The following programs/experiments are to be written for assembler and to be executed the same with 8086 and 8051 kits.

List of Experiments:

1. Programs for 16 bit arithmetic operations 8086(using various addressing modes)
2. Programs for sorting an array for 8086.
3. Programs for searching for a number of characters in a string for 8086.
4. Programs for string manipulation for 8086.
5. Programs for digital clock design using 8086.
6. Interfacing ADC and DAC to 8086.
7. Parallel communication between two microprocessor kits using 8255.
8. Serial communication between two microprocessor kits using 8251.
9. Interfacing to 8086 and programming to control stepper motor.
10. Programming using arithmetic, logical and bit manipulation instructions of 8051.
11. Program and verify Timer/Counter in 8051.
12. Program and verify interrupt handling in 8051.
13. UART operation in 8051.
14. Communication between 8051 kit and PC
15. Interfacing LCD to 8051
16. Interfacing Matrix/Keyboard to 8051
17. Data transfer from peripheral to memory through DMA controller 8237/8257

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ADVANCED ENGLISH COMMUNICATION SKILLS (AECS) LAB

B.Tech. III Year II Sem.
Course Code: EN606HS

L	T	P	C
0	0	3	2

Introduction:

A course on Advanced English Communication Skills (AECS) Lab is considered essential at the third year level of B.Tech and B. Pharmacy courses. At this stage, the students need to prepare themselves for their career which requires them to listen to, read, speak and write in English both for their professional and interpersonal communication. The main purpose of this course is to prepare the students of Engineering for their placements.

Course Objectives: This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve students' fluency in spoken English
- To enable them to listen to English spoken at normal conversational speed
- To help students develop their vocabulary
- To read and comprehend texts in different contexts
- To communicate their ideas relevantly and coherently in writing
- To make students industry-ready
- To help students acquire behavioural skills for their personal and professional life
- To respond appropriately in different socio-cultural and professional contexts

Course Outcomes: Students will be able to:

- Acquire vocabulary and use it contextually
- Listen and speak effectively
- Develop proficiency in academic reading and writing
- Increase possibilities of job prospects
- Communicate confidently in formal and informal contexts

Syllabus: The following course activities will be conducted as part of the Advanced English Communication Skills (AECS) Lab:

1. **Inter-personal Communication and Building Vocabulary** - Starting a Conversation – Responding Appropriately and Relevantly – Using Appropriate Body Language – Role Play in Different Situations - Synonyms and Antonyms, One-word Substitutes, Prefixes and Suffixes, Idioms and Phrases and Collocations.
2. **Reading Comprehension** –General Vs Local Comprehension, Reading for Facts, Guessing Meanings from Context, , Skimming, Scanning, Inferring Meaning.
3. **Writing Skills** – Structure and Presentation of Different Types of Writing – Letter Writing/Resume Writing/ e-correspondence/ Technical Report Writing.
4. **Presentation Skills** – Oral Presentations (individual or group) through JAM Sessions/Seminars/PPTs and Written Presentations through Posters/Projects/Reports/ e-mails/Assignments... etc.,
5. **Group Discussion and Interview Skills** – Dynamics of Group Discussion, Intervention, Summarizing, Modulation of Voice, Body Language, Relevance, Fluency and Organization of Ideas and Rubrics of Evaluation- Concept and Process,

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Pre-interview Planning, Opening Strategies, Answering Strategies, Interview through Tele-conference & Video-conference and Mock Interviews.

Minimum Hardware Requirement:

Advanced English Communication Skills (AECS) Laboratory shall have the following infrastructural facilities to accommodate at least 35 students in the lab:

- **Spacious room with appropriate acoustics**
- **Eight round tables with five movable chairs for each table.**
- **Audio-visual aids**
- **LCD Projector**
- **Public Address system**
- **Computer with suitable configuration**

Suggested Software: The software consisting of the prescribed topics elaborated above should be procured and used.

- **Oxford Advanced Learner's Compass, 8th Edition**
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**

REFERENCES:

1. Kumar, Sanjay and Pushp Lata. English for Effective Communication, Oxford University Press, 2015.
2. Konar, Nira. English Language Laboratories – A Comprehensive Manual, PHI Learning Pvt. Ltd., 2011.

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