

Faculty of Engineering & Technology  
 KAKATIYA UNIVERSITY, WARANGAL -506009  
 Department of Computer Science & Engineering  
 Department of Information Technology

**B.TECH IN ENGINEERING  
 CSE/IT  
 III SEMESTER**

Sl. No	Category/ Code	Course Title	L	T	P	Credits
1	MC-210	Environmental Science	2	0	0	0
2	BSC105	Mathematics – III	3	0	0	3
3	ESC-301	Analog Electronics	3	1	0	4
4	PCS-301	Data Structures using “C”	3	1	0	4
5	PCS-302	Computer Architecture & Organization	3	1	0	4
6	ECC-301L	Analog Electronics Lab	0	0	3	1.5
7	PCS-301L	Data Structures Lab	0	0	4	2
8	PCS-303L	IT Workshop using “C” Lab.	-	-	3	1.5
		Total Contact Hours		27		20

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**B. Tech. (CSE/IT) III SEMESTER**

**MC-210**

**ENVIRONMENTAL SCIENCES**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
2	0	0	0	External Marks: 70

**UNIT-I (8)**

**Introduction to Environmental Science:** Environment and society, major environmental issues: Ozone layer depletion, Acid rains, global climate change etc, sustainable development, Environmental impact assessment, environmental management

**Natural Resources Utilization and its Impacts:** Energy, minerals, water and land resources, Resource consumption, population dynamics, urbanization.

**UNIT-II (8)**

**Ecology and Biodiversity:** Energy flow in ecosystem, food chain, nutrient cycles, eutrofication value of biodiversity, biodiversity at global, national and local levels, threats for biodiversity, conservation of biodiversity.

**UNIT-III (8)**

**Water Pollution:** Sources, types of pollutants and their effects, water quality issues, contaminant transport, self-purification capacity of streams and water bodies, water quality standards, principles of water and wastewater treatment.

**UNIT-IV (8)**

**Air Pollution:** Sources, classification and their effects, Air quality standards, dispersion of pollutants, control of air pollution, automobile pollution and its control.

**UNIT-V (8)**

**Solid Waste Management:** Sources and characteristics of solid waste, effects, Collection and transfer system, disposal methods.

**Text Books:**

1. M. Chandrasekhar, Environmental science, Hi Tech Publishers, 2009.
2. P.N. Modi (2006), Water supply Engineering – Environmental Engineering (Vol. I) – Standard Book House.
3. Gerard Kiely, Environmental Engineering, McGraw Hill Education Pvt Ltd, Special Indian Edition, 2007.

**References:**

1. W P Cunningham, M A Cunningham, Principles of Environmental Science, Inquiry and Applications, Tata McGraw Hill, Eighth Edition, 2016.

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**B. Tech. (CSE/IT) III SEMESTER**

**BSC-105**

**Mathematics - III**

**STATISTICS, PROBABILITY, AND NUMERICAL TECHNIQUES**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

**Module1: Statistical Methods**

Introduction, Collection of Data, Graphical Representation, Measures of Dispersion, Moments, Skewness, Kurtosis, Correlation, Coefficient of Correlation, Lines of Regression.

(Sections 25.1, 25.2, 25.3, 25.6, 25.9, 25.10, 25.11, 25.12, 25.13, 25.14 of Text Book)

**Module2: Probability & Distributions**

Probability, Addition Law of Probability, Independent Events, Baye's Theorem, Random Variable, Continuous Probability Distribution, Expectation, Moment Generating Function, Binomial Distribution, Poisson Distribution, Normal Distribution, Exponential Distribution. (Sections 26.1, 26.4, 26.5, 26.6, 26.7, 26.9, 26.10, 26.11, 26.14, 26.15, 26.16, 26.19(6) of Text Book)

**Module3: Numerical Techniques-I**

Solution of Algebraic and Transcendental Equations, Principle of Least Squares, Method of Least Squares, Fitting of Other Curves, Finite Differences, Forward Differences, Backward Differences. (Sections 28.2, 24.4, 24.5, 24.6, 30.2, 30.2(1), 30.2(2) Of Text Book)

**Module4: Numerical Techniques-II**

Central Differences, Other Difference Operators, Newton's Interpolation Formulae, Gauss's Forward Interpolation Formula, Interpolation with Unequal Intervals, Numerical Differentiation. Sections 29.7, 29.4, 29.6, 29.7(1), 29.9, 30.1. of Text Book)

**Module5: Numerical Techniques-III**

Numerical Integration, Trapezoidal Rule, Simpson's one-third Rule, Simpson's three-eighth Rule, Weddle's Rule, Solution of Simultaneous Linear Equations (Iterative Methods)

(Sections 30.4, 30.6, 30.7, 30.8, 30.10, 28.5 of Text Book)

**Text Book:**

B.S Grewal, Higher Engineering Mathematics, 43<sup>rd</sup> Edition, Khanna Publications.

**References**

1. Erwin Kreyszig, Advanced Engineering Mathematics, 8<sup>th</sup> Edition, John Wiley & Sons
2. S.C. Gupta, V.K. Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand & Sons
3. S.S. Sastry, Introductory Methods of Numerical Analysis, PHI Learning Pvt. Ltd.

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**B. Tech. (CSE/IT) III SEMESTER**

**ESC 301**

**ANALOG ELECTRONICS**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	-	4	External Marks: 70

**UNIT-I**

**Review of Semiconductor Devices:** P-N junction and V-I characteristics, static and dynamic resistance, effect of temperature on V-I characteristics, Avalanche and Zener breakdown, Zener diode

**Regulated power supply:** Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Rectifiers with capacitive and inductive Filters, Voltage regulator, Block diagram of switched mode power supply

**UNIT-II**

**Bipolar Junction Transistor (BJT):** Principle of Operation, Common Emitter, Common Base and Common Collector Configurations and characteristics, Transistor as an amplifier and switch

**DC Analysis:** Operating point, DC & AC load lines, Biasing - Fixed Bias, Self Bias, Bias Stability, Thermal runaway and stabilization

**UNIT-III**

**Field Effect Transistor (FET):** Construction, Principle of Operation, V-I Characteristic and DC analysis of JFET, MOSFET, FET application as switch and amplifier.  
Frequency response of BJT and FET RC coupled amplifier,

**UNIT-IV**

**Feedback:** Advantages of negative feedback and effect of negative feedback on amplifier characteristics

**Positive feedback:** Condition for Oscillations, RC type Oscillators-RC phase shift and Wien-bridge Oscillators, LC type Oscillators –Hartley and Colpitts Oscillators, Crystal Oscillator.

**UNIT-V**

**Operational Amplifier:** Block diagram and Ideal characteristics, pin diagram and practical characteristics of IC 741, Op-amp application as adder, subtractor, difference amplifier, differentiator, integrator and square wave (clock pulse) generator (Qualitative treatment only)

**Timer:** 555 timer as mono-stable and astable mode and its basic application as square wave generator. (Qualitative treatment only)

**TEXT BOOKS:**

1. Jacob Millman & Christos C. Halkias, *Electronic Devices and Circuits*, McGraw Hill Education.
2. Robert L. Boylestad, Louis Nashelsky, *Electronic Devices and Circuits theory*, 11th Edition, 2009, Pearson
3. Roy Choudhary, Shail Jain, *Linear Integrated Circuits*, New Age International, New Delhi.

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**B. Tech. (CSE/IT) III SEMESTER**  
**PCS – 301**  
**DATA STRUCTURES USING “ C”**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	-	4	External Marks: 70

### **UNIT-I**

#### **Introduction**

Introduction to data structure, types of data structures, revision of arrays, memory representation of arrays, operations on arrays, static versus dynamic memory allocation, pointers, self-referential structure Time complexity.

### **UNIT-II**

#### **Linked lists**

Single linked list representation, operations on single linked list, Circular linked list and its operations, Doubly linked list and its operations, applications of lists, polynomial representation using lists.

### **UNIT-III**

#### **Stack-Queue (Linear Data structures)**

Definition of stack, operations on stack, implementation of stack using arrays and linked lists, application of stack, postfix evaluation using stack, conversion of infix to postfix and prefix expressions.

Definition of queue, operations on queue, implementation of queue using arrays and linked list, applications of queue, Circular queue and priority queue.

### **UNIT-IV**

#### **Trees-Graphs (Nonlinear Data structures)**

Definition of trees, Terminology on trees, binary tree, binary search tree and its operations, tree traversal techniques.

Definition of graph, terminology on graphs, representation of graphs, graph traversal techniques, spanning tree, minimum spanning tree algorithms.

**UNIT-V****Searching-Sorting**

Searching: Linear search, Binary search

Sorting: Bubble sort, Insertion sort, selection sort, quick sort and merge sort.

**Text Books:**

1. Ellis Horowitz, Sartaj Sahani, Dinesh Metha, "Fundamentals of data structures in C", Galgotia Publications Pvt. Ltd, ISBN 81-203-1874-9.
2. D. Samanta, "Classic data structures", Printice Hall India, ISBN 81-203-1874-9.

**Reference Books:**

1. Data Structures Using C, SIXTH edition, E. Balaguru Swamy, Tata McGraw-Hill, ISBN 1-25-9029544-9.
2. Fundamentals Of Data Structures In C, Horowitz, Sahni, Universities Press ISBN 10: 8173716056

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**B. Tech. (CSE/IT) III SEMESTER**

**PCS – 302**

**COMPUTER ARCHITECTURE AND ORGANIZATION**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	-	4	External Marks: 70

**UNIT-I**

**Review of Computer Systems:** The Evolution of Computers, Basic Functional Units and Operation of Digital Computers, Performance Measures.

**Number Representation:** Integer, Signed, Unsigned, 1's Complement, 2's Complement, r's Complement, Addition and Subtraction of Signed Numbers, Overflow in Integer Arithmetic, Fixed and Floating Point Representation, IEEE 754 Representation, BCD , Gray code.

**Instructions:** Memory Location and Address: Byte addressability, Big endian & Little endian assignments, Word alignment, Accessing Numbers, Characters and Character strings. Addressing modes, Instruction Format: Three, Two, One, Zero Address Instructions, Risk Instructions, Modes of Instructions, Instruction Sequencing, Assembly Language, Stacks and Queues, Subroutines.

**UNIT-II**

**Central Processing Unit:** Fundamental Concepts, Execution of Complete Instruction, Control Unit, Micro Programming Control Unit, Hardwired Control Unit, Study of 8088, Power Pc Processor.

**Memory Unit:** Basic Concepts of Memory, Memory Hierarchy, Technology: RAM, ROM, Flash Memory, EPROM, Cache Memory: Different Mapping Functions, Replacement Algorithms,

**Performance Considerations:** Interleaving, Hit Rate, Miss Penalty, Caches on Processor Chip, Virtual Memory: Address Translation, Associative Memory, Page replacement algorithms. Secondary Storage: Magnetic Hard disk, Optical Disk, Magnetic Tape.

**UNIT-III**

**Computer Arithmetic:** Addition & Subtraction of Signed Numbers, Carry look ahead adder, Multiplication of positive numbers, Booth's Algorithm, Fast Multiplication, Integer Division, Floating Point Arithmetic Operation: Addition, Subtraction, Multiplication & Division .

**Input/Output Unit:** I/O Interface: I/O Bus and Interface Modules, I/O Vs Memory Bus, Isolated I/O, Memory Mapped I/O, Synchronous & Asynchronous Data Transfer, Modes of Data Transfer: Programmed I/O, Interrupt initiated I/O, Priority Interrupt: Daisy Chaining Priority, Parallel Priority, Interrupt, Priority Encoder, Interrupt Cycle, Software Routine, DMA, Interface Circuit: Parallel, Port, Serial Port, Standard I/O Interfaces: PCI Bus, SCSI Bus, Universal Serial Bus.



**UNIT-IV**

Computer Peripherals: Input Devices: Keyboard, mouse, joystick, track ball, touch pad , scanners.  
Output Devices: Video displays, flat panel display, printers, graphics accelerators.

**Pipelining:** Basic concepts, Data & instruction hazards, Influence on instruction sets, Data path and control considerations, Super scalar operations.

Introduction to RISC, CISC. Introduction to parallel processing, interprocessor communication & synchronization

**UNIT-V**

**Large Computer Systems:** Forms of Parallel Processing, Array Processors, The Structure of General purpose multiprocessor, Interconnection Networks, Memory Organization, Program Parallelism and Shared Variables

**Text Books:**

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky Computer Organization, Tata McGraw Hill, 5/e

**Reference Books:**

1. Morris M. Mano, Computer System Architecture, PHI, 3rd Edition
2. John P. Hayes, Computer Architecture and Organization, McGraw Hill, 3/e
3. Andrew S. Tanenbaum, Structured Computer Organization, 6/e

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**B. Tech. (CSE/IT) III SEMESTER**  
**ESC – 301L**  
**ANALOG ELECTRONICS - LAB**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 25
-	-	3	1.5	External Marks: 50

- 1) Characteristics of PN junction and Zener diode
- 2) Full wave rectifier with and without filters
- 3) Characteristics of common base and common emitter BJT amplifier
- 4) Frequency response of RC coupled amplifier
- 5) Characteristics of common source FET amplifier
- 6) Design of different oscillators using BJT and FET
- 7) Op-amp applications as adder/Subtractor,
- 8) Op-amp applications as differentiator/integrator
- 9) 555 timer astable mode of operation i.e. square wave generator

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**B. Tech. (CSE/IT) III SEMESTER**  
**PCS- 301L**  
**DATA STRUCTURES USING “C” LAB**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 25
-	-	3	1.5	External Marks: 50

**LIST OF EXPERIMENTS**

1. Program to implement array operations.
2. Program to represent sparse matrix using array, and display its transpose.
3. Program to perform addition of two sparse matrices.
4. Program to implement stack and its operations using arrays.
5. Program to implement stack operations using arrays.
6. Program to implement multiple stacks in single array.
7. Program to convert infix expression to postfix expression.
8. Program to convert given infix expression to prefix expression.
9. Program to evaluate given postfix expression.
10. Program to implement queue operations using arrays.
11. Program to implement circular queue operations using arrays.
12. Program to create single linked list and implement its operations.
13. Program to implement double linked list and its operations.
14. Program to implement stack and queue using linked list.
16. Program to implement binary search tree and traversing techniques.
15. Program for linear search and binary search.
16. Programs for bubble sort, selection sort, insertion sort, quick sort and merge sort.

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**B. Tech. (CSE/IT) IV SEMESTER**

**PCS 303L**

**IT WORKSHOP - LAB**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 25
-	-	3	1.5	External Marks: 50

**LIST OF EXPERIMENTS**

**PC 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

**Task 5:** Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

**Task 6:** Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

### **LaTeX and Word**

**Task 1 – Word Orientation:** The mentor needs to give an overview of LaTeX and Microsoft (MS) office2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

**Task 2: Using LaTeX and Word** to create 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 LaTeX 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**

**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,

**Task 3: Performance Analysis** - Features to be covered:- Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

### **LaTeX and MS/equivalent (FOSS) tool Power Point**

**Task1:** Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and Power point. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

**Task 2:** Second week helps students in making their presentations interactive. Topic covered during this week includes: Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

**Task 3:** Concentrating on the in and out of Microsoft power point and presentations in LaTeX. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

**Reference books:**

1. Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dreamtech.
2. The Complete Computer upgrade and repair book, 3rd Edition, Cheryl A Schmidt, WILEY Dreamtech.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. PC Hardware and 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 KenQuamme. – CISCO Press, Pearson Education.
7. IT Essentials PC Hardware and Software Labs and StudyGuide Third Edition by Patrick Regan – CISCO Press, Pearson Education.
8. Microsoft Office 2007: The Missing Manual - Chris Grover, Mathew MacDonald, E.A. Vander Veer O'reilly Media.

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**B.TECH IN ENGINEERING  
CSE/IT  
IV SEMESTER**

Sl. No	Category / Code	Course Title	L	T	P	Credits
1	MC-220	Constitution of Indian	2	0	0	0
2	ESC-401	Digital Electronics	2	1	0	3
3	PCS-401	Mathematical Foundations in Computer Science	3	1	-	4
4	PCS-402	Design and Analysis of Algorithms	3	1	-	4
5	PCS-403	Operating Systems	3	1	-	4
6	PCS-404	OOP Through JAVA	3	1	0	4
7	PCS-403L	Operating Systems Lab.	-	-	3	1.5
8	PCS-404L	OOP Through JAVA Lab	-	-	3	1.5
Total Contact Hours			27			22

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**B. Tech. (CSE/IT) IV SEMESTER**

**MC-220**

**CONSTITUTION OF INDIA**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
2	0	0	0	External Marks: 70

**UNIT -1**

1. Making of Indian Constitution - Constituent Assembly
2. Historical Perspective of the Constitution of India
3. Salient Features and characteristics of the Constitution of India

**UNIT -2**

1. The Fundamental Rights
2. The Fundamental Duties and their Legal Status
3. The Directive Principles of State Policy – Their Importance and Implementation

**UNIT -3**

1. Federal Structure and Distribution of Administrative, Legislative and Financial Powers between the Union and the States
2. Parliamentary Form of Government in India – The Constitutional Powers and Status of the President of India
3. Amendment of the Constitutional Provisions and Procedure

**UNIT -4**

1. The Judiciary
2. Constitutional and Legal Frame Work for Protection of Environmental in Global and National Level
3. Corporate Social Responsibility (CSR) International and National Scenario.

**Text books:**

1. D.D. Basu: An Introduction of Indian Constitution
2. Greanvile Austin: The Indian Constitution
3. Paras Diwan: Studies on Environmental cases



**References books:**

1. Khanna Justice.H.R: Making of India's Constitution, Eastern Book Companies.
2. Rajani Kothari: Indian Politics
3. Ghosh Pratap Kumar: The Constitution of India. How it has been Formed, World Press.
4. A.Agrawal (Ed): Legal Control of Environmental Pollution.

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**B. Tech. (CSE/IT) IV SEMESTER**

**ESC-401**

**DIGITAL ELECTRONICS**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
2	1	-	3	External Marks: 70

**UNIT-I**

**Number System and Boolean algebra And Switching Functions:** Number Systems, Base Conversion Methods, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal Code and its Properties, Unit Distance Codes, Alphanumeric Codes, Error Detecting and Correcting Codes.

**Boolean Algebra:** Basic Theorems and Properties, Switching Functions, Canonical and Standard Form, Algebraic Simplification, Digital Logic Gates, Universal Gates, NAND/NOR realizations.

**UNIT-II**

**Minimization of Boolean logic:** Introduction, the Karnaugh Map Method, four Variable Maps, Prime and Essential Implications, Don't Care Map Entries, Tabular Method, Minimization and Combinational Design

**Basic Combinational circuits:** Half adder, Full adder, half subtractor, full subtractor, serial and parallel adder, carry look ahead adder, adder/subtractor

**UNIT-III**

**Combinational logic circuits:** Decoder, implementation of Boolean equations using decoder of suitable size, Multiplexer, Logic implementation using multiplexer, Encoder, priority encoder, demultiplexer, comparator

**UNIT-IV**

**Sequential Circuits:** SR Flip flop, edge and level triggered clock pulse, direct and indirect inputs of flip flop, JK, D and T flip flops. Race around condition, Master slave JK flip flop

Application of Flip flop as shift register, Asynchronous counter, synchronous counter and ring counter. (Qualitative treatment only)

**UNIT-V**

**Logic Families:** Characteristics of logic families, RTL, DTL, HTL, ECL, TTL and CMOS logic family circuits and its operation.

**TEXT BOOKS:**

- 1) Switching and Finite Automata Theory- ZviKohavi&Niraj K. Jha, 3rd Edition, Cambridge.
- 2) Digital Design- Morris Mano, PHI, 3rd Edition.
- 3) R. P. Jain, Modern Digital Electronics, McGraw Hill Publishers'.

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**B. Tech. (CSE/IT) IV SEMESTER**

**PCS 401**

**MATHEMATICAL FOUNDATIONS IN COMPUTER SCIENCE**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	-	4	External Marks: 70

**UNIT – I**

**Set theory:** Introduction, Basic Concepts of Set Theory, Representation of Discrete Structures, Relations and Ordering, Functions. Algebraic Structures: Introduction, Algebraic Systems, Semi groups and Monoids, Groups, Lattices as Partially Ordered Sets, Boolean algebra

**UNIT -- II**

**Mathematical logic:** Introduction, Statements and Notation, Connectives, Normal Forms, Theory of Inference for the Statement Calculus, The Predicate Calculus, Inference Theory of the Predicate Calculus.

**UNIT - III**

**Propositional logic:** Syntax, semantics, validity of formulas, satisfiable and unsatisfiable formulas, encoding and examining the validity of some logical arguments

**Proof techniques:** Proof by Induction, proof by contradiction, contra positive proofs, proof of necessity and sufficiency; first order Logic: Brief introduction; Basics of soundness and completeness;

**UNIT – IV**

**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, Solutions of Inhomogeneous Recurrence Relations.

**UNIT – V**

**Graphs:** Basic Concepts, Isomorphism's and Sub graphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multigraphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

**Text Books:**

1. Discrete Mathematical Structures with Applications to Computer Science, J.P. Tremblay, R. Manohar, McGraw Hill education (India) Private Limited. (UNITS - I, II)
2. Discrete Mathematics for Computer Scientists & Mathematicians, Joe L. Mott, Abraham Kandel, Theodore P. Baker, Pearson , 2nd ed. (Units - IV, V )

**Reference Books:**

1. Discrete Mathematics by N Ch SN Iyengar, VM Chandrasekaran.
2. Discrete Mathematics and Graph Theory(Cengage Learning) by Sartha
3. Discrete Mathematics and its Applications. Kenneth H Rosen.(McGraw Hill)
4. Elements of Discrete Mathematics, C. L. Liu and D. P. Mohapatra, 4th edition, McGraw Hill education (India) Private Limited
5. Norman L. Biggs, Discrete Mathematics, Oxford University Press, 2nd edition, 2002.

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**B. Tech. (CSE/IT) IV SEMESTER**  
**PCS 402**  
**DESIGN AND ANALYSIS OF ALGORITHMS**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	-	4	External Marks: 70

### **UNIT - I**

**Introduction:** Algorithm, Performance Analysis-Space complexity, Time complexity, Asymptotic Notations- Big oh notation, Omega notation, Theta notation and little oh notation. Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication.

### **UNIT - II**

**Disjoint Sets:** Disjoint set operations, union and find algorithms

**Backtracking:** General method, applications, n-queen's problem, sum of subsets problem, graph coloring

### **UNIT - III**

**Dynamic Programming:** General method, applications- Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Traveling sales person problem, Reliability design.

### **UNIT - IV**

**Greedy method:** General method, applications-Job sequencing with deadlines, knapsack Problem, Minimum cost spanning trees, Single source shortest path problem.

### **UNIT - V**

**Branch and Bound:** General method, applications - Travelling sales person problem, 0/1 knapsack Problem - LC Branch and Bound solution, FIFO Branch and Bound solution.

**NP-Hard and NP-Complete problems:** Basic concepts, non deterministic algorithms, NP - Hard and NP Complete classes, Cook's theorem

**Text Books**

1. Introduction to Algorithms, second edition, T.H. Cormen, C.E. Leiserson, R.L. Rivest, and C. Stein, PHI Pvt. Ltd./ Pearson Education.
2. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharan, University Press.

**References**

1. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
2. Algorithm Design: Foundations, Analysis and Internet Examples, M.T. Goodrich and R. Tamassia, John Wiley and sons.

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**B. Tech. (CSE/IT) IV SEMESTER**

**PCS 403**

**OPERATING SYSTEMS**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	-	4	External Marks: 70

**UNIT - I**

**Overview** – Introduction-Operating System objectives, User view, System view, Operating system definition, Computer System Organization, Computer Systems Architecture, OS Structure, OS Operations, Process Management, Memory Management, Storage Management, Protection and Security, Computing Environments.

**Operating System services**, User and OS interface, system calls, types of system calls, system programs, operating system design and implementation, OS structure. General Structure of MSDOS, Windows 2000, Linux.

**UNIT – II**

**Process and CPU Scheduling-** Process Concepts – The Process, Process State, Process Control Block, Threads – Process Scheduling – Schedulers - Context Switch, Operations on Processes, System calls – fork(), exec(), wait(), exit(), Inter Process Communications - Process Management in UNIX.

**Process Scheduling-** Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple Processor Scheduling, Real Time Scheduling, Thread Scheduling,

**UNIT -III**

**Process Synchronization**, Background, Critical Section Problem – Two process solution, Synchronization Hardware, Semaphores – classic problems of synchronization, Monitors  
Case study of Linux and Unix.

**Deadlocks** – System Model, Deadlock Characterization, Methods of Handling Deadlocks, Deadlock prevention, avoidance, detection, recovery, Starvation, Critical Regions,



**UNIT- IV**

**Memory Management-** Memory Management Strategies- Background, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of Page Table,

**Virtual Memory Management-** Background, Demand Paging – Page Interrupt Fault, Page Replacement Algorithms, Allocation of Frames, Thrashing, Memory Management in UNIX, Windows.

**Storage Management** – File System- Concept of a File, System calls for file operations, Access Methods, Directory and Disk Structure – File System Mounting, File Sharing Protection.

**UNIT -V**

**File System Implementation** – File System Structure, File System Implementation, Directory Implementation, Allocation Methods, Free Space Management, Efficiency and Performance.

**Mass Storage Structure-** Over of Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Swap space management.

**Protection** - System Protection, Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Access Control, Revocation Access Rights, Capability Based Systems, Language Based Protection.

**Text Books**

1. Operating Systems Concepts – Abraham Silberschatz, Peter Galvin, Greg Gagne, 9<sup>th</sup> Edition, 2016, Wiley India Publications

**References**

1. Operating Systems – Internals and Design Principles, William Stallings, 7<sup>th</sup> Edition Pearson Education Asia Publications.
2. Modern Operating Systems – Andrew S. Tenenbaum, 3<sup>rd</sup> Edition, PHI Publications.
3. Operating Systems – Deitel & Deitel, Pearson Education Asia.

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**B. Tech. (CSE/IT) III SEMESTER**

**PCS – 404**

**OBJECT ORIENTED PROGRAMMING THROUGH JAVA**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	-	4	External Marks: 70

**UNIT-I**

**Programming Paradigms:** Procedural Programming, Modular Programming, Object Oriented Programming and Generic Programming, Object Oriented Programming Concepts.

**Java basics:** Creation of Java, Java buzzwords, Data types, Variables and Arrays, Operators, Control statements, introductions to classes and simple programs.

**UNIT-II**

**Classes and objects:** Creating classes and objects , visibility modes, constructors, Overloading methods, Passing and returning objects, Recursion, Variable length arguments, Nested and inner classes, static - variables, Blocks and methods.

**String:** Exploring String, StringBuffer, StringBuilder and StringTokenizer classes.

**UNIT-III**

**Inheritance:** Basic concepts, Types of inheritance, Using super, Creating multilevel inheritance, Method Overriding, Runtime polymorphism, Dynamic method dispatch, Using abstract classes, Using final with inheritance, The Object class.

**Packages and interfaces:** Packages, Access Protection, Importing packages, Interfaces –Defining an interface, Implementing interfaces, Nested interfaces, Applying interfaces, Variables in interfaces, Interfaces can be extended.

**UNIT-IV**

**Exception handling:** Fundamentals of exception handling, exception type, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built in exceptions, creating own exceptions

**Using I/O:** The Predefined Streams, Using byte streams, Reading and writing Files using byte streams, Using Java's Character-based streams, Using Java's type wrappers to Convert Numeric Strings

### **UNIT-V**

**Applets:** Applet basics, applet skeleton, Applet initialization and termination, Requesting repainting, Using the status window, Passing parameters to Applets.

**AWT:** AWT classes, Window Fundamentals, Working with Frame Windows, Creating a Frame Window in an applet AWT Controls: Control Fundamentals, Labels, Using Buttons, Check Boxes, Choice Controls, Lists, Scroll Bars, Text Field, Text Area, Understanding Layout Managers, Menu Bars and Menus, Dialog Boxes.

### **Text Books:**

1. Herbert Schildt, "JAVA The Complete Reference", *9th Edition, McGraw-Hill Education India Pvt.Ltd*, ISBN: 9781259002465, 2011.
2. Herbert Schildt, Dale Skrien, "Java Fundamentals (A Comprehensive Introduction)", *1st Edition, McGraw Hill Education*, ISBN-13: 978-1-25-900659-3, 2013. (Chapters: 11, 15, 17, 18).

### **Reference Books:**

1. Sachin Malhotra, Saurabh Choudhary, "Programming in JAVA", *2nd Edition, Oxford Publications*, ISBN-13: 978-0-19-809485-2, 2013. (Chapters: 1 to 8, 12 to 15)
2. Kathy Sierra, Bert Bates, "Head First Java", *2nd Edition, O'Reilly Publications*, ISBN-13: 978-0596009205, 2013.
3. UttamK.Roy, "Advanced JAVA Programming", *1st edition, Oxford Publications*; ISBN-13: 978-0199455508, 2013.

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**B. Tech. (CSE/IT) IV SEMESTER**

**PCS 403L**

**OPERATING SYSTEMS - LAB**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 25
-	-	3	1.5	External Marks: 50

**LIST OF EXPERIMENTS**

1. Unix Commands, File permissions, VI editor, UNIX shell programming fundamentals.
2. Programs on Process creation using fork(), exec() and wait() system calls.
3. Programs on Implementation of pipes and FIFOs
4. Programs on CPU Scheduling algorithms like FCFS, LRU etc.
5. Programs on semaphores, readers and writers problem.
6. Programs on Implementation of Bankers' Algorithm.
7. Programs on Implementation of paging table.
8. Programs on Implementation of Page Replacement Algorithms,
9. Programs on Implementation of File Access Methods.
10. Programs on Implementation of Access Matrix.
11. Programs on Implementation of File Allocation Methods.

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**B. Tech. (CSE/IT) III SEMESTER**

**PCS – 404L**

**OBJECT ORIENTED PROGRAMMING THROUGH JAVA - LAB**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 25
-	-	3	1.5	External Marks: 50

**List of Experiments**

**Experiment-I**

1. Write a program to demonstrate control structures using sample of displaying prime numbers within a given range.
2. Write a program to read an array and display them using for-each control. Finally display the sum of array elements.
3. Write a program to read a matrix and display whether it is an identity matrix or not. Use civilized form of *break* statement.
4. Write a program to define a two dimensional array where each row contains different number of columns. Display the 2D-array using for-each.

**Experiment-II**

1. Write a program to demonstrate creating classes and objects with different visibility modes.
2. Write a program to demonstrate passing objects to methods.
3. Write a program to demonstrate constructors.
4. Write a program to demonstrate static variables.

**Experiment-III**

1. Read at least 5 strings from command line argument and display them in sorted order.
2. Accept the string, count number of vowels and remove all vowels using *StringBuffer* class.
3. Accept a line of text, tokenize the line using *StringTokenizer* class and print the tokens in reverse order.

**Experiment-IV**

1. Write program to demonstrate single inheritance.
2. Write program to demonstrate multilevel-inheritance.
3. Write program to demonstrate run time polymorphism java.
4. Write a program to demonstrate use of abstract class.
5. Write a program to demonstrate the use of overriding *equals()* method of an Object class.

**Experiment-V**

1. Write a program to create a package, and demonstrate to import a package into our file.
2. Write a program to implement multiple interfaces into single class.

**Experiment-VI**

1. Write a program to demonstrate exceptions using try and catch.
2. Handle *Array Index Of Bounds Exception*, *Number Format Exception* and *Arithmetic Exception* using multiple catch blocks.
3. Write a program to demonstrate re-throw of exception, and finally block.

**Experiment-VII**

1. Write a program to demonstrate wrapper class using sample of reading two integer numbers from command line and display their quotient.
2. Write a program to demonstrate Character-based streams.
3. Write a program to show the content of the specified file.
4. Write a program to copy the content of one file to another.

**Experiment-VIII**

1. Develop an applet to display “Good Morning” if current time is between 6AM and 12PM and “Good Afternoon” if the current time is between 12PM and 6PM, and “Good Evening” if the current time is between 6PM and 12AM.
2. Develop an applet which draws different geometric shapes and fill them with different colors.
3. Implement an applet program to display moving banner.

**Experiment-X**

1. Design a registration form using java frame window with AWT controls
2. Write a program to create frame windows to include different controls with different layouts.

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**B. Tech. (IT) V SEMESTER**

S. No.	Course Code	Course Title	Scheme of Instruction			Lecture hrs/week	Scheme of Examination		Credits
			L	T	P		CIE	SEE	
1	PC3101IT	Database Management Systems	3	1	0	4	30	70	4
2	PC3102IT	Theory of Computation	3	1	0	4	30	70	4
3	ES3103IT	Principles of Signals and Systems	3	0	0	3	30	70	3
4	PE-I*	Professional Elective – I*	3	1	0	4	30	70	4
5	HS3108-	Managerial Economics and Accountancy	3	0	0	3	30	70	3
6	PC3109IT	Database Management Systems Lab	0	0	3	3	25	50	1.5
7	PE-I**	Professional Elective –I Lab**	0	0	3	3	25	50	1.5
<b>Total</b>			<b>15</b>	<b>3</b>	<b>6</b>	<b>24</b>	<b>200</b>	<b>450</b>	<b>21</b>

**\*(PE-I)Professional Elective - I**

**PE3104IT** Web Programming  
**PE3105IT** Advanced Java  
**PE3106IT** Advanced Data Structures

**\*\* (PE-I)Professional Elective – I Lab**

**PE3110IT** Web Programming Lab  
**PE3111IT** Advanced Java Lab  
**PE3112IT** Advanced Data Structures Lab

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**B. Tech. (IT) V SEMESTER****DATABASE MANAGEMENT SYSTEMS (PC3101IT)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	0	4	External Marks: 70

**UNIT – I**

**Introduction to Database System and its Applications:** Evolution of DBMS, File Systems versus a DBMS, Data Models, Levels of Abstraction in a DBMS, Data Independence, Structure of a DBMS.

**Data modeling:** Introduction to ER model, Naming, conventions, Entities, Attributes, and Entity Sets, Relationships and Relationship Types, Constraints.

**UNIT – II**

**Relational Model:** Introduction, constraints over relations, integrity constraints, Querying relational data, and logical data base design, introduction to views, Relational Algebra, Tuple relational Calculus, Domain relational calculus.

**UNIT – III**

**SQL:** Introduction, Syntax, Basic commands, Specifying constraints, Basic Queries, Nested Quires, Queries using different Clauses, Cursors, Triggers, Built-in SQL functions.

**Database Design refinement:** Informal Design guidelines, Issues of redundancy, null values and decomposition, functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join, multi-valued dependencies, FOURTH normal form, FIFTH normal form.

**UNIT – IV**

**Transaction Processing:** Introduction, Transaction State and desirable properties, Transaction schedules, Serializability, and Recoverability.

**Concurrency control Techniques:** Introduction, locking techniques and Timestamp Based Protocols.

**Database Recovery techniques:** Recovery Techniques based on deferred update, Recovery Techniques based on immediate update. Shadow Paging.

**UNIT – V**

**Data Storage and indexing:** File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree base Indexing, Comparison of File Organizations.

**Text Books**



1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata McGraw Hill 3<sup>rd</sup> Edition
2. Database System Concepts, Silberschatz, Korth, Mc Graw hill, V edition.

**References**

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel, 7thEdition.
2. SQL The Complete Reference, James R. Groff, Paul N. Weinberg, 3rd Edition,
3. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
4. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.

**B. Tech. (IT) V SEMESTER****THEORY OF COMPUTATION (PC3102IT)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

**UNIT – I****Introduction and Finite Automata:**

Alphabets, Strings, Languages, Definition and applications of Finite Automata (FA), acceptance of strings and languages, Deterministic Finite Automata (DFA) and its representation, Non Deterministic Finite Automata (NFA), transition diagrams and Language recognizers. Conversions and Equivalence of NFA and DFA, NFA with  $\epsilon$ - transitions and its conversion to NFA without  $\epsilon$ - transitions, Minimization of Automata, Equivalence between two Automata's,.

**UNIT – II****Finite Automata with output and Regular Expressions:**

Finite Automata with output- Moore and Mealy machines and its equivalence. Definition of Regular expression(RE), Algebraic laws for Regular Expressions, Applications of REs, Regular sets, Regular languages, Designing of Finite Automata for Regular expression, DFA to Regular expression, Arden's Theorem, Non Regular Languages, Pumping Lemma for regular Language, Applications of Pumping lemma, Closure properties of Regular languages.

**UNIT – III****Regular Grammar, Context Free Grammars and Languages:**

Formal definition of Grammar, Regular Grammar, Right linear and left linear grammars, Equivalence between regular grammars and Finite Automata, Chomsky Hierarchy of Grammar Context Free Grammar (CFG), Leftmost, Rightmost derivations, Ambiguity in grammars and languages. Designing of grammar for regular language, Simplification of Context Free Grammars, Closure Properties of CFL.

**UNIT – IV****Normal forms and Pushdown Automata:**

Definition of Normal Form, Chomsky Normal Form (CNF), Greiback normal form (GNF), Conversion of CFG to CNF and GNF.

Pushdown Automata: Definition of Push Down Automata( PDA) , Representation and Acceptance of PDA, Designing PDA, Equivalence of CFG and PDA, Pumping Lemma for Context Free Languages.

**UNIT –V****Context sensitive Languages and Turing Machine:**

Definition of Linear Bounded Automata and its Representation, Introduction to Turing Machines(TM), Definition and Representation of TM, Variations of TM: Multitape TMs, Non Deterministic TM, Universal TM, Designing of TM.

**Undesirability and Recursively enumerable languages:** Recursive and Recursively enumerable languages, Definition of Undecidable Problem, Halting Problem, Post's Correspondence Problem (PCP).

**Text Book:**

John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, Introduction to Automata Theory, Languages, and Computation, Pearson Education Asia, 3rd Edition, ISBN: 978-1292039053, 2013

Mishra K.L.P., Chandrasekaran N, "Theory Of Computer Science: Automata, Languages and Computation", PHI Learning Pvt. Ltd., 3rd Edition, ISBN: 978-81-203-2968-3, 2012

**Reference Books:**

Harry R. Lewis and Christos H. Papadimitriou, Elements of the Theory of Computation, Pearson Education Asia, 2nd edition, ISBN: 978-0132624787, 1998

Michael Sipser, Introduction to the Theory of Computation, PThomson South-Western, 3rd Edition, ISBN: 1133187811, 2012.

John Martin, Introduction to Languages and The Theory of Computation, Tata McGraw-Hill Education Pvt. Ltd., 4th Edition, ISBN: 9780073191461, 2010.

Dexter C. Kozen, Automata and Computability, Undergraduate Texts in Computer Science, Springer, 1 st Edition, ISBN: 9781461273097, 2012

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**B. Tech. (IT) V SEMESTER****PRINCIPLES OF SIGNALS AND SYSTEMS(ES3103IT)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	0	0	3	External Marks :70

**UNIT-I**

**Introduction to Signals & Systems:** Classification of signals, Operations on signals, types of systems, Exponential and Trigonometric Fourier series, Dirichlet's condition.

**UNIT-II**

**Fourier Transform:** Representation of aperiodic signal, Introduction of Fourier transform, Convergence, properties of Fourier Transform, Fourier transform of periodic signals, Singularity function, Parseval's theorem, Energy spectral density, Development of Discrete Time Fourier transform, Convergence issues associated with the DTFT.

**UNIT-III**

**Sampling:** Sampling of continuous time signals, sampling theorem, Aliasing effect, reconstruction of a signal and its samples.

**Convolution & Correlation of signals:** Convolution integral, Properties of convolution, Graphical method of convolution, Convolution of Discrete time signals, overlap-add and overlap-save method of discrete convolution, Definition of correlation, Auto correlation, Properties of Autocorrelation, Cross correlation of signals.

**UNIT-IV**

**Laplace Transform:** Review of Laplace transforms, region of convergence and properties, poles and zeros, relation between Laplace and Fourier transforms, properties of Laplace transform, inverse Laplace transform, Solutions to differential equation and system behavior.

**UNIT-V**

**Z Transform:** Definition of Z-Transform, Properties of Z-Transform, Region of convergence of Z-Transform, Inverse Z Transform using Inspection, Partial fraction expansion, Power series Expansion, Contour integration methods, Parseval's relation analysis of discrete time systems using Z-Transform. Realization of discrete time system using Direct form, Cascade parallel forms.

**References:**

1. Alan V. Oppenheim, Alan. S. Willsky, S Hamid Nawab, Signals and Systems, 2<sup>nd</sup> edition, Prentice Hall of India, 2007.
2. Lathi B.P., Signals Systems Communications", 1<sup>st</sup> edition, B.S. Publications, 2006.
3. Simon Haykin and Van veen, "Signal and system", Willy, second edition

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**B. Tech. (IT) V SEMESTER****Professional Elective - I****WEB PROGRAMMING(PE3104IT)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

**UNIT – I**

Web Basics- Introduction, Concept of Internet- Protocols of Internet, World Wide Web, URL, Web Server, Web Browser. HTML- Introduction, History of HTML, Structure of HTML Document: Text Basics, Images and Multimedia, Links and webs, Document Layout, Cascading Style Sheet- HTML 4 style sheet features, Creating Forms, Frames and Tables.

**UNIT – II**

Dynamic HTML- Introduction of DHTML- HTML vs. DHTML, Advantages of DHTML, CSS of DHTML, Event Handling, Data Binding, Browser Object Models. XML Introduction- Introduction of XML- Some current applications of XML, Features of XML, Anatomy of XML document, The XML Declaration, Element Tags- Nesting and structure, XML text and text formatting element, Table element, Mark-up Element and Attributes, Document Type Definition (DTD), types. XML Schema, Importance of XML schema, Creating Element in XML Schema, XML Schema Types.

**Introduction of Java Script:** JavaScript characteristics, Objects in Java Script, Dynamic HTML with Java Script.

**UNIT – III**

AJAX Introduction- Introduction, AJAX Introduction, AJAX Components, Handling Dynamic HTML with AJAX, CSS to Define Look and Feel, Understand the XML Mark-up, XMLHttpRequest. AJAX using XML and XMLHttpRequest- Introduction, AJAX Using XML and XMLHttpRequest, Accessing, Creating and Modifying XML Nodes, Loading XML Data into an HTML Page, Receiving XML Responses, Handling Response XML.

**UNIT – IV**

PHP Introduction- PHP Introduction, Structure of PHP, PHP Functions, AJAX with PHP, PHP Code and the Complete AJAX Example. AJAX with Database- Introduction, AJAX Database, Working of AJAX with PHP, AJAX PHP Database Form, AJAX PHP MySQL Select Query.

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**UNIT – V**

Active Server Page- Introduction, Introduction of ASP, ASP – Variables, ASP Control Structure, ASP Objects' Properties and Methods. ASP Database Connectivity- Introduction, ASP Components, ASP Database Connection, ASP Scripting Components.

**Text Books:**

1. Steven Holzner, "HTML Black Book", DreamTech press.
2. Web Technologies, Black Book, DreamTech Press
3. Web Applications: Concepts and Real World Design, Knuckles, Wiley-India
4. Internet and World Wide Web How to program, P.J. Deitel & H.M. Deitel Pearson.

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**B. Tech. (IT) V SEMESTER****Professional Elective - I****ADVANCED JAVA(PE3105IT)**

Teaching Scheme				Examination Scheme
<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	Internal Marks :30
3	1	0	4	External Marks:70

**UNIT – I****Swings, JavaFX and Event Handling:**

Swing: Introduction to swings, Comparison with AWT, Exploring Swing Components: JTextField, JLabel, Swing buttons, JPasswordField, JTable, JComboBox, JList, JTree, JColorChooser, Dialogs and Swing Menus.

Event Handling- The Delegation event model- Events, Event sources, Event Listeners, Event classes, Handling action, mouse and keyboard events, Adapter classes, Inner classes, Anonymous Inner classes.

GUI programming with JavaFX: JavaFX basic concepts, JavaFX Application Structure, JavaFX Controls and Event handling.

**UNIT –II****Networking and Collection frame work:**

Networking: Networking API, Inet address, TCP/IP client sockets, URL, URL connection, HttpURL connection, Cookies, TCP/IP server sockets, Datagrams.

Collections Frame work: Collection Interfaces, Collection Classes: Array Class, Vector Class, Stack Class, Dictionary class, Hash table Class. accessing using iterators, working with maps, comparators.

**UNIT – III****Java Database Connectivity (JDBC):**

Introduction, JDBC Drivers, JDBC Architecture, JDBC Classes and Interfaces, Loading a Driver, Making a Connection, Execute SQL Statement, statement, prepared statement, callable statement, Retrieving Result, Getting Database Information, Scrollable and Updatable Resultset, Result Set Metadata.

**UNIT - IV****Servlets:**

Servlet: Server-Side Java, Servlet Alternatives, Servlet Strengths, Servlet Architecture, Servlet Life Cycle, GenericServlet, HttpServlet, Exploring Servlet API, Handling HTTP Requests and Responses, Passing Parameters to Servlets, Retrieving Parameters, Session Tracking, Filters.

**UNIT - V**

**Java Server Pages(JSP):** The Problem with Servlets, Life Cycle of JSP Page, JSP Processing, JSP Application Design with MVC, Setting Up the JSP Environment. JSP Directives, JSP Action elements, JSP Implicit Objects, JSP Form Processing, JSP Session and Cookies Handling, JSP Session Tracking JSP Database Access, JSP Standard Tag Libraries, JSP Custom Tag, JSP Expression Language, JSP Exception Handling, JSP XML Processing, JSTL.

**Text Books**

1. Herbert Schildt, Java Complete Reference Tenth Edition, McGraw Hill.
2. JDBC, Servlets and JSP black book, Dreamtech Publishers.
3. Uttam K. Roy, Advanced Java programming, Oxford University Press.

**References**

1. Bert Bates , Kathy Sierra and , Bryan Basham, “ Head First Servlets & JSP”, O'Relly.
2. Sharanam Shah, Vaishali Shah, Java EE 7 for Beginners
3. Cay S. Horstmans, Gray Coronell, Core Java Vol. II – Advanced Features
4. Joel Murach, Michael Urban, Java Servlets and JSP, 3<sup>rd</sup>Edition, 2014
5. Cay S. Horstmann, Core Java Volume I – Fundamentals, Pearson, 2019
6. Joel Murach, Java Programming, 5<sup>th</sup>Edition, 2017



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**B. Tech. (IT) V SEMESTER****Professional Elective - I****ADVANCED DATA STRUCTURES (PE3106IT)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

**UNIT-I**

Hashing: General idea, Hash Function, Collision Resolution Techniques in Hashing, Separate Chaining, Open Addressing, Linear Probing.

**UNIT-II**

Hashing: Quadratic Probing, Double Hashing, Rehashing, Extendible hashing.  
Trees: Review of Binary Search Trees (BST), AVL Trees, Splay Trees, B-Trees, B+ Trees, properties and basic operations.

**UNIT-III**

Graphs: Topological sort, shortest-path algorithms, Unweighted Shortest Paths, Dijkstra's algorithm, Graphs with Negative Edge Costs, Acyclic Graphs, Shortest-Path Example

**UNIT-IV**

Graphs: Network Flow Problems, A Simple Maximum-Flow Algorithm, Applications of Depth-First Search: Undirected Graphs, Biconnectivity, Euler Circuit.

**UNIT-V**

Graphs: Directed Graphs, Finding Strong Components.  
Pattern matching and Tries: Pattern matching algorithms-Brute force.

**TEXT BOOKS:**

1. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, 2nd Edition, Pearson, 2004.
2. M T Goodrich, Roberto Tamassia, Algorithm Design, John Wiley, 2002.

**REFERENCE BOOKS:**

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in Java", Third Edition, Published by Addison-Wesley, 2012, ISBN: 0-132-57627-9 / 9780132576277.
2. Mark Allen Weiss, "**Data Structures and Problem Solving Using Java**", Fourth Edition, Published by Addison-Wesley, 2010, ISBN: 0-321-54140-5.
3. Goodrich, Tamassia, Goldwasser, "**Data Structures and Algorithms in Java**", Sixth Edition, Wiley, 2014, ISBN-13 : 978-8126551903.
4. Michael T. Goodrich, Roberto Tamassia, "Algorithm Design and Application", Fourth Edition, Wiley, 2014, ISBN: 978-1-118-33591-8.
5. Data Structures & Algorithms in Java, 6ed

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## B. Tech. (IT) V SEMESTER

### MANAGERIAL ECONOMICS AND ACCOUNTANCY (HS3108-)

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	0	0	3	External Marks :70

#### UNIT-I

**Meaning and Nature of Managerial Economics:** Managerial Economics and its usefulness to Engineers, Fundamental Concepts of Managerial Economics-Scarcity, Marginalism, Equimarginalism, Opportunity costs, Discounting, Time Perspective, Risk and Uncertainty, Profits, Case study method.

#### UNIT-II

**Consumer Behavior:** Law of Demand, Determinants, Types of Demand; Elasticity of Demand (Price, Income and Cross-Elasticity); Demand Forecasting, Law of Supply and Concept of Equilibrium.

#### UNIT - III

**Theory of Production and Markets:** Production Function, Law of Variable Proportion, ISO quants, Economics of Scale, Cost of Production (Types and their measurement), Concept of Opportunity Cost, Concept of Revenue, Cost-Output relationship, Break-Even Analysis, Price - Output determination under Perfect Competition and Monopoly.

#### UNIT-IV

**Capital Management:** Significance, determination and estimation of fixed and working capital requirements, sources of capital, Introduction to capital budgeting, methods of payback and discounted cash flow methods with problems.

#### UNIT-V

**Book-keeping:** Principles and significance of double entry book keeping, Journal, Subsidiary books, Ledger accounts, Trial Balance, concept and preparation of Final Accounts with simple adjustments, Analysis and interpretation of Financial Statements through Ratios.

#### Suggested Reading:

1. Mehta P.L., Managerial Economics - Analysis, Problems and Cases, Sulthan Chand & Sons Educational Publishers, 2011
2. Maheswari S.N., Introduction to Accountancy, Vikas Publishing House, 2005
3. Pandey I.M., Financial Management, Vikas Publishing House, 2009

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**B. Tech. (IT) V SEMESTER****DATABASE MANAGEMENT SYSTEM LAB (PC3109IT)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :25
0	0	3	1.5	External Marks :50

**List of Experiments:**

- 1) Database design with E-R Model
- 2) Database design with Relational Model
- 3) Practicing DDL commands
- 4) Practicing DML commands
- 5) Querying (using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.)
- 6) Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
- 7) Triggers (Creation of insert trigger, delete trigger, update trigger)
- 8) Usage of Cursors
- 9) Basics of PL/SQL
- 10) Stored Procedures

**Text Books**

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill 3/e.
2. Database System Concepts, Silberschatz, Korth, Mc Graw hill, V edition.

**References:**

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel,7/e.
2. SQL The Complete Reference, James R. Groff, Paul N. Weinberg, 3rd Edition.
3. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
4. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL,Shah,PHI.

KAKATIYA UNIVERSITY, WARANGAL-506009

Department of Information Technology

**B. Tech. (IT) V SEMESTER****Professional Elective-I Lab****WEB PROGRAMMING LAB (PE3110IT)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :25
0	0	3	1.5	External Marks :50

- 1) Design web pages for your college containing a description of the courses, departments, faculties, library etc, use href, list tags.
- 2) Create your class timetable using table tag.
- 3) Create user Student feedback form using textbox, text area , checkbox, radio button, select box etc.
- 4) Create a web page using frame. Divide the page into two parts with Navigation links on left hand side of page (width=20%) and content page on right hand side of page (width = 80%). On clicking the navigation Links corresponding content must be shown on the right hand side.
- 5) Write html code to develop a webpage having two frames that divide the webpage into two equal rows and then divide the row into equal columns fill each frame with a different background color.
- 6) Create your resume using HTML tags also experiment with colors, text , link ,size and also other tags you studied.
- 7) Design a web page of your home town with an attractive background color, textcolor, an Image, font etc. (use internal CSS).
- 8) Use Inline CSS to format your resume that you created.
- 9) Use External CSS to format your class timetable as you created.
- 10) Use External, Internal, and Inline CSS to format college web page that you created.
- 11) Develop a JavaScript to display today's date.
- 12) Develop simple calculator for addition, subtraction, multiplication and division operation using JavaScript
- 13) Create HTML Page with JavaScript which takes Integer number as input and tells whether the number is ODD or EVEN.
- 14) Create HTML Page that contains form with fields Name, Email, Mobile No , Gender , favourite Color and a button now write a JavaScript code to combine and display the information in textbox when the button is clicked.
- 15) Implement Validation in above Feedback Form.

- 16) Use regular expression for validation in Feedback Form.
- 17) Using AJAX retrieve data from a TXT file and display it.
- 18) Create XML file to store student information like Enrolment Number, Name, Mobile Number and Email Id.
- 19) Create DTD for above XML File. Create XML Schema for above ( Practical No. 18 )
- 20) Create XSL file to convert above XML file intoXHTML file.
- 21) Write a PHP program to display today's date in dd-mm-yyyy format.
- 22) Write a PHP program to check if number is prime or not.
- 23) Write a PHP program to print first 10 Fibonacci Numbers.
- 24) Create HTML page that contain textbox, submit / reset button. Write PHP program to display this information and also store into text file.
- 25) Write a PHP script to read data from txt file and display it in html table (the file contains info in format Name: Password: Email )
- 26) Write a PHP Script for login authentication. Design an html form which takes username and password from user and validate against stored username and password in file.
- 27) Write PHP Script for storing and retrieving user information from MySql table.
  - a). Design A HTML page which takes Name, Address, Email and Mobile No. from user.
  - b) Store this data in MySql database / text file.
  - c) Next page display all user in html table using PHP.
- 28) Write a PHP script for user authentication using PHP-MYSQL. Use session for storing surname.
- 29) Fetch information from a database with AJAX.
- 30) Students have to create a whole Website which contains above topics in Website

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KAKATIYA UNIVERSITY, WARANGAL-506009

Department of Computer Science &amp; Engineering

**B. Tech. (IT) V SEMESTER****Professional Elective-I Lab****ADVANCED JAVA LAB (PE3111CS)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :25
0	0	3	1.5	External Marks :50

**List of Experiments**

1. Java Program to create login form with swing Components.
2. Java Program to create student registration form with swing components.
3. Java Program to demonstrate Jtree, Menus, Jtable in swing.
4. Java Program to handle action events, key events, mouse events.
5. Write simple JavaFx program to display “welcome message”
6. Write JavaFx Program to insert image in window.
7. Java program to create simple form using JavaFx.
8. Java program to handle action events using JavaFx.
9. Java Program to Create a Server for the purpose of URL supplied to URL class object
10. Java Program to Create a Server that Receives Data from the Client Using BufferedReader and Sends Reply to the Client Using PrintStream
11. Java Program that Accepts the Filename and Checks for its Existence. When the File Exists at Server Side, Send its Contents to the Client
12. Java Program of a Client Program to Accept a File Name from the Keyboard and Send that Name to the Server. The Client Receives the File Contents from the Server.
13. Java Program to Use Datagram Socket for Client Server Communication
14. Demonstrate operations of Vector, ArrayList, LinkedList collection classes?
15. Demonstrate operations of HashMap, TreeMap, LinkedHashMap collection classes?
16. Demonstrate operations of HashSet, TreeSet, LinkedHashSet collection class
17. Demonstrate operations of Stack, ArrayQueue, PriorityQueue collection classes?
18. Create a phone directory with names and phone numbers using hash table?  
Search the directory by name?  
Search the directory by phone number?
19. Java program to create a SQL table using JDBC and insert data value.
20. Java program to insert, modify, update value in SQL table using JDBC.
21. Java program to demonstrate prepared and callable statements.
22. Java Program to demonstrate scrollable result set.
23. Java Program to display meta data of a SQL table.
24. Java Program to create HTTP servlet and display a Welcome message.
25. Java program to retrieve the details from login form and display using Servlet.
26. Java program to create servlet to servlet communication.
27. Java program to retrieve the parameters from servlet.

28. Java Program to send parameters to servlet.
29. Java Program to handle session tracking using servlet.
30. JSP program to retrieve the name from web form and send greet message.
  
31. JSP Program to retrieve two integers from client and display their sum at client.
32. Write a JSP application that checks the login credentials and display appropriate message back to the Client?
33. JSP program to perform database operations.
34. JSP program to create cookies.
35. JSP program to handle database operations using JSTL.



KAKATIYA UNIVERSITY, WARANGAL-506009

Department of Information Technology

**B. Tech. (IT) V SEMESTER****Professional Elective Lab - I****ADVANCED DATA STRUCTURES LAB(PE3112IT)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :25
0	0	3	1.5	External Marks :50

1. Implementation various hash function and hashing techniques.
2. Implementation of Binary search tree operations
3. Implementation of AVL tree operations.
4. Implementation of Splay tree operations.
5. Implementation of B Tree operations.
6. Implementation of B+ Tree operations
7. Implementation of Graph Traversal methods
8. Implementation of Topological sort.
9. Implementation of Shortest Path Algorithms.
10. Implementation of Simple Max flow Algorithm.
11. Implementation of Knuth-Morris Pratt pattern matching Algorithm
12. Implementation of Boyer-Moore pattern matching Algorithm

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**B. Tech. (IT) VI SEMESTER**

S. No.	Course Code	Course Title	Scheme of Instruction			Lecture hrs/week	Scheme of Examination		Credits
			L	T	P		CIE	SEE	
1	PC3201IT	Compiler Design	3	1	0	4	30	70	4
2	PC3202IT	Computer Networks	3	1	0	4	30	70	4
3	PC3203IT	Software Engineering	3	1	0	4	30	70	4
4	PE-II*	Professional Elective –II*	3	1	0	4	30	70	4
5	OE-I#	Open Elective-I*	3	0	0	3	30	70	3
6	PC3208IT	Compiler Design Lab	0	0	3	3	25	50	1.5
7	PC3209IT	Software Engineering Lab	0	0	3	3	25	50	1.5
8	PW3210IT	Mini-project	0	0	3	3	50	00	1.5
<b>Total</b>			<b>15</b>	<b>4</b>	<b>9</b>	<b>28</b>	<b>250</b>	<b>450</b>	<b>23.5</b>

**\*(PE-II) Professional Elective – II**

**PE3204IT:** Advanced Database Management System

**PE3205IT:** Advanced Operating System

**PE3206IT:** Computer Graphics

**# Please Refer Annexure**

KAKATIYA UNIVERSITY, WARANGAL-506009

Department of Information Technology

**B. Tech. (IT) VI SEMESTER****COMPILER DESIGN (PC3201IT)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

**UNIT – I**

**INTRODUCTION TO COMPILER:** Definition of Compiler, Interpreter, Analysis of the source program, Phases of a compiler, Cousins of the Compiler, Grouping of Phases, Compiler construction tools.

**LEXICAL ANALYSIS:** Definition of lexeme, patterns and Tokens, Lexical analyzer, Role of Lexical Analyzer, Input Buffering, Specification of Tokens, Data structures in compilation, LEX- Lexical analyzer generator

**UNIT – II**

**SYNTAX ANALYSIS:** Introduction to parser, Role of the parser, Context-Free Grammars; Top-Down parsing-Recursive Descent Parsing, Predictive Parsing; Bottom-Up parsing-Shift Reduce Parsing, Operator Precedent Parsing; LR Parsers–SLR Parser, Canonical LR Parser, LALR Parser; YACC – automatic parser generator.

**UNIT – III**

**SEMANTIC ANALYSIS:** Attributed grammars, Syntax Directed Definitions, Evaluation Orders for Syntax directed definitions, Syntax directed translation;

**INTERMEDIATE CODE:** Intermediate forms of source Programs – abstract syntax tree, polish notation and three address codes; Conversion of popular Programming languages into intermediate code forms: Declarations, Assignment Statements, Boolean Expressions and loops.

**UNIT – IV**

**CODE OPTIMIZATION:** Introduction, Principal sources of optimization, Optimization of basic blocks, Introduction to global data flow analysis, Basic blocks, Flow graphs, Data flow equation, Global optimization, Data flow analysis for structured programs.

**UNIT – V**

**RUN-TIME ENVIRONMENT AND CODE GENERATION:** Storage Organization, Stack Allocation Space, Access to Non-local Data on the Stack, Heap Management, Issues in the design of code generator, The target machine, Next-use Information, A simple Code generator, Introduction to DAG, DAG representation of Basic Blocks, Peephole Optimization.

**TEXT BOOK:**

1. A.V. Aho, M.S. Lam, R. Sethi and J.D. Ullman, "Compilers: Principles, Techniques and Tools", 2nd edition, Pearson Education, 2007.

**REFERENCE BOOKS:**

1. Allen I. Holub, "Compiler Design in C", 1st edition, Prentice Hall of India, 2003.
2. C. N. Fischer and R. J. LeBlanc, "Crafting a compiler with C", 1st edition, Benjamin Cummings, 2003.
3. J.P. Bennet, "Introduction to Compiler Techniques", 2nd edition, Tata McGraw-Hill, 2003.
4. Henk Alblas and Albert Nymeyer, "Practice and Principles of Compiler Building with C", 3rd edition, Pearson/Prentice Hall India, 2001.
5. Kenneth C. Loudon, "Compiler Construction: Principles and Practice", 1st edition, Thompson Learning, 2003.
6. K. Muneeswaran "Compiler Design" 1st edition. Oxford University press ,2012

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**B. Tech. (IT) VI SEMESTER**  
**COMPUTER NETWORKS (PC3202IT)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

**UNIT – I**

Introduction to Computer Networks, Network Hardware and Software, Network Standardization, Protocols and Standards, OSI and TC/IP Reference Models, Example Networks. The Physical Layer: Guided Transmission Media, Wireless Transmission, Communication Satellites, Circuit switched networks, Datagram networks, virtual circuit networks, The Mobile Telephone System.

**UNIT – II**

The Data Link Layer: Data link layer design issues, framing techniques, error control methods, flow control over noiseless and noisy channels, Example data link protocols. The Medium Access Control Sublayer: The Channel Allocation Problem, Carrier Sense Multiple Access Protocols, Collision free protocols, IEEE Ethernet, Wireless LANs, Bluetooth, Data Link Layer Switching.

**UNIT – III**

The Network Layer: Network Layer Design Issues, Datagram and Virtual circuit subnets, Routing Algorithms, Multicast Routing Algorithms, Routing in Adhoc networks, Congestion Control Algorithms, Quality of Service, Internetworking, and The Network Layer in the Internet: IPv4 IPv6 and IP Addresses.

**UNIT – IV**

The Transport Layer: The Transport Service, Elements of Transport Protocols, TCP connection establishment, A Simple Transport Protocol, UDP, and TCP Protocols, The Internet Transport Protocols: TCP

**UNIT – V**

The Application Layer: DNS—The Domain Name System, Electronic Mail, MIME, SMTP protocol, PoP3, IMAP, The World Wide Web, URLs, HTM and Multimedia. Network Security: Cryptography, Symmetric-Key Algorithms, Public-Key Algorithms.

**TEXT BOOKS:**

- 1.Computer Networks -- Andrew S Tanenbaum, 4th Edition, Pearson Education.
- 2.Data Communications and Networking – Behrouz A. Forouzan, Fourth Edition TMH,2006.

**REFERENCE BOOKS:**

1. An Engineering Approach to Computer Networks-S.Keshav,2nd Edition, Pearson Education
- 2.Understanding communications and Networks,3rd Edition, W.A.Shay, Cengage Learning.
- 3.Computer and Communication Networks ,Nader F. Mir, Pearson Education
- 4.Computer Networking: A Top-Down Approach Featuring the Internet, James F.Kurose,K.W.Ross,3rd Edition, Pearson Education.

**B. Tech. (IT) VI SEMESTER****SOFTWARE ENGINEERING (PC3203IT)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

**UNIT-I**

**Introduction to Software Engineering:** The evolving role of software, changing nature of 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, the unified process, Agile development model.

**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.

**Creating an architectural design:** software architecture, data design, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams.

**User Interface Design:** the golden rules, User Interface Analysis and Design

**UNIT-IV**

**Software Testing Techniques:** White box and black box testing, testing for specialized environment, architectures and application, user interface testing.

**Software Testing Strategies:** A strategic approach to software testing, test strategies for conventional software, validation testing, system testing, the art of debugging.

**Product metrics:** Software quality, metrics for analysis model, metrics for design model, metrics for source code, metrics for testing, metrics for maintenance.

**UNIT-V**

**Metrics for Process and Products:** Software measurement, metrics for software quality.

**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. Roger S.Pressman , “Software Engineering , A Practitioner ‘s Approach”, 6th Edition, McGraw-Hill International Edition.
2. Ian Sommerville, “Software Engineering”, 7<sup>th</sup> Edition, Pearson Education.
3. Grady Booch, James Rumbaugh, Ivar Jacobson, “The Unified Modeling Language User Guide”, Pearson Education.

**Reference Books:**

1. James F. Peters, Witold Pedrycz , “Software Engineering :An Engineering Approach”, John Wiley.
2. Waman S Jawadekar, “Software Engineering Principles and Practice”, The Mc Graw-Hill Companies.



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**B. Tech. (IT) VI SEMESTER**

**Professional Elective – II**

**ADVANCED DATABASE MANAGEMENT SYSTEMS (PE3204IT)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

**UNIT –I**

**Parallel and Distributed Databases:** Introduction, Architectures for Parallel Databases, Parallel Query Evaluation, Parallelizing Individual Operations, Parallel Query Optimization, Introduction to Distributed Databases, Distributed DBMS Architectures, Storing Data in Distributed DBMS, Distributed Catalog Management.

**UNIT –II**

**Distributed Databases:** Distributed Query Processing, Updating Distributed data, Distributed Transactions, Distributed Concurrency Control, Distributed Recovery.

**Object-Database Systems:** Motivating Example, Structured Data Types, Operations on Structured Data, Encapsulation and ADTs, Inheritance, Objects, OIDs and Reference types, Database design for an ORDBMS.

**UNIT –III**

**Object-Database Systems:** ORDBMS Implementation Challenges, OODBMS, Comparing RDBMS, OODBMS, and ORDBMS.

**Deductive Databases:** Introduction to Recursive Queries, Theoretical Foundations, Recursive Queries with Negation, From Data log to SQL, Evaluating Recursive Queries.

**UNIT –IV**

**Information Retrieval and XML data:** Colliding Worlds: Databases, IR, and XML, Introduction to Information Retrieval, Indexing for Text Search, Web Search Engines, Managing Text in DBMS, A Data Model for XML, XQUERY: Querying XML Data, Efficient Evaluation of XML Queries.

**UNIT –V**

**Spatial Data Management:** Types of Spatial Data and queries, Applications involving Spatial Data, Introduction to Spatial Indexes, Indexing Based on Space-Filling Curves, Grid Files, R Trees: Point and Region Data, Issues on High Dimensional Indexing.

**TEXTBOOKS :**

1. Raghu Ramakrishnan and Johannes Gehrke , “Database Management Systems “, Third Edition, McGraw Hill Education, ISBN No: 978-9339213114, 2014.
2. Ramez Elmasri and Shamkanth B. Navathe, “Fundamentals of Database Systems“, Seventh Edition, Pearson Education, ISBN No: 978-9332582705, 2017.
3. Stefano Ceri, Giuseppe Pelagatti , “Distributed Databases: Principles and Systems” , McGraw Hill Education , ISBN No: 978-0070265110, 2017.
4. M. Tamer Ozsu, “Principles of Distributed Database Systems”, Pearson Education , ISBN No: 978-8177581775.

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**B. Tech. (IT) VI SEMESTER**

**Professional Elective – II**

**ADVANCED OPERATING SYSTEMS (PE3205IT)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

**UNIT – I**

Functions of Operating System, Why Advanced Operating Systems, Types of Advanced Operating Systems. Architectures of Distributed Systems: System Architecture Types, Distributed Operating Systems, Issues in Distributed Operating Systems, Communication Primitives. Theoretical Foundations: Inherent Limitations of a Distributed System, Lamport's Logical Clocks, Vector Clocks, Causal Ordering of Messages, Termination Detection.

**UNIT – II**

Distributed Mutual Exclusion: The Classification of Mutual Exclusion Algorithms, Non-Token – Based Algorithms: Lamport's Algorithm, The Ricart-Agrawala Algorithm, Maekawa's Algorithm, Token-Based Algorithms: Suzuki-Kasami's Broadcast Algorithm, Singhal's Heuristic Algorithm, Raymond's Tree Based Algorithm.

**UNIT – III**

Distributed Deadlock Detection: Preliminaries, Deadlock Handling Strategies in Distributed Systems, Issues in Deadlock Detection and Resolution, Control Organizations for Distributed Deadlock Detection, Centralized- Deadlock – Detection Algorithms, Distributed Deadlock Detection Algorithms, Hierarchical Deadlock Detection Algorithms

**UNIT – IV**

Multiprocessor System Architectures: Introduction, Motivation for multiprocessor Systems, Basic Multiprocessor System Architectures, Multi Processor Operating Systems: Introduction, Structures of Multiprocessor Operating Systems. Operating System Design Issues, Threads, Process Synchronization, Processor Scheduling. Distributed File Systems: Architecture, Mechanisms for Building Distributed File Systems, Design Issues

**UNIT – V**

Distributed Scheduling: Issues in Load Distributing, Components of a Load Distributed Algorithm, Stability, Load Distributing Algorithms, Requirements for Load Distributing, Task Migration, Distributed Shared Memory: Architecture and Motivation, Algorithms for Implementing DSM, Memory Coherence, Coherence Protocols, Design Issues.

**TEXT BOOKS:**

1. 1.Advanced Concepts in Operating Systems, MukeshSinghal, Niranjan G. Shivaratri, Tata McGraw-Hill Edition 2001

**REFERENCES:**

1. Distributed Systems: Andrew S. Tanenbaum, Maarten Van Steen, Pearson Prentice Hall, 2<sup>nd</sup> Edition, 2007
2. Sinha, Distributed Operating Systems Concepts and Design, IEEE Computer Society Press, 1997.

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**B. Tech. (IT) VI SEMESTER**

**Professional Elective – II**

**COMPUTER GRAPHICS (PE3206IT)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

**UNIT-I**

**Introduction:** Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices

**Output primitives:** Points and lines, line drawing algorithms (Bresenham's and DDA Algorithm), mid-point circle and ellipse algorithms

**Polygon Filling:** Scan-line algorithm, boundary-fill and flood-fill algorithms

**UNIT-II**

**2-D geometrical transforms:** Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems

**2-D viewing:** The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland algorithms, Sutherland –Hodgeman polygon clipping algorithm.

**UNIT-III**

**3-D object representation:** Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon rendering methods.

**UNIT-IV**

**3-D Geometric transformations:** Translation, rotation, scaling, reflection and shear transformations, composite transformations.

**3-D viewing:** Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

**UNIT-V**

**Computer animation:** Design of animation sequence, general computer animation functions, rasteranimation, computer animation languages, key frame systems, motion specifications

**Visible surface detection methods:** Classification, back-face detection, depth-buffer, BSP-treemethods and area sub-division methods

**Text Books:**

1. Steven Harington , “Computer Graphics”, *TMH*.
2. Foley, Van Dam, Feiner, Hughes, “Computer Graphics: Principles and Practice in C”, *2<sup>nd</sup> Edition, Pearson Education*.
3. Donald Hearn and M.Pauline Baker, “Computer Graphics C Version”, *Pearson Education*.

**Reference Books:**

1. David F Rogers, “Procedural Elements For Computer Graphics”, *2<sup>nd</sup> Edition Tata Mc Graw Hill*.
2. Neuman and Sproul, “Principles of Interactive Computer Graphics”, *The Mc Graw Hill*
3. Shalini Govil, “Principles of Computer Graphics”, *2005, Springer*.

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Department of Information Technology

**B. Tech. (IT) VI SEMESTER**

**COMPILER DESIGN LAB(PC3208IT)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :25
0	0	3	1.5	External Marks :50

1. Programs using Lex Tool.
  - a. Specification to skip comments in a file.
  - b. Specification to print two digit numbers in words.
  - c. Specification to check validity of given date.
  - d. Specification to convert given octal number into decimal equivalent.
2.
  - a. Design a lexical analyzer for a given language and the lexical analyzer should ignore redundant spaces, tabs and new lines
  - b. Implement the lexical analyzer using LEX tool to generate tokens from the given C program
3. Write a lexical analyzer program for the following:
  - a) To count the number of vowels and consonants in the given string .
  - b) To count the number of characters, words and lines in the given text.
  - c) To count the number of '+'ve and '-'ve integers from the given program
4. Write a lexical analyzer program for the following:
  - a) To count the number of keywords and identifiers in the given program.
  - b) To convert an octal number to decimal number.
  - c) To recognize numbers in the given program.
5. Programs using Lex Tool.
  - a) To count the number of comment lines in the given C program
  - b) To count the number of scanf and printf statements in the given C program
6. Write lexical analyzer program for the following:
  - a) To add line numbers to the given file and displays the same onto the standard output
  - b) To extract only comments from C program and display the same onto the standard output
7. Write yet another compiler compiler program for the following:
  - a) To recognize nested if control statements and display the level of nesting.
  - b) To check the validity of given simple sentence.
8. Write yet another compiler compiler program for the following:
  - a) To check the validity of given date.
  - b) To test for balanced parentheses in the given input.
  - c) To check the validity of given arithmetic expression.
9. Write yet another compiler compiler (YACC) program for the following:

- a) To recognize a valid variable which starts with a letter followed by any number of letters or digits.
- b) To check whether given string is Palindrome or not.
- c) Implementation of Calculator using LEX and YACC.

10. Program to find all the meaningful words and generate the tokens for the given input program.
11. Program on implementing symbol table for HLL.
12. Program for designing predicative parser.
13. Program on implementing shift reduce parser.
14. Program on implementing SLR Parser.
15. Program on implementing LALR parser.
16. Program for constructing LL(1) parser.

**Text Book:**

[1] Alfred V.Aho, Ravi Sethi, JeffreyD.Ullman, *Compilers: Principles, Techniques and Tools*, 2nd ed. Hong Kong: Pearson Education Asia, 2013.



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Department of Information Technology

**B. Tech. (IT) VI SEMESTER**  
**SOFTWARE ENGINEERING LAB (PC3209IT)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :25
0	0	3	1.5	External Marks :50

**List of Experiments**

**Experiment –I**

1. Development of problem statement.
2. Preparation of Software Requirement Specification Document, Design Documents and Testing Phase related documents.
3. Preparation of Software Configuration Management and Risk Management related documents.
4. Study and usage of any Design phase CASE tool
5. Performing the Design by using any Design phase CASE tools.
6. Develop test cases for unit testing and integration testing
7. Develop test cases for various white box and black box testing techniques.

**Experiment –II**

Perform above exercised for any two sample projects. List of sample projects is given below

1. Online Exam Registration
2. E-ticketing
3. Library Management system
4. Credit Card Processing
5. Hospital Management
6. Student Course Registration
7. Trading System
8. Bank ATM System

**ANNEXURE**

- ✓ Students should not choose same department subject as an Open elective subject.
- ✓ Students can select any one of the following subjects as an Open elective subject.

**Open Elective subjects offered from different department**

<b>Sl.No</b>	<b>Course Code</b>	<b>Name of the subject</b>	<b>Branch</b>
1	OE3213EC	Microprocessor and Interfacing	ECE
2	OE3207CS	Fundamentals of Data Structures	CSE

**B. Tech. (IT) VI SEMESTER****OPEN ELECTIVE-I****MICROPROCESSORS AND INTERFACING(OE3213EC)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	0	0	3	External Marks :70

**UNIT I**

Evolution of microprocessors, 8085 microprocessor architecture, addressing modes and instruction sets. Basic assembly language programming, pin configuration, timing diagram of read and write operation.

**UNIT II**

8086 architecture-functional block diagram, register organization, memory segmentation, programming model, pins description in maximum mode and minimum mode, timing diagrams.

**UNIT III**

Instruction formats, addressing modes, classification of instruction set, assembler directives, macros, 8086 microprocessor assembly language programs: simple programs involving data transfer operation, arithmetic operation, logical operation, branch operation, machine control operation, string manipulations, stack and subroutine operations.

**UNIT IV**

8255 Programmable peripheral interface block diagram and various modes of operation. Interfacing of ADC, DAC, keyboard, seven segment display, stepper motor interfacing and 8254 (8253) programmable interval timers.

**UNIT V**

Interrupt structure of 8086, interfacing programmable interrupt controller 8259 and DMA Controller 8257 to 8086 microprocessor. Serial communication standards, RS 232, Serial data transfer schemes and block diagram of 8251 USART.

**TEXTBOOKS:**

1. Ramesh Gaonkar, "Microprocessor architecture, programming and applications with the 8085", Penram International Publication (India) Pvt. Ltd.
2. Douglas V. Hall, "Microprocessors and Interfacing", Tata McGraw Hill Publication.
3. Sivarama P. Dandamudi, "Introduction to Assembly Language Programming From 8086 to Pentium Processors", Springer Publication.
4. Walter A. Triebel and Avtar Singh, "The 8088 and 8086 Microprocessors: Programming, Interfacing Software, Hardware and Applications", Pearson Publication.
5. A. K. Ray and K. M. Bhurchandi, "Advance microprocessors and Peripherals" Tata McGraw Hill Publication.
6. Lyla B. Das, "The X86 Microprocessors, Architecture, Programming and Interfacing (8086 to Pentium)", Pearson Publication.

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Department of Information Technology

**B. Tech. (IT) VI SEMESTER****OPEN ELECTIVE-I****FUNDAMENTALS OF DATA STRUCTURES(OE3207CS)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	0	0	3	External Marks :70

**UNIT-I**

**Introduction:** Introduction to data structure, types of data structures, revision of arrays, memory representation of arrays, operations on arrays, static versus dynamic memory allocation, pointers, self-referential Structure Time complexity.

**UNIT-II**

**Stack-Queue (Linear Data structures):** Definition of stack, operations on stack, implementation of stack. Applications of Stack.

**UNIT-III**

Definition of queue, operations on queue, implementation of queue using arrays  
Applications of queue, Circular queue and priority queue.

**UNIT-IV**

**Trees-Graphs (Nonlinear Data structures):** definition of trees, Terminology on trees, binary tree, binary search tree and its operations, tree traversal techniques. Applications of Trees.

**UNIT-V**

**Graph:** definition, terminology on graphs, representation of graphs, graph traversal techniques, spanning tree, minimum cost spanning tree algorithms. Applications of Graphs.

**Text Books:**

- 1.Sahni Horowitz, "Fundamentals of data structures in C", UniversitiesPress, second edition, 2008, ISBN No-978-8173716058.
- 2.R Venkatesan,SLovelynRose,"Datastructures",Wiley, second edition, 2019, ISBN No-978-8126577149.

**References:**

- 1.Narasimha Karumanchi, "Data Structures and Algorithms Made Easy: Data Structures and Algorithmic Puzzles", Careermonk Publications, 2016, ISBN-No: 978-8193245279.

**ABBREVIATIONS**

L	:	Lectures	T	:	Tutorials
P	:	Practicals	CIE	:	Continuous Internal Evaluation
SEE	:	Semester End Examination	PC	:	Professional Core
OE	:	Open Elective	PW	:	Project Work