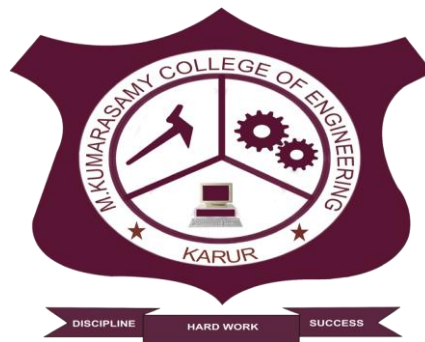


M. KUMARASAMY COLLEGE OF ENGINEERING

(Autonomous)

Thalavapalayam, Karur - 639 113.



**Curriculum and Syllabus for M.C.A
(MASTER OF COMPUTER APPLICATIONS)**

REGULATIONS - 2015

**(As per Credit Based Semester and Grading System
with effect from the Academic year 2015 – 2016)**

REGULATIONS - 2015
CURRICULUM AND SYLLABUS I TO VI SEMESTERS
MASTER OF COMPUTER APPLICATIONS

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

- a. To excel in problem solving and programming skills in the various computing fields of IT industries
- b. To develop the ability to plan, analyze, design, code, test, implement & maintain a software product for real time system
- c. To promote students capability to set up their own enterprise in various sectors of Computer applications
- d. To experience the students in finding solutions and developing system based applications for real time problems in various domains involving technical, managerial, economical & social constraints
- e. To prepare the students to pursue higher studies in computing or related disciplines and to work in the fields of teaching and research.

PROGRAMME OBJECTIVES (POs)

- a. Understand and Apply mathematical foundation, computing and domain knowledge for the conceptualization of computing model of problems.
- b. Identify, Analyze the computing requirements of a problem and Solve them using computing principles.
- c. Design and Evaluate a computer based system, components and process to meet the specific needs of applications.
- d. Use current techniques and tools necessary for complex computing practices.
- e. Use suitable architecture or platform on design and implementation with respect to performance
- f. Develop and integrate effectively system based components into user environment.
- g. Understand and commit to Cyber regulations and responsibilities in Professional computing practices.
- h. Recognize the need for and develop the ability to engage in continuous learning as a Computing professional.
- i. Apply the understanding of management principles with computing knowledge to manage the projects in multidisciplinary environments.
- j. Communicate effectively with the computing community as well as society by being able to comprehend effective documentations and presentations.
- k. Understand societal, environmental, health, legal, ethical issues within local and global contexts and the consequential responsibilities relevant to professional practice.
- l. Function effectively in a team environment to accomplish a common goal.
- m. Identify opportunities and use innovative ideas to create value and wealth for the betterment of the individual and society.
- n. Use knowledge to analyze, interpret the data and synthesis the information to derive valid conclusions using research methods.
- o. Expertise in developing application with required domain knowledge.

**M.KUMARASAMY COLLEGE OF ENGINEERING
(AUTONOMOUS)**

P.G. DEGREE IN MASTER OF COMPUTER APPLICATIONS

Semester: I II III IV V VI

REGULATIONS 2015

CURRICULUM

SEMESTER – I

Course Code	Course Title	Hours / Week			Credit	Maximum Marks		
		L	T	P		CIA	ESE	Total
	THEORY							
PMA15101	Probability and Statistics	3	1	0	4	50	50	100
PCA15101	Computer Organization	3	0	0	3	50	50	100
PCA15102	C Programming	3	0	0	3	50	50	100
PCA15103	Computer Graphics and Multimedia Systems	3	0	0	3	50	50	100
PCA15104	Data Structures	3	0	0	3	50	50	100
	PRACTICAL							
PCA15105P	Programming in C Laboratory	0	0	3	2	50	50	100
PCA15106P	Multimedia Tools Laboratory	0	0	3	2	50	50	100
PCA15107P	Data Structures Laboratory	0	0	3	2	50	50	100
PTP15101P	Career Skill Development – I	0	0	1	1	50	50	100
Total					23	900		

SEMESTER – II

Course Code	Course Title	Hours / Week			Credit	Maximum Marks		
		L	T	P		CIA	ESE	Total
	THEORY							
PCA15201	System Software	3	0	0	3	50	50	100
PCA15202	Design and Analysis of Algorithms	3	1	0	4	50	50	100
PCA15203	Object Oriented Programming in C++	3	0	0	3	50	50	100
PCA15204	Web Programming	3	0	0	3	50	50	100
PCA15205	Operating Systems	3	0	0	3	50	50	100
	PRACTICAL							
PCA15206P	Algorithms Laboratory	0	0	3	2	50	50	100
PCA15207P	Object Oriented Programming in C++ Laboratory	0	0	3	2	50	50	100
PCA15208P	Web Programming Laboratory	0	0	3	2	50	50	100
PTP15201P	Career Skill Development – II	0	0	1	1	50	50	100
Total					23	100		

SEMESTER – III

Course Code	Course Title	Hours / Week			Credit	Maximum Marks		
		L	T	P		CIA	ESE	Total
	THEORY							
PMA15301	Discrete Mathematics	3	1	0	4	50	50	100
PCA15301	Advanced Operating Systems	3	0	0	3	50	50	100
PCA15302	Database Management Systems	3	0	0	3	50	50	100
PCA15303	Java Programming	3	0	0	3	50	50	100
PCA15304	Software Engineering	3	0	0	3	50	50	100
	PRACTICAL							
PCA15305P	Operating Systems Laboratory	0	0	3	2	50	50	100
PCA15306P	DBMS Laboratory	0	0	3	2	50	50	100
PCA15307P	Java Programming Laboratory	0	0	3	2	50	50	100
PTP15301P	Career Skill Development – III	0	0	1	1	50	50	100
Total					23	900		

SEMESTER – IV

Course Code	Course Title	Hours / Week			Credit	Maximum Marks		
		L	T	P		CIA	ESE	Total
	THEORY							
PCA15401	Computer Networks	3	0	0	3	50	50	100
PCA15402	Object Oriented Analysis and Design	3	1	0	4	50	50	100
PCA15403	Data warehousing and Data Mining	3	0	0	3	50	50	100
PCA15404	Web Technology	3	0	0	3	50	50	100
PCA1545-	Elective – I	3	0	0	3	50	50	100
	PRACTICAL							
PCA15405P	Networks Laboratory	0	0	3	2	50	50	100
PCA15406P	Case Tools Laboratory	0	0	3	2	50	50	100
PCA15407P	Web Technology Laboratory	0	0	3	2	50	50	100
PTP15401P	Career Skill Development – IV	0	0	1	1	50	50	100
Total					23	900		

SEMESTER – V

Course Code	Course Title	Hours / Week			Credit	Maximum Marks		
		L	T	P		CIA	ESE	Total
	THEORY							
PCA15501	Cloud Computing	3	0	0	3	50	50	100
PCA15502	Mobile Computing	3	0	0	3	50	50	100
PCA15503	C# and .Net Framework	3	1	0	4	50	50	100
PCA1555-	Elective – II	3	0	0	3	50	50	100
PCA1555-	Elective – III	3	0	0	3	50	50	100
	PRACTICAL							
PCA15504P	Open Source Tools Laboratory	0	0	3	2	50	50	100
PCA15505P	C# and .Net Framework Laboratory	0	0	3	2	50	50	100
PCA15506P	Mini Project	0	0	3	2	50	50	100
Total					22	800		

SEMESTER - VI

Course Code	Course Title	Hours			Credit	Maximum Marks		
		L	T	P		CIA	ESE	Total
PCA15601P	Project Work	0	0	24	12	150	150	300
Total					12	300		

Total Credits: 126

LIST OF ELECTIVES FOR IV SEMESTER

Course Code	Course Title	L	T	P	C
PCA15451	Software Project Management	3	0	0	3
PCA15452	XML and its Applications	3	0	0	3
PCA15453	Information Systems	3	0	0	3
PCA15454	Distributed Computing	3	0	0	3
PCA15455	Advanced Databases	3	0	0	3
PCA15456	Embedded Systems	3	0	0	3
PCA15457	Network Programming	3	0	0	3
PMA15451	Operations Research	3	0	0	3

LIST OF ELECTIVES FOR V SEMESTER

Course Code	Course Title	L	T	P	C
PCA15551	E-Commerce	3	0	0	3
PCA15552	Mobile Application Development	3	0	0	3
PCA15553	Software Testing and Quality Assurance	3	0	0	3
PCA15554	Professional Ethics	3	0	0	3
PCA15555	Big Data Analytics	3	0	0	3
PCA15556	Bio Informatics	3	0	0	3
PCA15557	Social Network Analysis	3	0	0	3
PCA15558	Principles of Compiler Design	3	0	0	3
PCA15559	Component Based Technology	3	0	0	3
PCA155510	Ad hoc and Sensor Networks	3	0	0	3
PCA155511	Soft Computing	3	0	0	3
PCA155512	Organizational Behavior	3	0	0	3
PCA155513	Advanced Computer Architecture	3	0	0	3
PBA15551	Human Resource Management	3	0	0	3
PBA15552	Principles of Management	3	0	0	3
PBA15553	Accounting and Financial Management	3	0	0	3

COURSE OBJECTIVES:

- To provide the students with the fundamental understanding of probability and statistics
- To focus on the analysis of data using basic statistical tests.

COURSE OUTCOMES:

- Ability to apply elementary rules of probability in handling probability distributions and sampling distributions
- Ability to obtain point and interval estimates for means and proportions
- Ability to test hypotheses involving means and proportions
- Ability to draw conclusions based on the results of statistical tests

UNIT I PROBABILITY AND RANDOM VARIABLE 9

Axioms of probability – Conditional, Total probability – Baye’s Theorem – Random variable – Probability mass function – Probability density functions – Properties – Moments – Moment generating functions and properties.

UNIT II PROBABILITY DISTRIBUTIONS AND APPLICATIONS 9

Discrete, Binomial, Poisson Distributions - Mean and variance of Poisson, Continuous, Normal Distributions – Importance of Normal - Exponential Distributions – Uniform Distribution – Related Properties.

UNIT III CORRELATION AND REGRESSION 9

Simple Linear Correlation – Correlation Coefficients – Properties. Regression – Equation of Regression Line of Y on X – Equation of the Regression Line of X on Y – Multiple Regression Analysis – Multiple Correlation Coefficients.

UNIT IV TESTS OF HYPOTHESES 9

Level of Significance – Type I and Type II errors – Large Sample Tests – Tests for Mean, Standard Deviation, Proportions and differences using T, Chi-square and F distributions.

UNIT V RELIABILITY AND QUALITY CONTROL 9

Concepts of Reliability – Hazard Functions – Reliability of Series and Parallel Systems – Control Chart for Measurements (x and R Charts) – Control Chart for Attributes (P, C and NP Charts)

L :45 T: 15 TOTAL : 60 PERIODS

TEXT BOOK(S):

1. Richard A Johnson, *Miller & Freund’s Probability and Statistics for Engineers*, Prentice Hall of India Pvt, Ltd., New Delhi, 2005
2. S C Gupta and V K Kapoor, *Fundamentals of Mathematical Statistics*, Sultan Chand & Sons Education Publishers, New Delhi, Reprint 2005.

REFERENCES:

1. Sheldon Ross, *A First Course in Probability*, Pearson Education, New Delhi, 2005
2. Seymour Lipchitz and John J. Schiller, *Introduction to Probability and Statistics*, Schaum's Outline Series, Tata McGraw Hill Publications, New Delhi, 2005
3. Walpole Ronald E, Myers Raymond H, Myers Sharon L, and Ye Keying E, *Probability and Statistics for Engineers and Scientists*, Pearson Education, New Delhi, 2006

PCA15101

COMPUTER ORGANIZATION

3 0 0 3 100

COURSE OBJECTIVES:

- To impart knowledge on the various aspects of computer organization of modern digital computer systems.
- To provide knowledge about Digital Logic Circuits, Shift Registers, Data Representation and I/O Organization.

COURSE OUTCOMES:

- An ability to understand the conversion of number system with their representations
- An ability to understand the concepts of logic gates, half adder and full adder, Flip-Flops.
- An ability to understand and design the various types of shift registers and counters.
- An ability to use register transfer language with micro operations.
- An ability to understand Input / Output organization and memory.

UNIT I DIGITAL FUNDAMENTALS**8**

Number Systems and Conversions – Boolean Algebra and Simplification –Minimization of Boolean Functions – Karnaugh Map, Logic Gates – NAND – NOR Implementation.

UNIT II COMBINATIONAL AND SEQUENTIAL CIRCUITS**10**

Design of Combinational Circuits – Adder/Subtractor – Encoder – Decoder – MUX / DEMUX – Comparators, Flip Flops – Triggering – Master-Slave Flip Flop –State Diagram and Minimization – Counters – Registers.

UNIT III BASIC STRUCTURE OF COMPUTERS**9**

Functional units – Basic operational concepts – Bus structures – Performance and Metrics – Instruction and instruction sequencing – Hardware – Software Interface – Addressing modes – Instructions – Sets – RISC and CISC – ALU design – Fixed point and Floating point operation.

UNIT IV PROCESSOR DESIGN**9**

Processor basics – CPU Organization – Data path design – Control design – Basic concepts – Hard wired control – Micro programmed control – Pipeline control – Hazards – Super scalar operation.

UNIT V MEMORY AND I/O SYSTEM**9**

Memory technology – Memory systems – Virtual memory – Caches – Design methods –Associative memories – Input/output system – Programmed I/O – DMA and Interrupts – I/O Devices and Interfaces.

TOTAL : 45 PERIODS**TEXT BOOKS:**

1. Morris Mano, “Digital Design”, Prentice Hall of India, 2005.
2. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, Fifth Edition, “Computer Organization”, Tata McGraw Hill, 2002.

REFERENCES:

1. Charles H. Roth, Jr., “Fundamentals of Logic Design”, Jai co Publishing House, Mumbai, Fourth Edition, 1992.
2. William Stallings, “Computer Organization and Architecture – Designing for performance”, Sixth Edition, Pearson Education, 2003.
3. David A. Patterson and John L. Hennessy, “Computer Organization and Design: The Hardware/Software interface”, Second Edition, Morgan Kaufmann, 2002.
4. John P. Hayes, “Computer Architecture and Organization”, Third Edition, Tata McGrawHill, 1998.

PCA15102

C PROGRAMMING

3 0 0 3 100

COURSE OBJECTIVES:

- To impart knowledge on programming techniques.
- To solve problems using the knowledge of programming.

COURSE OUTCOMES:

- An ability to understand the high level languages.
- An ability to design and develop functions or subroutines.
- An ability to build user defined data types.
- An ability to work on memory with pointer concepts.
- An ability to manage the file with various operations.

UNIT I INTRODUCTION TO C LANGUAGE**9**

Overview of 'C' language - Constants, Variables and Data Types - Operators, Expressions and Assignment statements - Managing Input/Output Operations - Formatted I/O - Decision Making - Branching - IF, Nested IF - Switch - goto - Looping- While, do, for statements.

UNIT II ARRAYS AND FUNCTIONS**9**

Arrays - dynamic and multi-dimensional arrays - Character arrays and Strings - String handling Functions - User defined Functions - Categories of Functions - Recursion.

UNIT III STRUCTURES AND UNIONS**9**

Basics of Structures-Declaring a Structure - Array of Structures -Passing Structures elements to Functions- Passing entire Structure to Function - Structures within Structures - Union - Union of Structures - Enumerated Data Types – typedef Statement.

UNIT IV POINTERS**9**

Pointers – Declaration-Accessing a variable-dynamic memory allocation-Pointers versus Arrays- Array of pointers-Pointers to functions and structure Pointers.

UNIT V FILE MANAGEMENT**9**

File Management in C - Data hierarchy- Files and Streams - Sequential access file- Random access file – Preprocessors.

TOTAL : 45 PERIODS**REFERENCE BOOKS:**

1. E.Balagurusamy “ Programming in ANSI C ” , Tata McGraw Hill, 2004.
2. Yashavant P. Kanetkar “Understanding Pointers In C” , BPB Publications, NewDelhi, 2002.
3. Byron C Gotfried, Programming with C, Schuams’ outline series, 2nd edition, Tata McGraw Hill, 2006.

PCA15103 COMPUTER GRAPHICS AND MULTIMEDIA SYSTEMS 3 0 0 3 100**COURSE OBJECTIVES:**

- To understand computational development of graphics with mathematics
- To provide in-depth knowledge of display systems, image synthesis, shape modeling of 3D application.
- To Understand basic concepts related to Multimedia including data standards, algorithms and software
- To Experience development of multimedia software by utilizing existing libraries and descriptions of algorithms

COURSE OUTCOMES:

- Gain proficiency in 3D computer graphics API programming
- Enhance the perspective of modern computer system with modeling, analysis and interpretation of 2D and 3D visual information.
- Able to understand different realizations of multimedia tools
- Able to develop interactive animations using multimedia tools
- Gain the knowledge of different media streams in multimedia transmission

UNIT I BASIC CONCEPTS 9

2D Transformations – Clipping – Window – View Prot Mapping – Graphical User Interfaces and Interactive Input Methods – Picture Construction Techniques – Virtual Reality Environment.

UNIT II 3D GRAPHICS 9

3D Transformation – 3D Viewing – Visible Surface Detection – Back Face Detection – Depth Buffer Method – Scan Line Method.

UNIT III MULTIMEDIA BASICS 9

Introduction to Multimedia – Components – Hypermedia – Authoring – Authoring tools – File formats – Color models – Digital Audio representation – Transmission – Audio signal processing – Digital music making – MIDI – Digital video – Video compression techniques – Video performance measurements – Multimedia Databases – Animation – Key frames and tweening techniques – Principles of animation – Virtual reality – Multimedia for portable devices

UNIT IV MULTIMEDIA COMMUNICATION 9

Stream characteristics for Continuous media – Temporal Relationship – Object Stream Interactions – Media Synchronization – Models for Temporal Specifications – Streaming of Audio and Video – Recovering from packet loss – RTSP – Multimedia Communication Standards – RTP/RTCP – SIP and H.263- Real time streaming and On-demand streaming

UNIT V MULTIMEDIA APPLICATION DEVELOPMENT 9

Design, Development and evaluation of multimedia a system - The development of user interface design - Design Process - MultiMedia & the Internet - Multimedia conferencing - Multimedia file sharing – Multimedia broadcasting - Multimedia Development Issues - Multimedia project – Structured Multimedia development - Multimedia project timing - Sample project

TOTAL: 45 PERIODS

REFERENCES:

1. Donald Hearn and M. Pauline Baker, “Computer Graphics in C Version”, Second Edition, Pearson Education
2. Tom McReynolds – David Blythe “ Advanced Graphics Programming Using OpenGL” , Elsevier, 2010
3. Parag Havaladar and Gerard Medioni, “Multimedia Systems-Algorithms, Standards and Industry Practices”, Course Technology, Cengage Learning, 2010.

4. John F. Koegel Bufend , “Multimedia systems”, Pearson Education, Delhi, 2002
5. Ralf Steinmetz and Klara “Multimedia Computing, Communications and Applications”, Pearson Education,2004.
6. Kurose and Ross, ‘Computer Networks : A top down Approach’, Pearson Education, 2002
7. Mohammad Dastbaz, Desgning Interactive Multimedia Systems
8. Multimedia – Technology and applications David Hillman Galgotia Publications, Delhi
9. Ralf Steinmetz and Klara Nahrstedt “Multimedia Applications”, Springer, 2007.

PCA15104

DATA STRUCTURES

3 0 0 3 100

COURSE OBJECTIVES:

- To understand the linear and non linear data structures available in solving problems
- To know about the sorting and searching techniques and its efficiencies
- Using the data structures and algorithms in real time applications

COURSE OUTCOMES:

- An ability to understand the concepts and structure of data stored.
- An ability to understand the design, function and implementation of programming.
- An ability to employ existing ideas or adapting existing solutions to similar problems.
- An ability to break down a large, complex problem into smaller, solvable problems.
- An ability to understand basic concepts related to programming.

UNIT I INTRODUCTION 9

Introduction to Data Structure – Abstract Data Types (ADT) – Primitive data structures – Arrays and its representation – Strings - Structures.

UNIT II STACKS AND QUEUES 9

Stack – Queue – Circular Queue – Applications of stack – Infix to postfix conversion – Applications of Queue – Linked Lists – Doubly Linked lists – Polynomial Addition.

UNIT III TREE STRUCTURES 9

Trees – Terminology - Representation of Trees – Binary Tree – expression trees – Binary tree traversals – Applications of trees – Binary search tree – AVL trees –B-Trees.

UNIT IV SORTING AND INDEXING 9

Bubble sort - Quick Sort - Insertion Sort – Heap sort – Hashing – Hashing functions - Collision Resolution by chaining.

UNIT V GRAPHS 9

Definitions – Graph representation - Graph Traversals - Depth-first search – breadth-first search - applications of graphs – shortest path algorithms – minimum cost spanning tree – Prim's and Kruskal's algorithms.

TOTAL : 45 PERIODS**TEXT BOOKS:**

1. E. Horowitz, S.Sahni and Dinesh Mehta, “Fundamentals of Data structures in C++”, University Press, 2007.
2. Reema Thareja, “Data Structures using C”, Oxford Press, 2012.

REFERENCES:

1. Tanaenbaum A.S.,Langram Y. Augestein M.J “ Data Structures using C” Pearson Education , 2004
2. M. A. Weiss, “Data Structures and Algorithm Analysis in C++”, Pearson Education Asia, 2013.
3. V. Aho, J. E. Hopcroft, and J. D. Ullman, “Data Structures and Algorithms”, Pearson Education, 1983.

COURSE OBJECTIVES:

- To focus skills in developing computer programs in c language.
- To efficiently implement the well-structured computer algorithms in programming Languages.

COURSE OUTCOMES:

- An ability to show independence and initiative in identifying problems and solving them.
- An ability to consider alternative hypotheses - view the problem from different perspectives.
- An ability to generate possible alternative solutions.
- An ability to break down a large, complex problem into smaller, solvable problems.
- An ability to employ existing ideas or adapting existing solutions to similar problems.

1 .Display the following:

- (i) Floyd's triangle (ii) Pascal Triangle

2.Generate the following series of numbers:

- (i) Armstrong numbers between 1 to 100
(ii) Prime numbers between 1 to 50
(iii) Fibonacci series up to N numbers

3. Manipulate the strings with following operations.

- (i) Concatenating two strings (ii) Reversing the string
(iii) Finding the substring (iv) Replacing a string (v) Finding length of the string

4. Find the summation of the following series:

- (i) Sine (ii) Cosine (iii) Exponential

5. Create the sales report for M sales persons and N products using two dimensional array.

6. Simulate following Banking operations using functions.

- (i)Deposit (ii) Withdrawal (iii) Balance Enquiry

7. Implement using recursion

- (i) Find the solution of Towers of Hanoi problem using recursion.
(ii) Fibonacci number generation.
(iii) Factorial

8. Generate Student mark sheets using structures.

9. Create a collection of books using arrays of structures and do the following:

- (i)Search a book with title and author name (ii) Sorts the books on title.

10. Perform string operations using pointers.

11. Program to implement dynamic memory allocation.

12. Create, Reading and displaying a sequential and random access file.

COURSE OBJECTIVES:

- To implement basic Multimedia Techniques using Flash, Photoshop.
- To give practical exposure to perform animation using various multimedia tools.

COURSE OUTCOMES:

- Exhibit the creativity through Photoshop and embed graphics into the web page.
- To design animation and entrench into the web page.
- Gives ability to integrate data, text, image, audio, or video in a single application.

Implement the following using Photoshop, Flash.

1. Design a Poster in Photoshop with different layers and make use of appropriate effects:

(i) Mask Effect (ii) Gaussian Blur Effect (iii) Motion Blur Effect (iv) Crystallize Effects.

2. Enhance a photograph to produce the following illusions:

(i) Rain Effect (ii) Glass Effect (iii) Texture Effect.

3. Design an advertisement in Flash with different effects like Tint Tweening, Alpha Tweening, Motion Tweening and Mask Effect.

4. Animate traffic Signal to control the traffic in junction points using Flash.

5. To perform text effects using Photoshop

6. Device a routine to produce the animation effect of a square transforming to a triangle and then to a circle.

7. Create an animation to represent the growing moon.

8. Design a visiting card containing atleast one graphic and text information.

9. Choose an image and adjust the brightness and contrast of the picture so that it gives an elegant look.

10. Using photoshop choose appropriate tool(s) from the toolbox, cut the objects from 3 files (f1.jpg, f2.jpg & f3.jpg); organize them in a single file and apply feather effects

PCA15107P

DATA STRUCTURES LABORATORY

0 0 3 2 100

COURSE OBJECTIVES:

- To obtain in-depth practical knowledge in data structures.
- To apply concepts of data structures in solving real time problems.

COURSE OUTCOMES:

- Ability to identify and implement appropriate data structure for a given application.
- An ability to identify all the trade-offs involved in choosing static versus dynamic data structures.
- Graduates will be able to understand the concepts of data structures and applications.
- An ability to identify and implement appropriate data structures for a given application.

Write a C program to implement the following concepts of data structures:

1. Operation on matrix using arrays
2. Polynomial Addition using array
3. Array implementation of stack
4. Array implementation of Queue
5. Infix to postfix conversion
6. Singly Linked List operations
7. Singly Linked List implementation of stack.
8. Binary tree traversals
9. Searching Techniques: Linear and Binary Search
10. Quick sort

PCA15201

SYSTEM SOFTWARE

3 0 0 3 100

COURSE OBJECTIVES:

- To understand the relationship between system software and machine architecture.
- To know the design and implementation of assemblers, loaders and linkers.
- To understand about lexical analyzer and parsing techniques.

COURSE OUTCOMES:

- Design and implement system software.
- Analyze the generation of object codes.
- Determine the working of device drivers.
- Understanding the working of compiler.

UNIT I INTRODUCTION**9**

System programs – Assembler – Compiler – Interpreter- Operating system- Machine Structure – Instruction set and addressing modes.

UNIT II ASSEMBLERS**9**

Basic assembler functions- machine dependent and machine independent assembler features - Assembler design – Two-pass assembler with overlay structure- one pass assembler and multi pass assembler.

UNIT III LOADERS AND LINKERS**9**

Basic loader functions - machine dependent and machine independent loader features. Loader design – Linkage editors - dynamic linking and bootstrap loaders.

UNIT IV COMPILERS**9**

Structure - Lexical Analyzers - Designing lexical analyzers - Syntactic specification of programming languages.

UNIT V**9**

Parsing Techniques – SLR-Intermediate code generation - Parse trees -Three address codes - quadruple and triples.

TOTAL : 45 PERIODS**TEXT BOOKS:**

1. Leland L Beck, *System Software*, An Introduction to System Programming, Pearson Education, 13th Indian Reprint, New Delhi, 2003.
2. John J Donovan, *Systems Programming*, Tata McGraw Hill Company, New Delhi, 2004.
3. Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, *Compilers: Principles, Techniques, & Tools*, 2nd edition Addison-Wesley, 2006.

REFERENCE BOOKS:

1. Dhamdhare D M, *Systems Programming and Operating Systems*, Tata McGraw Hill Company, New Delhi, 2002.
2. David Galles, *Modern Compiler Design*, Addison Wesley, 2004.

COURSE OBJECTIVES:

- To know about the fundamentals of algorithm analysis.
- To know about the sorting and searching techniques and its efficiencies.
- To get a clear idea about the various algorithm design techniques.
- Using the data structures and algorithms in real time applications.
- Able to analyze the efficiency of algorithm.

COURSE OUTCOMES:

- Able to apply the algorithm design techniques to any of the real world problem.
- Able to develop any new application with the help of data structures and algorithms.
- Able to write efficient algorithm for a given problem and able to analyze its time complexity.

UNIT I INTRODUCTION 9

Fundamentals of algorithmic problem solving – Important problem types – Fundamentals of the analysis of algorithm efficiency – analysis frame work – Asymptotic notations – Mathematical analysis for recursive and non-recursive algorithms.

UNIT II DIVIDE AND CONQUER METHOD AND GREEDY METHOD 9

Divide and conquer methodology – Merge sort – Quick sort – Binary search – Binary tree traversal – Multiplication of large integers – Strassen's matrix multiplication – Greedy method – Prim's algorithm – Kruskal's algorithm – Dijkstra's algorithm.

UNIT III DYNAMIC PROGRAMMING 9

Computing a binomial coefficient – Warshall's and Floyd' algorithm – Optimal binary search tree – Knapsack problem – Memory functions.

UNIT IV BACKTRACKING AND BRANCH AND BOUND 9

Backtracking – N-Queens problem – Hamiltonian circuit problem – Subset sum problem – Branch and bound – Assignment problem – Knapsack problem – Traveling salesman problem.

UNIT V NP-HARD AND NP-COMPLETE PROBLEMS 9

P & NP problems – NP-complete problems – Approximation algorithms for NP-hard problems – Traveling salesman problem – Knapsack problem.

L :45 T: 15 TOTAL : 60 PERIODS

REFERENCES:

1. Anany Levitin "*Introduction to the Design and Analysis of Algorithms*", Pearson Education 2003.
2. Thomas H.Cormen, Charles E.Leiserson, Ronald L.Rivest, Clifford Stein "*Introduction to Algorithms*", Prentice-Hall India Private Ltd., 2007

PCA15203

OBJECT ORIENTED PROGRAMMING IN C++**3 0 0 3 100****COURSE OBJECTIVES:**

- To impart the concepts of Object Oriented Programming (OOP).
- To implement the concepts of OOP in the real world applications.

COURSE OUTCOMES:

- An ability to understand the basics of object-oriented programming features in C++
- An ability to understand the fundamental constructs of class and objects.
- An ability to understand the concepts of building class hierarchy using inheritance and polymorphism.
- An ability to understand the implementation of pointers and various functions
- An ability to understand the fundamental constructs of exception handling, templates, and files.

UNIT I FUNDAMENTALS 9

Object–Oriented Programming concepts – Encapsulation – Programming Elements – Program Structure – Enumeration Types — Functions and Pointers – Function Invocation – Overloading Functions – Scope and Storage Class – Pointer Types – Arrays and Pointers – Call–by–Reference – Assertions – Standard template library.

UNIT II IMPLEMENTING ADTS AND ENCAPSULATION 9

Aggregate Type struct – Structure Pointer Operators – Unions – Bit Fields – Data Handling and Member Functions – Classes – Constructors and Destructors – Static Member – this Pointer – reference semantics – implementation of simple ADTs.

UNIT III POLYMORPHISM 9

ADT Conversions – Overloading – Overloading Operators – Unary Operator Overloading – Binary Operator Overloading – Function Selection – Pointer Operators – Visitation – Iterators – containers – List – List Iterators.

UNIT IV TEMPLATES 9

Template Class – Function Templates – Class Templates – Parameterizing – STL – Algorithms – Function Adaptors.

UNIT V INHERITANCE 9

Derived Class – Typing Conversions and Visibility – Code Reuse – Virtual Functions – Templates and Inheritance – Run–Time Type Identifications – Exceptions – Handlers – Standard Exceptions.

TOTAL : 45 PERIODS**REFERENCES:**

- 1.Ira Pohl, *Object–Oriented Programming Using C++*, Pearson Education, Second Edition,2003.
- 2.Stanley B.Lippman, Josee Lajoie, *C++ Primer*, Pearson Education, Third Edition, 2004.
- 3.Ashok N. Kamthane," Object Oriented Programming with ANSI and Turbo C++", Person Education, 2002.
- 4.Bhave , *Object Oriented Programming With C++*, Pearson Education , 2004.

COURSE OBJECTIVES:

- To understand the concepts and architecture of the World Wide Web.
- To understand and practice mark up languages
- To understand and practice embedded dynamic scripting on client side Internet Programming
- To understand and practice web development techniques on client-side

COURSE OUTCOMES:

- Acquire knowledge about functionalities of world wide web
- Explore markup languages features and create interactive web pages using them
- Learn and design Client side validation using scripting languages
- Acquire knowledge about Open source JavaScript libraries

UNIT I INTRODUCTION TO WWW 9

Internet Standards – Introduction to WWW – WWW Architecture – SMTP – POP3 – File Transfer Protocol - Overview of HTTP, HTTP request – response — Generation of dynamic web pages.

UNIT II UI DESIGN 9

Markup Language (HTML): Introduction to HTML and HTML5 - Formatting and Fonts –Commenting Code – Anchors – Backgrounds – Images – Hyperlinks – Lists – Tables – Frames - HTML Forms.

Cascading Style Sheet (CSS): The need for CSS, Introduction to CSS – Basic syntax and structure - Inline Styles – Embedding Style Sheets - Linking External Style Sheets – Backgrounds – Manipulating text - Margins and Padding - Positioning using CSS.

UNIT III INTRODUCTION TO JAVASCRIPT 9

Introduction - Core features - Data types and Variables - Operators, Expressions, and Statements - Functions - Objects - Array, Date and Math related Objects - Document Object Model - Event Handling- Controlling Windows & Frames and Documents - Form handling and validations.

UNIT IV ADVANCED JAVASCRIPT 9

Browser Management and Media Management – Classes – Constructors – Object-Oriented Techniques in JavaScript – Object constructor and Prototyping - Sub classes and Super classes – JSON - jQuery and AJAX.

UNIT V PHP 9

Introduction - How web works - Setting up the environment (LAMP server) - Programming basics - Print/echo - Variables and constants – Strings and Arrays – Operators, Control structures and looping structures – Functions – Reading Data in Web Pages - Embedding PHP within HTML – Establishing connectivity with MySQL database.

TOTAL : 45 PERIODS

REFERENCE BOOKS:

1. Harvey & Paul Deitel & Associates, Harvey Deitel and Abbey Deitel, *Internet and World WideWeb - How To Program*, Fifth Edition, Pearson Education, 2011.
2. Achyut S Godbole and Atul Kahate, *Web Technologies*, Second Edition, Tata McGraw Hill, 2012.
3. Thomas A Powell, Fritz Schneider, *JavaScript: The Complete Reference*, Third Edition, Tata McGraw Hill, 2013.
4. David Flanagan, *JavaScript: The Definitive Guide*, Sixth Edition”, O'Reilly Media, 2011
5. Steven Holzner, *The Complete Reference - PHP*, Tata McGraw Hill, 2008
6. Mike Mcgrath, *PHP & MySQL in easy Steps*, Tata McGraw Hill, 2012.

PCA15205

OPERATING SYSTEMS

3 0 0 3 100

COURSE OBJECTIVES:

- To provide the knowledge about Process Management and Memory Management.
- To understand the File System concepts and Storage Structure.

COURSE OUTCOMES:

- Able to know the operating system structure and components
- An ability to apply the process scheduling
- Ability to understand the methods and recovery of deadlock.
- An ability to understand the file system management.

UNIT I INTRODUCTION**9**

Definition – Objectives and Functions – Mainframe Systems – Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems – Real-Time Systems - Operating System Structure – System Components – Services – System Calls – System Programs – Design and Implementation.

UNIT II PROCESSES**9**

Process Concept – Process Scheduling – Operations on Processes – Cooperating Processes – Inter-Process Communication – Central Processing Unit (CPU) Scheduling – Basic Concepts – Scheduling Criteria – Algorithms – Multiple Processor Scheduling – Real Time Scheduling.

UNIT III PROCESS SYNCHRONIZATION AND DEADLOCKS**9**

Overview – Multithreading Model – Threading Issues -Process Synchronization – Critical Section Problem –Synchronization Hardware – Semaphore – Classic Problems of Synchronization – Deadlock – Deadlock Methods.

UNIT IV MEMORY MANAGEMENT**9**

Swapping – Contiguous Memory Allocation – Paging – Segmentation – Segmentation with Paging – Virtual Memory – Demand Paging – Page Replacement –Allocation of Frames – Thrashing.

UNIT V FILE SYSTEM AND MASS-STORAGE STRUCTURE**9**

File Concept – Access Methods – Directory Structure – File System Mounting – File Sharing – Protection –File System Structure and Implementation- Directory Implementation- Allocation Methods– Disk Structure – Disk Scheduling – Disk Management.

TOTAL: 45 PERIODS**TEXT BOOK:**

1. Silberschatz, Galvin, and Gagne, *Operating System Concepts*, Sixth Edition, John Wiley and Sons, New Delhi, 2008.

REFERENCES:

1. William Stallings, *Operating Systems*, Prentice Hall, New Delhi, 2010.
2. H.M.Deitel, *An Introduction to Operating Systems*, 3rd Edition, Pearson Education, 2003.

COURSE OBJECTIVES:

- To introduce the classic algorithms in various domains, and techniques for designing efficient algorithms
- To understand the major techniques for algorithm design and analysis through the study of various algorithms.
- students are guided to apply the algorithms to solve different problems.

COURSE OUTCOME:

- Understand the various problem solving techniques
- Apply the algorithms and design techniques to solve problems
- Understand how to chose problem solving techniques base on the problems
- Learn how to solve various problems under each technique

Write a program to implement the following algorithms

1. Quick Sort
2. Binary Search
3. Binary Tree Traversal
4. Warshall's Algorithm
5. Dijkstra's Algorithm
6. Prim's Algorithm
7. Knapsack Problem – Dynamic Programming
8. Subset Sum Problem – Backtracking
9. Travelling salesperson problem – Branch and Bound
10. Strassen's matrix multiplication

PCA15207P OBJECT ORIENTED PROGRAMMING IN C++ LABORATORY 0 0 3 2 100**COURSE OBJECTIVES:**

- To impart the concepts of Object Oriented Programming (OOP).
- To implement the concepts of OOP in the real world applications.

COURSE OUTCOMES:

- An ability to solve conceptual and technical problems using object-oriented techniques
 - To build and understand implementation issues related to object-oriented techniques.
 - An ability to fix programming errors.
 - To build good quality software using object-oriented techniques.
-
1. Write a C++ Program to illustrate Enumeration and Function Overloading
 2. Write a C++ Program to illustrate Scope and Storage class
 3. Implementation of ADT such as Stack and Queues
 4. Write a C++ Program to illustrate the use of Constructors, Destructors and Constructor Overloading
 5. Write a Program to illustrate Static member and methods
 6. Write a Program to illustrate Bit fields
 7. Write a Program to overload binary operator, friend and member function
 8. Write a Program to overload unary operator in Postfix and Prefix form as member and friend function
 9. Write a Program to illustrate Iterators and Containers
 10. Write a C++ Program to illustrate function templates
 11. Write a C++ Program to illustrate template class
 12. Write C++ Programs and incorporating various forms of Inheritance
 13. Write a C++ Program to illustrate Virtual functions
 14. Write a C++ Program to illustrate Exception Handling

COURSE OBJECTIVES:

- To implement basic Web Development Technology using HTML, Java Script, VB Script.
- To give practical exposure to create a web application.
- This course will introduce students to the realm of web design.
- To understand how HTML works, and more advanced and complicated structures and concepts of web design, such as CSS and layout control.

COURSE OUTCOMES:

- An ability to use most HTML tags and CSS properties and use a text editor to construct the basic HTML and CSS structure for a webpage;
- An ability to develop webpages that present information, graphics and hypertext links to other webpages in a cohesive manner, and build up with peers a website using CSS structure, while demonstrating awareness of usability and other web design issues
- Be aware of a range of real-world web design approaches and critically evaluate these approaches
- An ability to examine and evaluate the effectiveness of a web design in respect to its context.

1. Create a web page with the following using HTML5

- To embed an image map in a web page
- To fix the hot spots
- Show all the related information when the hot spots are clicked.

2. Create a web page with all types of Cascading style sheets.

3. Implement Client Side Scripts for Validating Web Form Controls using JavaScript.

4. Designing Quiz Application Personal Information System/ Using JavaScript

5. Write a JavaScript for Loan Calculation.

6. Develop and demonstrate a HTML file that includes JavaScript that uses functions for the following problems:

- Parameter: A string
Output: The position of the left-most vowel in the given string
- Parameter: A number
Output: The number with its digits in the reverse order

7. Develop PHP program using Arrays, control structures, looping structures and Form Handling.

8. Using PHP and MySQL, develop a program to accept book information viz. Accession Number, title, authors, edition and publisher from a web page and store the information in a database and to search for a book with the title specified by the user and to display the Search results with proper headings.

9. Write an AJAX program for parsing a JSON file and formatting the output.

10. Develop a web application for Airline Reservation System using PHP & AJAX.

PMA15301

DISCRETE MATHEMATICS

3 1 0 4 100

COURSE OBJECTIVES:

- To enable the students to analyze algorithms for various applications of logics.
- To efficiently implement the modeling computation and languages.
- To introduce in depth the basic concepts of probability.

COURSE OUTCOMES:

- An ability to understand the fundamental structures of set theory and functions.
- Acquire more knowledge in basic concepts of linear algebra.
- An ability to distinguish the difference between the deterministic finite static machines and nondeterministic finite state machines.

UNIT I FUNDAMENTAL STRUCTURES 9

Set theory – Relationships Between Sets – Operations on Sets – Set Identities – Principle of Inclusion and Exclusion – Minsets. Relations: – Binary Relations – Partial Orderings – Equivalence Relations. Functions: Properties of Functions – Composition of Functions – Inverse Functions.

UNIT II MATRIX ALGEBRA 9

Matrices – Rank of Matrix- Solving System of Equations- Eigen Values and Eigen Vectors – Cayley Hamilton Theorem (without proof) – Inverse of Matrix – Computation of Powers of Matrix.

UNIT III LOGIC 9

Propositional Logic – Logical Connectives – Truth Tables – Normal Forms (Conjunctive and Disjunctive) – Predicate Logic – Universal and Existential Quantifiers – Proof Techniques – Direct and Indirect – Proof by Contradiction.

UNIT IV COMBINATORICS 9

Pigeonhole Principle – Permutations and Combinations – Recursion and Recurrence Relations using Generating Functions and Particular Integral and Complementary Functions- Mathematical Induction.

UNIT V FINITE AUTOMATA 9

Finite State Machines – Deterministic Finite State Machines (DFA) – Non Deterministic Finite State Machines (NFA) – Equivalence of DFA and NFA – Formal Languages – Classes of Grammars – Type 0 – Context Sensitive – Context Free – Regular Grammars

L :45 T: 15 TOTAL : 60 PERIODS**TEXTBOOK (S):**

1. Alan Doerr, and Kenneth Levasseur, *Applied Discrete Structures for Computer Science*, Galgotia Publications Pvt. Ltd., New Delhi, 2010.
2. John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, *Introduction to Automata Theory, Languages and Computations*, Pearson Education, New Delhi, 2011.

REFERENCES:

1. J. P. Trembly and R.Manohar, *Discrete Mathematical Structures with Applications to Computer Science*, Tata McGraw Hill Publications Co. Ltd., New Delhi, 2008.
2. Ralph P. Girmaldi, *Discrete and Combinatorial Mathematics: An Applied Introduction*, Pearson Education, New Delhi, 2002.
3. M. K. Venkataraman, N. Sridharan and N. Chandrasekaran, *Discrete Mathematics*, The National Publishing Company, Chennai, 2003.
4. Judith L. Gersting, *Mathematical Structures for Computer Science*, Replika Press Pvt Ltd, Haryana,2006.
5. Kenneth H. Rosen, *Discrete Mathematics and its Applications*, Tata McGraw Hill Publications, Delhi, 2011.

PCA15301

ADVANCED OPERATING SYSTEMS

3 0 0 3 100

COURSE OBJECTIVES:

- To learn the fundamentals of Operating Systems
- To gain knowledge on Distributed operating system concepts that includes architecture, Mutual exclusion algorithms, Deadlock detection algorithms and agreement protocols
- To gain insight on to the distributed resource management components viz. the algorithms for implementation of distributed shared memory, recovery and commit protocols
- To know the components and management aspects of Real time, Mobile operating systems

COURSE OUTCOMES:

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

- Discuss the various synchronization, scheduling and memory management issues
- Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system
- Discuss the various resource management techniques for distributed systems
- Identify the different features of real time and mobile operating systems
- Install and use available open source kernel
- Modify existing open source kernels in terms of functionality or features used

UNIT I FUNDAMENTALS OF OPERATING SYSTEMS

9

Introduction – Process Concepts – Inter-Process Communication - CPU Scheduling Algorithms - Deadlocks – Deadlock methods.

UNIT II MEMORY MANGAMENT

9

Swapping – Contiguous Memory Allocation – Paging – Segmentation – Segmentation with Paging – Virtual Memory – Demand Paging – Page Replacement Algorithms.

UNIT III DISTRIBUTED & REAL TIME OPERATING SYSTEMS

9

Issues in Distributed Operating System – Architecture – Communication Primitives – Lamport’s Logical clocks – Causal Ordering of Messages – Distributed Mutual Exclusion Algorithms: Introduction – Classification – Simple Solution – Lamport Algorithm – Real Time Operating Systems: Basic Model of Real Time Systems - Characteristics- Applications of Real Time Systems.

UNIT IV OVERVIEW

9

General Overview of the System : History – System structure – User perspective – Operating system services – Assumptions about hardware. Introduction to the Kernel : Architecture of the UNIX operating system – Introduction to system concepts – Kernel Data Structure.

UNIT V FILE SUBSYSTEM

9

Internal representation of files: Inodes – Structure of a regular file – Directories – Conversion of a path name to an Inode – Super block – Inode assignment to a new file – Case Study: System calls – File – Process – IPC.

TOTAL: 45 PERIODS**REFERENCES:**

1. Mukesh Singhal and Niranjana G. Shivaratri, “Advanced Concepts in Operating Systems – Distributed, Database, and Multiprocessor Operating Systems”, Tata McGraw-Hill, 2001.
2. Abraham Silberschatz; Peter Baer Galvin; Greg Gagne, “Operating System Concepts”, Seventh Edition, John Wiley & Sons, 2004.
3. Rajib Mall, “Real-Time Systems: Theory and Practice”, Pearson Education India, 2006
4. Maurice J. Bach, “The Design of the Unix Operating System”, First Edition, Pearson Education, 1999.

PCA15302

DATABASE MANAGEMENT SYSTEMS 3 0 0 3 100

COURSE OBJECTIVES :

- To understand the fundamentals of database technology.
- To understand a way to store and retrieve Database information conveniently and efficiently.
- Ability to Model and Design a database, the languages and facilities provided by Database management System.

COURSE OUTCOMES:

- Ability to Design of database for any given problem.
- Ability to Design Logical Database Schema and Mapping it to implementation level schema through Database Language Features.
- Ability to understand the practical problems of Concurrency control and its solutions.
- Ability to gain knowledge about failures and Recovery mechanisms.

UNIT I INTRODUCTION 9

Historical perspective - Files versus database systems - Architecture - E-R model - Security and Integrity - Data models.

UNIT II RELATIONAL MODEL 9

The relation - Keys - Constraints - Relational algebra and Calculus - Queries - Programming and triggers

UNIT III DATA STORAGE 9

Disks and Files - file organizations - Indexing - Tree structured indexing - Hash Based indexing

UNIT IV QUERY EVALUATION AND DATABASE DESIGN 9

External sorting - Query evaluation - Query optimization - Schema refinement and normalization - Physical database design and tuning - Security

UNIT V TRANSACTION MANAGEMENT 9

Transaction concepts - Concurrency control - Crash recovery - Decision support - Case studies

TOTAL: 45 PERIODS**REFERENCES:**

1. Raghu RamaKrishnan and Johannes Gehrke, "Database Management Systems", McGraw Hill International Editions, 2000.
2. C. J. Date, "An Introduction to Database Systems", Seventh Edition, Addison Wesley, 1997.
3. Abraham Silberschatz, Henry. F. Korth and S. Sudharshan, "Database system Concepts", Third Edition, Tata McGraw Hill, 1997.

PCA15303

JAVA PROGRAMMING

3 0 0 3 100

COURSE OBJECTIVES:

- To understand the concept of Java Language, Exception Handling, Multithreading.
- To provide the knowledge about Abstract Windowing Toolkit (AWT) Package, Socket Programming and Database connectivity.

COURSE OUTCOMES:

- An ability to understand the concept of Object Oriented Programming.
- An ability to handle Exception.
- An ability to design GUI components using AWT and Swings.
- An ability to write network programming and Database Connectivity.

UNIT I**9**

Fundamentals of object oriented programming - JAVA Evolution – An overview of JAVA – Data Types, Variables and Arrays – Operators and Expressions – Control Statements.

UNIT II**9**

Classes, Objects and methods: Class Fundamentals – Declaring Objects – Assigning object reference variables – Methods declaration – Constructors – method overloading – method overriding – this Keyword - static members – abstract methods and classes – Inner Classes - using final – finalize method.

Inheritance: Basics – using super – Creating multilevel hierarchy – using final with inheritance.

UNIT III**9**

Interfaces and Packages : Interfaces - Packages – Access Protection – Importing packages

Exception Handling : Fundamentals – types – multiple catch clauses – nested try – java’s built in exceptions – creating user exceptions .

Multithreaded Programming : Java thread model – Creating thread - Priorities – Synchronization – Inter thread communication.

UNIT IV**9**

Applet Programming - AWT and Event Handling – string handling – Managing Input / Output Files in Java.

UNIT V**9**

Networking : Basics – InetAddress – TCP/IP client socket – URL – URL connection - TCP/IP server socket – Datagrams - Remote Method Invocation(RMI) – Java Database connectivity(JDBC).

TOTAL : 45 PERIODS**REFERENCES:**

1. Herbert Schildt, "*Java The Complete Reference*", Tata McGraw Hill, Fifth Edition, 2002.
2. E Balagurusamy, "*Programming with JAVA*", Mc Graw Hill, Fourth Edition, 2010
3. Horstmann and Cornell, "*Core Java*", Pearson Education, 2007
4. Deitel and Deitel, "*JAVA – How to Program*", Prentice Hall International Inc, 2007
5. Ken Arnold, James Gosling, David Holmes, "*The Java Programming Language*", Pearson Education, third Edition, 2007

COURSE OBJECTIVES:

- To help students to develop skills that will enable them to construct software of high quality which is reliable, and that is reasonably easy to understand, modify and maintain.
- To understand user conceptual models and development of better specifications, specification of interface and mockup to confirm specifications.

COURSE OUTCOMES:

- Ability to make the students a productive practitioner skilled in applying engineering process and practice to software components and systems.
- Ability to gain knowledge in design languages, reusable code and for participatory design and Interactive debugging.

UNIT I INTRODUCTION**9**

Software Engineering paradigms – Waterfall Life cycle model – Spiral Model – Prototype Model – Object oriented Model, Incremental Model - Fourth Generation Techniques – Planning – COst Estimation – Organization Structure – Software Project Scheduling, – Risk analysis and management – Requirements and Specification – Rapid Prototyping.

UNIT II SOFTWARE DESIGN**9**

Abstraction – Modularity – Software Architecture – Cohesion – Coupling – Various Design Concepts and notations – Real time and Distributed System Design – Documentation – Dataflow Oriented design – Jackson System development – Designing for reuse – Programming standards.

UNIT III SOFTWARE METRICS**9**

Scope – Classification of metrics – Measuring Process and Product attributes – Direct and Indirect measures – Reliability – Software Quality Assurance – Standards.

UNIT IV SOFTWARE TESTING AND MAINTENANCE**9**

Software Testing Fundamentals – Software testing strategies – Black Box Testing – White Box Testing – System Testing – Testing Tools – Test Case Management – Art of debugging - Software Maintenance Organization – Maintenance Report – Types of Maintenance.

UNIT V SOFTWARE CONFIGURATION MANAGEMENT (SCM) & CASE TOOLS**9**

Need for SCM – Version Control – SCM process – Software Configuration Items – Taxonomy – Case RePOsitory – Features.

TOTAL : 45 PERIODS**REFERENCES:**

1. Roger S. Pressman, “*Software Engineering: A Practitioner Approach*”, Sixth edition, McGrawHill, 2005.
2. I. Sommerville, “*Software Engineering*”, Eighth Edition, Addison Wesley-Longman, 2007.
3. Pankaj Jalote, “*An Integrated approach to Software Engineering*”, Second Edition, Springer Verlag, 2004.

COURSE OBJECTIVES:

- To learn the fundamentals of Operating Systems
- To gain knowledge on the inter process communication, scheduling algorithms and basic commands in UNIX

COURSE OUTCOMES:

- An ability to implement the process scheduling algorithms, inter process communication.
 - An ability to implement the basic commands in UNIX.
-
1. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time.
 2. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time.
 3. Developing Application using Inter Process Communication (using shared memory, pipes or message queues)
 4. Implement the Producer – Consumer problem using semaphores (using UNIX system calls).
 5. Simple Programs with basic Unix Commands (essential, utilities, filters, Regular expressions)
 6. Simple Programs with process Commands
 7. Simple Programs with communication Commands
 8. Simple Programs with advanced filters – (sed, awk)
 9. Programs using eval, exec, getopt
 10. Programming in C using file, process and IPC system calls

COURSE OBJECTIVES:

- To understand the fundamentals of database technology
- To understand a way to store and retrieve Database information conveniently and efficiently.
- Ability to Model and Design a database, the languages and facilities provided by Database management System

COURSE OUTCOMES:

- Ability to Design of database for any given problem.
 - Ability to Design Logical Database Schema and Mapping it to implementation level schema through Database Language Features.
 - Ability to understand the practical problems of Concurrency control and its solutions.
 - Ability to gain knowledge about failures and Recovery mechanisms.
1. Creation of base tables and views.
 2. Data Manipulation
INSERT, DELETE and UPDATE in tables
SELECT, Sub Queries and JOIN
 3. Data Control Commands
 4. High level language extensions – PL/SQL. Or Transact SQL
 5. Use of Cursors, Procedures and Functions
 6. Embedded SQL or Database Connectivity.
 7. Oracle or SQL Server Triggers.
 8. Working with Forms, Menus and Reports.
 9. Front-end tools – Visual Basic/Developer 2000

COURSE OBJECTIVES:

- To gain the practical knowledge in Java Programming concepts.
- To introduce the Abstract window Tool Kit, Thread and Socket Programming problems.

COURSE OUTCOMES:

- An ability to implement overloading, overriding, packages and string concepts.
- An ability to implement the exception handling.
- An ability to implement data base connectivity and threads.

Write a java program to implement the following concepts

1. Java classes and Objects
2. Constructor overloading and overriding concepts
3. Method overloading and overriding concepts.
4. Inheritance
5. Interfaces
6. Packages
7. Exception Handling
8. Multithreading Concepts
9. Applet applications
10. Event Handling
11. String Handling
12. Files (I/O Packages)
13. Chat application using datagram's
14. Remote Method Invocation
15. Database Connectivity

PCA15401

COMPUTER NETWORKS

3 0 0 3 100

COURSE OBJECTIVES:

- To understand networking concepts and basic communication model.
- To understand network architectures and components required for data communication.
- To analyze the function and design strategy of physical, data link, network layer and transport layer.
- To acquire knowledge of various application protocol standard developed for internet.

COURSE OUTCOMES:

- Able to trace the flow of information from one node to another node in the network
- Able to Identify the components required to build different types of networks
- Able to understand the functionalities needed for data communication into layers
- Able to choose the required functionality at each layer for given application
- Able to understand the working principles of various application protocols
- Acquire knowledge about security issues and services available

UNIT I NETWORK FUNDAMENTALS 9

Data Communication – physical structure – Topologies – The OSI model – TCP/IP protocol suite – Digital and Analog Transmission – Transmission Media – Modem standards.

UNIT II DATA LINK LAYER 9

Error Detection And Correction : Types of Errors- Single Bit and Multiple bit errors – VRC – LRC – CRC - checksum. Data Link Control And Protocols: Stop and Wait ARQ – Go-back-N ARQ- Selective Repeat ARQ – Connecting Devices: Repeaters, Hubs, Switches – Introduction to IEEE Project 802:Ethernet,Token Ring, FDDI-802.11.

UNIT III NETWORK LAYER 9

Internetworking – IP addressing – Subnetting- Classless IP addresses – ARP – RARP – ICMP – Routing – Distance Vector and Link State Routing, BGP.

UNIT IV TRANSPORT LAYER 9

Transport Services – Elements of Transport Protocols - UDP - Connection oriented, Reliable service – TCP – Connection establishment – TCP Congestion control – Transactional TCP.

UNIT V APPLICATION LAYER 9

DNS – Remote Logging –FTP –WWW –SMTP– VOIP – Network Management Protocol: SNMP – HTTP.

TOTAL : 45 PERIODS**TEXT BOOKS:**

1. Behrouz A Forouzan , "Data Communication and Networking", Mc Graw Hill, 2011.
2. Behrouz A Forouzan, Sophia Chung Fegan, "TCP/ IP Protocol Suite", Tata McGraw Hill, 2004

REFERENCES:

1. William Stallings, "Data and Computer Communication", Prentice Hall, 2007
2. Tanenbaum A. S, "Computer Networks", Prentice Hall, 2008.
3. Comer E, "Internetworking with TCP/IP, Principles Protocols and Architecture", Prentice Hall, 2007.

COURSE OBJECTIVES:

- To know how to identify objects, relationships, services and attributes through UML.
- To get in depth knowledge on Object Oriented Analysis and Design concepts.
- To get familiarized on object oriented design process.

COURSE OUTCOMES:

- Able to develop the software system under object oriented paradigm.
- Ability to model and design software based on user requirements.
- Demonstrate the functional behavior of UML diagrams.
- Recognize the concepts and notations used for finding Objects and classes.
- Depict the utility of Object Oriented Methodologies.
- Determine the factors of Object Oriented Design Process.

UNIT I INTRODUCTION 9

An overview – Object basics – Object state and properties – Behavior – Methods – Messages – Information hiding – Class hierarchy – Relationships – Associations – Aggregations- Identity – Dynamic binding – Persistence – Metaclasses – Object oriented system development life cycle.

UNIT II METHODOLOGY AND UML 9

Introduction – Survey – Rumbaugh, Booch, Jacobson methods – Patterns – Frameworks – Unified approach – Unified modeling language – Static and Dynamic models – UML diagrams – Class diagram – Usecase diagrams – Dynamic modeling – Model organization – Extensibility.

UNIT III OBJECT ORIENTED ANALYSIS 9

Identifying Usecase – Business object analysis – Usecase driven object oriented analysis – Usecase model – Documentation – Classification – Identifying object, relationships, attributes, methods – Super-sub class – A part of relationships Identifying attributes and methods – Object responsibility.

UNIT IV OBJECT ORIENTED DESIGN 9

Design process – Axioms – Colollaries – Designing classes – Class visibility – Refining attributes – Methods and protocols – Object storage and object interoperability – Databases – Object relational systems – Designing interface objects – Macro and Micro level processes – The purpose of a view layer interface

UNIT V SOFTWARE QUALITY 9

Quality assurance – Testing strategies – Object orientation testing – Test cases – Test Plan – Debugging principles – Usability – Satisfaction – Usability testing – Satisfaction testing

L :45 T: 15 TOTAL : 60 PERIODS

TEXT BOOKS:

1. Ali Bahrami, “Object Oriented System Development”, McGraw Hill International Edition,1999.

REFERENCES:

1. Craig Larman, “Applying UML and Patterns”, Second Edition, Pearson Education, 2002.
2. Grady Booch, James Rumbaugh, Ivar Jacobson, “The Unified Modeling Language User Guide”, Addison Wesley Long man, 1999.
3. Bernd Bruegge, Allen H. Dutoit, Object Oriented Software Engineering using UML, Patterns and Java, Pearson 2004

PCA15403 DATA WAREHOUSING AND DATA MINING 3 0 0 3 100

COURSE OBJECTIVES:

- To introduce the concept of data mining with in detail coverage of basic tasks, metrics, issues and implication.
- Core topics like classification, clustering and association rules are exhaustively dealt with.
- To introduce the concept of data warehousing with special emphasis on architecture and design.

COURSE OUTCOMES:

- An ability to understand and implement classical algorithms in data mining.
- An ability to assess the strengths and weaknesses of the data mining algorithms.
- An ability to identify the application area of algorithms and apply them.

UNIT I

9

Data Warehousing Components -Multi Dimensional Data Model- Data Warehouse Architecture-Data Warehouse Implementation- Mapping the Data Warehouse to Multiprocessor Architecture- OLAP.-Need-Categorization of OLAP Tools.

UNIT II INTRODUCTION

9

Relation to Statistics, Databases- Data Mining Functionalities-Steps In Data Mining Process-Architecture Of A Typical Data Mining Systems- Classification Of Data Mining Systems - Overview Of Data Mining Techniques.

UNIT III DATA PREPROCESSING AND ASSOCIATION RULES

9

Data Pre-processing-Data Cleaning, Integration, Transformation, Reduction, Discretization Concept Hierarchies-Concept Description: Data Generalization And Summarization Based Characterization-Mining Association Rules In Large Databases: Efficient and Scalable Frequent Item set Mining Methods.

UNIT IV PREDICTIVE MODELING

9

Classification and Prediction: Issues Regarding Classification And Prediction-Classification By Decision Tree Induction-Bayesian Classification-Other Classification Methods-Prediction-Clusters Analysis: Types Of Data In Cluster Analysis-Categorization Of Major Clustering Methods: Partitioning Methods – Hierarchical Methods

UNIT V APPLICATIONS

9

Applications of Data Mining-Social Impacts Of Data Mining-Tools-An Introduction To DB Miner-Case Studies-Mining WWW-Mining Text Database-Mining Spatial Databases.

TOTAL :45 PERIODS

REFERENCES

1. Jiawei Han and Micheline Kamber “Data Mining Concepts and Techniques” Second Edition, Elsevier, Reprinted 2008.
2. Alex Berson and Stephen J. Smith “Data Warehousing, Data Mining & OLAP”, Tata McGraw – Hill Edition, Tenth Reprint 2007.
3. K.P. Soman, Shyam Diwakar and V. Ajay “Insight into Data mining Theory and Practice”, Easter Economy Edition, Prentice Hall of India, 2006.
4. G. K. Gupta “Introduction to Data Mining with Case Studies”, Easter Economy Edition, Prentice Hall of India, 2006.
5. Pang-Ning Tan, Michael Steinbach and Vipin Kumar “Introduction to Data Mining”, Pearson Education, 2007.

COURSE OBJECTIVES:

- To understand the concepts of Web and its programming techniques.
- To create a Web Application using various technologies.

COURSE OUTCOMES:

- An ability to understand the scripting basics and VB script.
- An ability to create the web sites.

UNIT I INTERNET & HTML 9

Introduction to Web Technology-Web system architecture – Web Browser – Overview of HTTP.
HTML : Introduction- Links – Images – Tables – Frames – Forms – CSS.

UNIT II DHTML 9

Dynamic HTML – introduction – DOM – event model – filters and transition – data binding – data control – ActiveX control – handling of multimedia data

UNIT III CLIENT SIDE SCRIPTING 9

Scripting basics – Java Script introduction – control structures – functions – arrays – objects – Events and Event Handling - using Java Script with Style Sheets.

VB Script: Basics – Variables, Subtypes & Constants – Arrays – Procedures – Message and Input Boxes - Event Handling.

UNIT IV CGI 9

CGI and Controlling the Web from the Server: Putting your server to work – Traditional CGI programming – The Anatomy of a CGI Application Server – Specific Technologies Netscape ONE Vs Microsoft Windows DNA – Serious Applications for serious Web Publishing – Server-Independent Technologies.

UNIT V SERVLET 9

Servlet API Overview - Writing and running Simple Servlet - Servlet Life Cycle - GenericServlet and HttpServlet - ServletConfig & ServletContext - Writing servlet to Handle Get and Post Methods - Reading user request data - Writing thread safe servlets - Http Tunneling - Concept of cookie - Reading and writing cookies - Need of Session Management - Types of Session management - Using HttpSession Object.

TOTAL : 45 PERIODS

REFERENCES:

1. Chris Bates , “Web Programming”, Third Edition, Wiley Eastern, 2006
2. Thomno A. Powell, “The Complete Reference HTML and XHTML”, Fourth edition, Tata McGraw Hill, 2003.
3. Deitel & Deitel, “Internet and World Wide Web – How to Program”, Prentice Hall, Third Edition, 2004
4. Adiran Kingsley – Hughes, Kathie Kingsley-Hughes et.al. “VB Script: Programmers Reference” , Second Edition, WROX, 2007
5. Shelley Powers et.al. “Dynamic Web Publishing”, Second Edition, Tech Media, 1998
6. Dustin R. Callway, “Inside Servlets” , Second Edition, Pearson Education, 1999

COURSE OBJECTIVES:

- To understand the communication between Client and Server.
- To understand usage of TCP/UDP.
- To understand how to build network applications.

COURSE OUTCOMES:

- To write Network based programs.
- To design and implement client-server applications using TCP and UDP sockets.
- To analyze network programs.

Write a C / Java program to implement the following

1. Develop an application for transferring files over RS232.
2. Write a program that takes a binary file as input and performs bit stuffing and CRC computation.
3. Develop a Client – Server application for chat.
4. Develop a Client that contacts a given DNS Server to resolve a given host name.
5. Write a Client to download a file from a HTTP Server.
6. Study of Network Simulators like NS2 / Glomosim
7. Develop an application for ARP / RARP.
8. Develop an application for Sliding-Window protocol.
9. Develop an application for DV/ LS routing protocol.

COURSE OBJECTIVES:

- To show how we apply the process of analysis and design to software development.
- To point out the importance and function of each UML model throughout the process of object-oriented analysis and design and explaining the notation of various elements in these models.
- To provide the necessary knowledge and skills in using object-oriented CASE tools.

COURSE OUTCOMES:

- To show the importance of systems analysis and design in solving complex problems.
- To explain the importance of modeling and how the Unified Modeling Language (UML) represents an object-oriented system using a number of modeling views.
- To construct various UML models (including use case diagrams, class diagrams, interaction diagrams, state chart diagrams, activity diagrams, and implementation diagrams) using the appropriate notation.
- To recognize the difference between various object relationships: inheritance, association, whole-part, and dependency relationships.
- To apply the Rational Software Suit for the construction of UML models and expressing the appropriate notation associated with each model

1. Practicing the different types of case tools such as Rational Rose / other Open Source is used for all the phases of Software development life cycle.
2. Data modeling
3. Source code generators
4. Apply the following to typical application problems:
 - Project Planning
 - Software Requirement Analysis
 - Software Design
 - Data Modeling & Implementation
 - Software Estimation
 - Software Testing

A possible set of applications may be the following:

- a. Library System
- b. Student Marks Analyzing System
- c. Text Editor.
- d. Create a dictionary.
- e. Telephone directory.
- f. Inventory System.

PCA15407P

WEB TECHNOLOGY LABORATORY

0 0 3 2 100

COURSE OBJECTIVES:

- To implement the concepts of Web programming techniques.
- To develop a web application using various technologies.

COURSE OUTCOMES:

- An ability to develop the web sites.
 - An ability to design a FTP Server through which download /Upload files.
 - An ability to do the scripting programs in client & server side.
-
1. Web Page Creation using HTML and DHTML and Client side scripting Languages
 2. Write an application/GUI program in java for getting time and date information from the server using TCP/UDP
 3. Design a FTP Server through which download /Upload files.
 4. Write a program in java to implement Database Connectivity
 4. Write a JSP program for order processing
 5. Write a Servlet, bean program to access information from databases
 6. Write a ASP program using the components

PCA15451

SOFTWARE PROJECT MANAGEMENT

3 0 0 3 100

COURSE OBJECTIVES:

- To know of how to do project planning for the software process.
- To learn the cost estimation techniques during the analysis of the project.
- To understand the quality concepts for ensuring the functionality of the software

COURSE OUTCOMES:

- Understand the activities during the project scheduling of any software application.
- Learn the risk management activities and the resource allocation for the projects.
- Can apply the software estimation and recent quality standards for evaluation of the software projects
- Acquire knowledge and skills needed for the construction of highly reliable software project
- Able to create reliable, replicable cost estimation that links to the requirements of project planning and managing

UNIT I SOFTWARE PROJECT MANAGEMENT CONCEPTS 9

Introduction to Software Project Management: An Overview of Project Planning: Select Project, Identifying Project scope and objectives, infrastructure, project products and Characteristics. Estimate efforts, Identify activity risks, and Allocate resources.

UNIT II SOFTWARE EVALUATION AND COSTING 9

Project Evaluation: Strategic Assessment, Technical Assessment, cost-benefit analysis, Cash flow forecasting, cost-benefit evaluation techniques, Risk Evaluation. Selection of Appropriate Project approach: Choosing technologies, choice of process models, Structured methods.

UNIT III SOFTWARE ESTIMATION TECHNIQUES 9

Software Effort Estimation: Problems with over and under estimations, Basis of software Estimation, Software estimation techniques, expert Judgment, Estimating by analogy. Activity Planning: Project schedules, projects and activities, sequencing and scheduling Activities, networks planning models, formulating a network model.

UNIT IV RISK MANAGEMENT 9

Risk Management: Nature of Risk, Managing Risk, Risk Identification and Analysis, Reducing the Risk. Resource Allocation: Scheduling resources, Critical Paths, Cost scheduling, Monitoring and Control: Creating Framework, cost monitoring, prioritizing monitoring.

UNIT V SOFTWARE QUALITY MANAGEMENT 9

TQM, Six Sigma, Software Quality: defining software quality, ISO9126, External Standards, Comparison of project management software's: dot Project, Launch pad, openProj. Case study: PRINCE2

TOTAL : 45 PERIODS**REFERENCES:**

1. Bob Hughes & Mike Cotterell, "Software Project Management", Tata McGraw- Hill Publications, Fifth Edition 2012.
2. S. A. Kelkar, "Software Project Management" PHI, New Delhi, Third Edition ,2013.
3. Futrell , "Quality Software Project Management", Pearson Education India, 2008

PCA15452

XML AND ITS APPLICATIONS

3 0 0 3 100

COURSE OBJECTIVES:

- To know how XML is used in Web applications and software engineering that include programming and databases.
- Student masters the fundamentals of several XML based technologies, such as XQuery.
- To understand the principles of client programming, DOM.

COURSE OUTCOMES:

- Ability to plan and implement XML based applications, and to fully apply functional programming in document conversion.
- The student is familiar with some Schema validators and XSLT processors
- The student is able to develop advanced XML based applications

UNIT I INTRODUCTION TO XML & DTD 9

Comparison with HTML – XML documents – Well-formed XML document – Markup and character data – Prolog and XML declaration – Processing Instructions – XML elements – Types of elements – Attributes – Elements Vs Attributes – CDATA sections - XML Namespaces.

DTD: Valid XML document – Document Type Declarations and Document Type Definitions(DTDs) – Internal and External DTDs – Validating XML documents using DTD – Entities and Attributes – General and Parameter Entities.

UNIT II XML SCHEMA 9

Validating XML documents using XML Schema – Comparison with DTD – Creation of Simple Types – Specifying attribute constraints and defaults – Creation of Complex type – Specifying different types of content using Complex type – Specifying data types and restrictions in Schema.

UNIT III CASCADING STYLE SHEETS 9

Attaching Style sheets in XML documents – Selecting Elements in Style Sheet Rules – Creating Style rules – Formal Style Property Specifications.

XSL TRANSFORMATIONS: XSLT style sheets in XML Documents – Creating XSLT style sheets – Matching Document structures to template rules – Defining Template rules and Declarations – XPath Operators and Expressions – Branching and Control functions – Variables and Parameters in XSLT – Working with Strings , Booleans and Numbers – Restructuring Input Documents and Manipulating Document Subsets.

UNIT IV DOM AND SAX 9

Comparison – Creating a DOM parser – Displaying and Filtering XML documents – Working with SAX – Displaying and Filtering XML documents.

UNIT V - XML TECHNOLOGIES 9

XLINK , XPOINTERS, XQUERY, SVG, RDF.

TOTAL: 45 PERIODS**REFERENCES:**

1. William R.Stanek , “XML Pocket Consultant” , Prentice Hall, 2002.
2. Sandra E.Eddy & John E.Schnyder “Teach Yourself XML”, IDG Books India (P) Ltd, 2000.
3. Heather Williamson, “XML:The Complete Reference”, McGraw-Hill, 2001.

PCA15453

INFORMATION SYSTEMS

3 0 0 3 100

COURSE OBJECTIVES:

- To develop an awareness of the nature and use of information and information systems in an organisational context.
- To introduce the various techniques used within systems analysis and design.
- To foster an appreciation of the different types of methodologies used in the system development process.

COURSE OUTCOMES:

- Propose practical solutions to given analytical problems .
- Demonstrate the effective use of a chosen methodology through requirements analysis and fact finding techniques.

UNIT I INFORMATION SYSTEM AND ORGANIZATION 9

Matching the Information System Plan to the Organizational Strategic Plan – Identifying Key Organizational Objective and Processes and Developing an Information System Development – User role in Systems Development Process – Maintainability and Recoverability in System Design.

UNIT II REPRESENTATION AND ANALYSIS OF SYSTEM STRUCTURE 9

Models for Representing Systems: Mathematical, Graphical and Hierarchical (Organization Chart, Tree Diagram) – Information Flow – Process Flow – Methods and Heuristics – Decomposition and Aggregation – Information Architecture - Application of System Representation to Case Studies

UNIT III SYSTEMS, INFORMATION AND DECISION THEORY 9

Information Theory – Information Content and Redundancy – Classification and Compression – Summarizing and Filtering – Inferences and Uncertainty – Identifying Information needed to Support Decision Making – Human Factors – Problem characteristics and Information System Capabilities in Decision Making.

UNIT IV INFORMATION SYSTEM APPLICATION 9

Transaction Processing Applications – Basic Accounting Application – Applications for Budgeting and Planning – Other use of Information Technology: Automation – Word Processing – Electronic Mail – Evaluation Remote Conferencing and Graphics – System and Selection – Cost Benefit – Centralized versus Decentralized Allocation Mechanism.

UNIT V DEVELOPMENT AND MAINTENANCE OF INFORMATION SYSTEMS 9

Systems analysis and design – System development life cycle – Limitation – End User Development – Managing End Users – off-the Shelf Software Packages – Outsourcing – Comparison of Different Methodologies.

TOTAL : 45 PERIODS**TEXT BOOKS:**

1. K. C. Laudon, J. P. Laudon, M. E. Brabston, “Management Information Systems: Managing the Digital Firm”, Pearson Education 2002.
2. K. C. Laudon, J. P. Laudon, “Management Information Systems, Organization and Technology in the Networked Enterprise,” Sixth Edition, Prentice Hall, 2000.

REFERENCES:

1. E.F. Turban, R.K., R.E. Potter. “Introduction to Information Technology”, Wiley, 2004.
2. M. E. Brabston, “Management Information Systems: Managing the Digital Firm”, Pearson Education, 2002.
3. Jeffrey A. Hoffer, Joey F. George, Joseph S. Valachich, “Modern Systems Analysis and Design”, Third Edition, Prentice Hall, 2002.

PCA15454

DISTRIBUTED COMPUTING

3 0 0 3 100

COURSE OBJECTIVES:

- To know the various distributed computing system strategies.
- To understand the levels of message passing and call semantics.
- To learn the architecture of Remote Procedure Call.
- To be aware of the transaction models and deadlocks.
- To understand the purpose and categories of clock synchronization.

COURSE OUTCOMES:

- An ability to understand various distributed computing system strategies.
- An ability to Understand RPC, Deadlock, and clock synchronization.

UNIT I BASIC CONCEPTS**9**

Characterization of Distributed Systems – Examples – Resource Sharing and the Web – Challenges – System Models – Architectural and Fundamental Models – Networking and Internetworking – Types of Networks – Network Principles- Internet Protocols.

UNIT II INTER PROCESS COMMUNICATION AND DISTRIBUTED OBJECTS**9**

Inter process Communication – The API for the Internet Protocols – External Data Representation and Marshalling – Client/Server Communication – Group Communication – Case Study – Distributed Objects and Remote Invocation – Communication Between Distributed Objects – Remote Procedure Call – Events and Notifications.

UNIT III DISTRIBUTED TRANSACTIONS AND CONCURRENCY**9**

Control Transactions – Locks – Optimistic Concurrency Control – Timestamp Ordering – Comparison – Flat and Nested Distributed Transactions – Atomic Commit Protocols – Concurrency Control in distributed Transactions – Distributed Deadlocks – Transaction Recovery.

UNIT IV RESOURCE MANAGEMENT**9**

Time and Global States – Introduction – Clocks, Events and Process states – Synchronizing physical clocks – Logical time and logical clocks – Global states – Distributed debugging – Coordination and Agreement – Introduction – Distributed Mutual Exclusion – Elections Algorithm – Multicast Communication – Consensus and Related Problems.

UNIT V DISTRIBUTED FILE SYSTEM AND NAME SERVICES**9**

Distributed File Systems – Introduction – File Service Architecture – Network File System – Name Services – Introduction – Name Services and the Domain Name System – Directory Services.

TOTAL: 45 PERIODS**TEXT BOOK(S)**

1. George Coulouris, Jean Dollimore and Tim Kindberg, *Distributed Systems Concepts and Design*, Pearson Education, 2010

REFERENCES

1. Andrew S Tanenbaum and Maarten van Steen, *Distributed Systems, Principles and Paradigms*, Pearson Education, 2004
2. Mugesh Singhal, Niranjana G Shivaratri, *Advanced Concepts in Operating Systems*, Tata McGraw Hill, Edition, 2001
3. M L Liu, *Distributed Computing Principles and Applications*, Pearson Education, 2004.
4. Joshy Joseph and Craig Fellenstein, *Grid Computing*, IBM Press, 2004.
5. Ajay D Kshemkalyani and Mukesh Singhal, *Distributed Computing – Principles, Algorithms and System*, Cambridge University Press, 2008
6. Pradeep K. Sinha, *Distributed Operating Systems*, Prentice Hall of India, 2005

PCA15455

ADVANCED DATABASES

3 0 0 3 100

COURSE OBJECTIVES:

- To know about the different databases.
- To understand the fundamentals of database technology
- To understand a way to store and retrieve Database information conveniently and efficiently.
- To have an introductory knowledge about the emerging trends in the area of distributed DB, XML, Mobile, Multimedia databases.

COURSE OUTCOMES:

- Ability to Design of database for any given problem.
- Ability to understand the practical problems of Concurrency control and its solutions.

UNIT I PARALLEL AND DISTRIBUTED DATABASES 9

Database System Architectures: Centralized and Client-Server Architectures – Server System Architectures – Parallel Systems- Distributed Systems – Parallel Databases: I/O Parallelism – Inter and Intra Query Parallelism – Inter and Intra operation Parallelism – Distributed Database Concepts - Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency Control – Distributed Query Processing – Three Tier Client Server Architecture- Case Studies.

UNIT II OBJECT AND OBJECT RELATIONAL DATABASES 9

Concepts for Object Databases: Object Identity – Object structure – Type Constructors – Encapsulation of Operations – Methods – Persistence – Type and Class Hierarchies – Inheritance – Complex Objects – Object Database Standards, Languages and Design:
ODMG Model – ODL – OQL – Object Relational and Extended – Relational Systems: Object Relational feature sin SQL/Oracle –Case Studies.

UNIT III XML DATABASES 9

XML Databases: XML Data Model – DTD - XML Schema - XML Querying – Web Databases – JDBC – Information Retrieval – Data Warehousing – Data Mining

UNIT IV MOBILE DATABASES 9

Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management - Location Dependent Data Distribution - Mobile Transaction Models - Concurrency Control - Transaction Commit Protocols- Mobile Database Recovery Schemes

UNIT V MULTIMEDIA DATABASES 9

Multidimensional Data Structures – Image Databases – Text/Document Databases- Video Databases – Audio Databases – Multimedia Database Design.

TOTAL: 45 PERIODS**REFERENCES**

1. R. Elmasri, S.B. Navathe, “Fundamentals of Database Systems”, Fifth Edition, Pearson Education/Addison Wesley, 2007.
2. Thomas Cannolly and Carolyn Begg, “ Database Systems, A Practical Approach to Design, Implementation and Management”, Third Edition, Pearson Education, 2007.
3. Henry F Korth, Abraham Silberschatz, S. Sudharshan, “Database System Concepts”, Fifth Edition, McGraw Hill, 2006.
4. C.J.Date, A.Kannan and S.Swamynathan, ”An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006.
5. V.S.Subramanian, “Principles of Multimedia Database Systems”, Harcourt India Pvt Ltd., 2001.
6. Vijay Kumar, “ Mobile Database Systems”, John Wiley & Sons, 2006.

PCA15456

EMBEDDED SYSTEMS

3 0 0 3 100

COURSE OBJECTIVES:

- To know about the embedded computing.
- To have an introductory knowledge about the embedded system development.
- To understand the fundamentals of looping constructs.

COURSE OUTCOMES:

- Ability to understand the embedded system development.
- Ability to know about the inter process communication.

UNIT I EMBEDDED COMPUTING**9**

Challenges of Embedded Systems – Embedded system design process. Embedded processors – ARM processor – Architecture, ARM and Thumb Instruction sets.

UNIT II EMBEDDED C PROGRAMMING**9**

C-looping structures – Register allocation – Function calls – Pointer aliasing – structure arrangement – bit fields – unaligned data and endianness – inline functions and inline assembly – portability issues.

UNIT III OPTIMIZING ASSEMBLY CODE**9**

Profiling and cycle counting – instruction scheduling – Register allocation – conditional execution – looping constructs – bit manipulation – efficient switches – optimized primitives.

UNIT IV PROCESSES AND OPERATING SYSTEMS**9**

Multiple tasks and processes – context switching – scheduling policies – Inter process communication mechanisms – Exception and interrupt handling – performance issues.

UNIT V EMBEDDED SYSTEM DEVELOPMENT**9**

Meeting real time constraints – Multi-state systems and function sequences. Embedded software development tools – Emulators and debuggers. Design methodologies – case studies – complete design of example embedded systems.

TOTAL: 45 PERIODS**REFERENCES**

1. Andrew N Sloss, D.Symes, C.Wright, “ARM System Developers Guide”, Morgan Kaufmann / Elsevier, 2006.
2. Michael J.Point, “Embedded C”, Pearson Education, 2007.
3. Wayne Wolf, “Computers as Components: Principles of Embedded Computer System Design”, Morgan Kaufmann / Elsevier, 2nd edition, 2008.
4. Steve Health, “Embedded System Design”, Elsevier, 2nd edition, 2003.

PCA15457

NETWORK PROGRAMMING

3 0 0 3 100

COURSE OBJECTIVES:

- To understand the basic concepts of protocols.
- To understand the concepts of advanced sockets.

COURSE OUTCOMES:

- An ability to understand the concept of TCP Echo Server, TCP Echo Client.
- An ability to understand the sockets.
- An ability to understand IPV4 and IPV6 format.

UNIT I INTRODUCTION 9

Introduction – Overview of UNIX OS – Environment of a UNIX process – Process control – Process relationships Signals – Inter process Communication – overview of tcp/ip protocols.

UNIT II ELEMENTARY TCP SOCKETS 9

Introduction to Socket Programming – Introduction to Sockets – Socket address Structures – Byte ordering functions – address conversion functions – Elementary TCP Sockets – socket, connect, bind, listen, accept, read, write, close functions – Iterative Server – Concurrent Server.

UNIT III APPLICATION DEVELOPMENT 9

TCP Echo Server – TCP Echo Client – Posix Signal handling – Server with multiple clients – boundary conditions: Server process Crashes, Server host Crashes, Server Crashes and reboots, Server Shutdown – I/O multiplexing – I/O Models – select function – shutdown function – TCP echo Server (with multiplexing) – poll function – TCP echo Client (with Multiplexing)

UNIT IV SOCKET OPTIONS, ELEMENTARY UDP SOCKETS 9

Socket options – getsockopt and setsockopt functions – generic socket options – IP socket options – ICMP socket options – TCP socket options – Elementary UDP sockets – UDP echo Server – UDP echo Client – Multiplexing TCP and UDP sockets – Domain name system – gethostbyname function – Ipv6 support in DNS – gethostbyadr function – getservbyname and getservbyport functions.

UNIT V ADVANCED SOCKETS 9

Ipv4 and Ipv6 interoperability – threaded servers – thread creation and termination – TCP echo server using threads – Mutexes – condition variables – raw sockets – raw socket creation – raw socket output – raw socket input – ping program – trace route program.

TOTAL : 45 PERIODS**REFERENCES:**

1. W. Richard Stevens, “Advanced Programming in The UNIX Environment”, Addison Wesley, 1999.
2. W. Richard Stevens, “UNIX Network Programming - Volume 1”, Prentice Hall International, 1998.

PMA15451

OPERATIONS RESEARCH

3 0 0 3 100

COURSE OBJECTIVES:

- To implement the Operations Research Techniques for solving real time problems.
- To gain the knowledge about the Network Constructions and Queuing Theory.

COURSE OBJECTIVES:

- An ability to understand modeling and to get solution of variable in integer.
- An ability to identify the optimum way of transportation problem of goods.
- An ability to identify the optimum way of scheduling jobs.
- An ability to understand to minimize the waiting time in queues.
- To build good quality Network Construction concepts.

UNIT I LINEAR PROGRAMMING**9**

Mathematical Formulation of Linear Programming – Graphical Solution of Linear Programming Models – Linear Programming Methods – Simplex Method – Artificial Variable Techniques: Big M Method – Two Phase Method.

UNIT II TRANSPORTATION AND ASSIGNMENT MODELS**9**

Mathematical Formulation of Transportation Problem – Methods for Finding Initial Basic Feasible Solution – Optimum Solution – Degeneracy – Mathematical Formulation of Assignment Models – Hungarian Algorithm – Variants of the Assignment Problem.

UNIT III INTEGER PROGRAMMING MODELS**9**

Application of Integer Programming – Formulation – Formulation Possibilities through Mixed Integer programming – Methods of Integer Programming – The Concept of cutting Plane Algorithm – Gomory's Method – Gomory's Mixed Integer Method – Branch and Bound Technique.

UNIT IV SCHEDULING**9**

Network Construction – Basic Components – Rules of Network Construction – Critical Path Method (CPM) – Program Evaluation and Review Technique (PERT) – Resource Analysis in Network Scheduling: Time –Cost Optimization Algorithm and Linear Programming Formulation.

UNIT V QUEUING MODELS**9**

Characteristics of Queuing Models –Element of Queuing system – Classification of Queuing Models – Poisson Queues – $(M / M / 1) - (FIFO / \infty / \infty) - (M / M / 1) - (FIFO / N / \infty) - (M / M / C) - (FIFO / \infty / \infty) - (M / M / C) - (FIFO / N / \infty)$ Models.

TOTAL : 45 PERIODS**TEXTBOOK:**

1. Hamdy A.Taha, *Operations Research: An Introduction*, Prentice-Hall of India, New Delhi, 2007.

REFERENCES:

1. A M. Natarajan, P. Balasubramani, and A. Tamilarasi, *Operations Research*, Pearson Education, New Delhi, 2009.
2. Prem Kumar Gupta and D. S. Hira, *Operations Research*, Sultan Chand and Co., New Delhi. 2010.
3. R. Panneer Selvam, *Operations Research*, Galgotia, New Delhi, 2007.
4. Kanti Swarup, P. K. Gupta and Manmohan, *Operations Research*, Sultan Chand and Co., New Delhi, 2012.
5. J.K. Sharma, *Operations Research Theory and Applications*, Macmillan, 4th Edition, 2011.
6. Harvey M Wagner, *Principles of Operation Research with A Applications to Mangerial Decisions*, Prentice – Hall of India Private Limited, New Delhi, 2007.