MOTHER TERESA WOMEN'S UNIVERSITY

KODAIKANAL – 624 102

M.Sc.(COMPUTER SCIENCE)

(EFFECTIVE FROM JUNE 2018-2019 ONWARDS)

MASTER OF SCIENCE

M.SC. Computer Science

UNDER CBCS (with effect from 2018-2019)

OBJECTIVES:

- The main objective of this course is to provide knowledge of programming.

- Information technology includes software development, data manipulation and technology re-engineering which can be learned after completing this course.

- Software development and networking system are very comprehensive area of learning and they can be understood deeply by doing this course.

PROGRAMME SPECIFIC OUTCOMES

PS01 : After this course candidate will be able to handle digital commerce, software development and can achieve organizational goals objectives

PS02 :Also they can control the maintenance of software network to handle the technological challenges.

PS04: To pursue this course successfully, strong analytical skills, critical thinking skills and experimental skills are required.

PS05 :They also have to focus on problem solving abilities, system networking knowledge, use of technology with innovative ideas

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DEPARTMENT OF COMPUTER SCIENCE

M.SC. COMPUTER SCIENCE

ALLOCATION OF PAPERS AND CREDITS FOR PG PROGRAMME

2018 – 2019 ONWARDS

S.NO.	SUBJECT CODE	SUBJECT NAME	HOURS	CREDITS	INT	EXT	TOT
		First Semester					
01.	PCST11	Advanced Java Programming	6	5	25	75	100
02.	PCST12	Data Structures and Algorithms	6	5	25	75	100
03.	PCST13	Mathematical Foundations of Computer Science	6	5	25	75	100
04.	PCSP11	Advanced Java Lab	6	5	25	75	100
05.	PCSE11	Elective – I	6	5	25	75	100
	Total		30	25			500
		Second Semester					
01.	PCST21	Advanced Operating System	6	5	25	75	100
02.	PCST22	Relational Database Management System	6	5	25	75	100
03.	PCST23	Computer Networks	6	5	25	75	100
04.	PCSP22	RDBM Lab	6	5	25	75	100
05.	PCSE22	Elective – II	6	5	25	75	100
	Total		30	25			500
		Third Semester					
01.	PCST31	Compiler Design	6	5	25	75	100
02.	PCST32	Software Engineering	6	5	25	75	100
03.	PCST33	Web Programming	6	5	25	75	100
04.	PCSP33	Web Programming Lab	6	5	25	75	100

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05.	PCSE33	Elective – III	6	5	25	75	100
Total			30	25			500
Fourth Semester							
01.	PCST41	Digital Image Processing	6	5	25	75	100
02.	PCST42	Mobile Computing	6	5	25	75	100
03.	PCSP44	Project	-	5	25	75	100
Total			12	15			300
Grand Total				90			1800

ELECTIVES		
SEMESTER I	**SEMESTER II**	**SEMESTER III**
1. Computer Graphics 2. Soft Computing	1. Data Warehousing and Data Mining 2. Cryptography and Network Security	1. Software Project Management 2. Big Data Analytics

SCHEME OF EXAMINATION

Internal (Theory)	-	25
Test	-	15
Attendance	-	5
Assignment / Technical Quiz	-	5
Total	-	25
External (Theory)	-	75

QUESTION PATTERN

1.	PART A	10*1 Marks=10 (Objective Type/Multiple Choice) 2 Question from each Unit	10
2.	PART B	5*4 Marks =20 (From each Unit Either or Choice)	20
3.	PART C	3*15 Marks =45 (Open Choice) (Any three Question out of 5,onequestion from each unit)	45
		Total	75

The Internal assessment for Practical   : 25

The External assessment for Practical   : 75

CODE :PCST11   **ADVANCED JAVA PROGRAMMING**   **6HOURS/5CREDITS**

Objectives:

1. To Understand the Basic Programming Concepts of Java.
2. To know how to import user defined package, to create thread program and string methods
3. To learn about the Input/output and Networking package classes and methods
4. The Student can Familiar with Abstract Windowing Toolkit and Applet package classes and methods and in-depth knowledge in the basic concepts of remote method Invocation, JDBC and servlet.

Unit – I   OVERVIEW OF JAVA, INHERITANCE AND METHODS

Introduction- Object-Oriented Programming- Lexical Issues- Data types- Variables and Arrays – Operators – Control Statements –Objects-Classes - Inheritance – Methods –Method Overriding – Using Final with Inheritance - The Creation of Java- Java Byte code - The Java Buzzwords – Garbage Collection

Unit – II   USER DEFINED PACKAGES, THREAD PROGRAMMING AND STRING

Packages – Importing Packages – Interfaces – Exception Handling – Multithreaded Programming-The String Constructors –String Handling – Character Extraction – Comparison – Modifying a String - String Buffer.

Unit – III   JAVA PACKAGES: I/O, NET PACKAGE

I/O Package: The Java I/O Classes and Interfaces – File – Byte Streams – The Character Streams – Serialization- Net Package: The Networking Classes and Interfaces – InetAddress – Datagrams – TCP/IP Server Sockets.

Unit – IV   JAVA PACKAGES: AWT, APPLET

AWT Package: AWT Classes – Window Fundamentals – Working with Graphics– Working with Color – Working with Fonts – Applet Package: Applet Basics – Applet Architecture – Reading and Writing in Console – Print Writer class

Unit – V   SOFTWARE DEVELOPMENT USING JAVA

Remote Method Invocation – JDBC – Servlets – Life Cycle of a Servlet – The Servlet API – Servlet and Http Package.

Text Book(s):

1. Herbert Schildt"The Complete Reference JAVA", 7th Edition-,Tata McGraw Hill, 2007.

Reference(s):

1. Herbert Schildt, "The Complete Reference",8th Edition-,Tata McGraw Hill, 2011.
2. Kogent, "Java 6 Programming Black Book" Edition 2011, Kogent Learning Solutions.
3. Steven Holzner, "Java2(JDK 5 Edition) Programming" 2007 edition

CODE: PCST12 DATASTRUCTURES AND ALGORITHMS 6HOURS/5CREDITS

Objectives:

1. To understand about the basic data structures.
2. To know about the basic search and sort algorithms.
3. To understand about the binary trees
4. The Students can use a particular data structure and algorithm to solve a problem.

UNIT I INTRODUCTION TO ANALYSIS OF ALGORITHMS

Introduction to algorithms - Algorithm Analysis framework - Performance of algorithms: Space and Time Complexity - Asymptotic Notations: Big-Oh, Big-Omega and Big-Theta - Best, Worst and Average case analysis of algorithms. Mathematical analysis of Non recursive Algorithms - Sequential Search. Mathematical analysis of Recursive Algorithms - Recurrence relation - Binary search.

UNIT II LINEAR DATA STRUCTURES

Abstract Data Types (ADT) - List ADT - Array-based implementation - Linked list implementation - doubly-linked lists - Applications of Lists - Polynomial Operations. Stack ADT - Array based and linked List based implementation - Postfix expression evaluation. Queue ADT - Circular queue and linked List based implementation - Applications of Queues.

UNIT III BINARY TREES AND PRIORITY QUEUES

Trees - Binary trees - Binary tree representation and traversals - Threaded binary trees - Expression Trees -Binary Search Tree - Applications of trees. Balanced trees: AVL trees. Priority queue - Binary heap - Heap operations - Applications of heap.

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UNIT IV SETS AND HASHING

Disjoint Set ADT - Dynamic equivalence problem - Set operations - Representation - Implementation of union - Find operations - Smart union algorithms - Path compression - Applications of set. Hashing - Closed hashing: Separate chaining - Open addressing: Linear and quadratic probing - rehashing - Extendible hashing.

UNIT V GRAPHS

Graph - Definitions - Representations - Topological sort - Breadth first traversal - Depth first traversal - Connected components - Shortest path algorithms: Single source shortest path - Minimum spanning tree - Prim's and Kruskal's algorithms.

Text Book(s):

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Pearson Education, Fourth Edition, 2013.
2. AnanyLevitin, "Introduction to the Design and Analysis of Algorithm", Pearson Education Asia, 2013.

Reference Book(s):

1. Ellis Horowitz and SartajSahni, "Fundamentals of Data Structures", Galgotia Book Sorce, Gurgaon, 2007.
2. Jean-Paul Tremblay and Paul G. Sorenson, "An Introduction to Data Structures with Applications", Tata McGraw-Hill, New Delhi, Second Edition, 1991.
3. Alfred V. Aho, John E. Hopcroft and Jeffry D. Ullman, "Data Structures and Algorithms", Pearson Education, New Delhi, 2006
4. Thomas H Cormen, Charles E Leiserson, Ronald L Rivest and Clifford Stein, "Introduction to Algorithms", Prentice Hall of India, New Delhi, Second Edition, 2007

CODE :PCST13   **MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE**   **6HOURS/5CREDITS**

Objectives:

1. To study the basic set theory.
2. To study the basic concepts of Permutations and combinations
3. To Study the basic search algorithms to find the shortest path
4. The Students will familiarize with different mathematical structures.

UNIT – I MATHEMATICAL LOGIC & PREDICATES

Statements and notations, Connectives, Well-formed formulas, Truth Tables, tautology, equivalence implication, Normal forms. **Predicates:** Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof of contradiction, Automatic Theorem Proving.

UNIT – II SET THEORY

Properties of binary Relations, equivalence, compatibility and partial ordering relations, Hasse diagram. Functions: Inverse Function Composition of functions, recursive Functions, Lattice and its Properties, Pigeon hole principles and its application.

UNIT – III ALGEBRAIC STRUCTURES & COMBINATORICS

Algebraic structures: Algebraic systems Examples and general properties, Semi groups and monoids, groups sub groups' homomorphism, Isomorphism. Elementary **Combinatorics:** Basis of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of Inclusion – Exclusion.

UNIT – VI RECURRENCE RELATIONS

Generating Functions, Function of Sequences Calculating Coefficient of generating function, Recurrence relations, solving recurrence relation by substitution and Generating Functions. Characteristics roots solution of in homogeneous Recurrence Relation.

UNIT – V GRAPH THEORY AND APPLICATIONS

Representation of Graph, DFS, BFS, Spanning Trees, and planar Graphs. Applications of Graph: Graph Theory and Applications, Basic Concepts Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers

Text Book(s):

1. Mathematical Foundation of computer science(Discrete Structures)- Dr.D.S.C, PRISM, 3/e, 2010.

2. Mathematical Foundation of computer science-Dr.J.Rajendra Prasad, T.Rama Rao, A.MadanaMohana Rao, 1/e, 2011.
3. Discrete mathematics structure with application to computer science, Tremblay. JP &Manohar P., Mc-Graw-Hill, 2/e, 2004.

Reference Book(s):

1. Discrete Mathematics, Norman Biggs, Oxford. 10/e, 2010.
2. Discrete Mathematics for Computer Scientists and Mathematicians. Joe L. Mott, Abraham Kandel, and Theodore P. Baker, Prentice Hall, 2/e, 2002.
3. Elements of Discrete Mathematics, C. L. Liu, McGraw-Hill, 3/e, 2008.
4. Discrete and Combinatorial Mathematics – An Applied Introduction – Ralph. P. Grimaldi. Pearson Education , 5/e ,2003.
5. Discrete mathematics and its applications, Kenneth H. Rosen, McGraw-Hill, 7/e, 2012.

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2. Mathematical Foundation of computer science-Dr.J.Rajendra Prasad, T.Rama Rao, A.MadanaMohana Rao, 1/e, 2011.
3. Discrete mathematics structure with application to computer science, Tremblay. JP &Manohar P., Mc-Graw-Hill, 2/e, 2004.

Reference Book(s):

1. Discrete Mathematics, Norman Biggs, Oxford. 10/e, 2010.
2. Discrete Mathematics for Computer Scientists and Mathematicians. Joe L. Mott, Abraham Kandel, and Theodore P. Baker, Prentice Hall, 2/e, 2002.
3. Elements of Discrete Mathematics, C. L. Liu, McGraw-Hill, 3/e, 2008.
4. Discrete and Combinatorial Mathematics – An Applied Introduction – Ralph. P. Grimaldi, Pearson Education , 5/e ,2003.
5. Discrete mathematics and its applications, Kenneth H. Rosen, McGraw-Hill, 7/e, 2012.

SEMESTER – I

CODE:PCSP11   ADVANCED JAVA LAB   6HOURS/5CREDITS

Objectives:

1. To Explore exception handling techniques.

2. To Practice concurrency programming.

3. To Understand about applets and network programming.

4. The Students can Design, implement, test, debug, and develop programs in java

LIST OF EXPERIMENTS

1. Simple Java program with JavaDoc comments
2. Programs using packages and classes, JAR file creation
3. Programs using inheritance and its types
4. Programs using Interface and exception handling
5. Implementation of Multithreading
6. Program to demonstrate the use of Collection Classes
7. Database Connectivity using JDBC
8. Implementation of Applets
9. Event driven windows based application in Java
10. Program in AWT and Events Handling.
11. Network Programming using RMI.
12. Implementation using Java Servlet

CODE PCST21   ADVANCED OPERATING SYSTEM   6HOURS/5CREDITS

OBJECTIVE(S):

1. To learn the concepts of operating systems.
2. To learn about the various issues in operating systems.
3. To appreciate the emerging trends in operating systems
4. To familiarize with the important mechanisms in operating systems.

UNIT – IOPERATING SYSTEMS OVERVIEW

Introduction to operating systems – Computer system organization, architecture – Operating system structure, operations – Process, memory, storage management – Protection and security – Distributed systems – Computing Environments – Open-source operating systems – OS services – User operating-system interface – System calls – Types – System programs – OS structure – OS generation – System Boot – Process concept, scheduling – Operations on processes – Cooperating processes – Inter-process communication – Examples – Multithreading models – Thread Libraries – Threading issues – OS examples.

UNIT – IIPROCESS MANAGEMENT

Basic concepts – Scheduling criteria – Scheduling algorithms – Thread scheduling – Multiple-processor scheduling – Operating system examples – Algorithm Evaluation – The critical-section problem – Peterson's solution – Synchronization hardware – Semaphores – Classic problems of

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synchronization – Critical regions – Monitors – Synchronization examples – Deadlocks – System model – Deadlock characterization – Methods for handling deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock detection – Recovery from deadlock.

UNIT–III STORAGE MANAGEMENT

Memory Management – Swapping – Contiguous memory allocation – Paging –Segmentation – Example: The Intel Pentium - Virtual Memory: Background – Demand paging – Copy on write – Page replacement – Allocation of frames – Thrashing.

UNIT –IV I/O SYSTEMS

File concept – Access methods – Directory structure – File-system mounting – Protection – Directory implementation – Allocation methods – Free-space management – Disk scheduling – Disk management – Swap-space management – Protection.

UNIT –V CASE STUDY

The Linux System – History – Design Principles – Kernel Modules – Process Management – Scheduling – Memory management – File systems – Input and Output – Inter-process Communication – Network Structure – Security – Windows 7 – History – Design Principles – System Components – Terminal Services and Fast User – File system – Networking.

Text Book(s):

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, —Operating System Concepts Essentials, John Wiley & Sons Inc., 2010.

Reference Book(s):

1. Andrew S. Tanenbaum, —Modern Operating Systemsl, Second Edition, Addison Wesley, 2001.
2. D M Dhamdhere, —Operating Systems: A Concept-based Approachl, Second Edition, Tata McGraw-Hill Education, 2007.
3. Charles Crowley, —Operating Systems: A Design-Oriented Approachl, Tata McGraw Hill Educationl, 1996.
4. William Stallings, —Operating Systems: Internals and Design Principlesl, Seventh Edition, Prentice Hall, 2011.

CODE: PCST22   **RELATIONAL DATABASE MANAGEMENT SYSTEM**   **6HOURS/5CREDITS**

Objectives:

1. To understand the overview of Data Base systems & Data Models.

2. To modify and maintain the database structure.

3. To Understand the needs of database processing and learn techniques for controlling the Consequences of concurrent data access.

4. The Students can able to handle the Database.

Unit I: Introduction

Database Systems vs. File Systems- View of Data-Data Models-Database Languages-Transaction Management-Database System Structure-History of Database Systems-Database System Applications-Entity Relational Model.

Unit II: Relational Databases

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SQL-Basic Structure-Set Operations-Complex Queries-Joined Queries-DDL-Embedded SQL-Dynamic SQL-Other SQL Functions-Query by Example-Normalization.

Unit III:

Relational Database Design-Indexing & Hashing-Static Hashing-Dynamic Hashing-Multiple Key Access-Integrity And Security.

Unit IV: Query Evaluation and Optimization

Query Processing-Selection Operation-Sorting-Join Operation-Evaluation of Expressions-Query Optimization.

Unit V: Transaction Management

Transaction Management-Concurrency Control-Protocols-Deadlock Handling-Recovery Systems-Recovery with Concurrent Transactions-Shadow Paging-Buffer Management-Case Studies-Oracle-Microsoft SQL Server

TEXT BOOK

1. Abraham Silberschatz, Hentry F.Korth and S.Sudharssan, "Database System Concepts", 4th Edition, Tata McGraw Hill, 2002

REFERENCE BOOKS

2. Raghu Ramakrishnan & Johannesgerhrke, "Database Management Systems", McGraw Hill International edition, 2000

3. Introduction to RDBMS-C.J.Date

SEMESTER - II

CODE :PCST23   **COMPUTER NETWORKS**   **6hours/5credits**

Objective(s):

1. To study layered architecture of computer networks and protocols.
2. To learn the various mediums used in the physical layer.
3. To study the functionalities of data link layer.
4. The students can familiar with the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks

UNIT – I   INTRODUCTION, PHYSICAL LAYER

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Overview: Data Communication - Network Types - Internet History - TCP/IP Protocol Suite - The OSI Model - Digital Signals - Data rate limits - Performance - Line Coding - Block Coding - Transmission Media: Guided Media - Unguided Media – Switching.

UNIT – II   DATA LINK LAYER

Link Layer Addressing - ARP - Error Detection and Correction - Data Link Control Services - Data Link Layer Protocols - HDLC - PPP - Media Access Control - Ethernet - Wireless LANs: IEEE 802.11, Bluetooth -Connecting Devices.

UNIT – III   NETWORK LAYER

Network layer Services - Packet switching - Performance - IPV4 addresses - Forwarding of packets - Internet Protocol - ICMPV4 - Mobile IP - Routing algorithms - Routing Protocols - IPV6 addressing - IPV6 protocol -Transition from IPV4 to IPV6

UNIT – IV   TRANSPORT LAYER

Transport Layer Services - Protocols - UDP - TCP: Transition Diagram, Flow Control, Error Control, Congestion Control - SCTP - QoS: Flow Control to improve QoS - Integrated Services - Differentiated Services - Client Server Programming.

UNIT – V   APPLICATION LAYER AND SECURITY

World Wide Web and HTTP - FTP - Electronic Mail - Telnet - Secure Shell - Domain Name System - Cryptographic Algorithms - Authentication Protocols - Message Integrity Protocols - Public Key Distribution(X.509) - Network Layer Security - Transport Layer Security - Application Layer Security - Firewalls.

Text Book(s):

1. Behrouz A. Foruzan, "Data communication and Networking", Tata McGraw-Hill, Fifth Edition, 2013
2. Larry L. Peterson, Bruce S. Davie, "Computer Networks: A Systems Approach", Morgan Kauffmann Publishers Inc., Third Edition, 2003.

Reference Book(s):

1. James F. Kuross, Keith W. Ross, "Computer Networking, A Top-Down Approach Featuring the Internet", Addison Wesley, ThirdEdition,2004.
2. Pete Loshin, "IPv6: Theory, Protocol and Practice", ELSEVIER, Morgan Kauffmann Publishers Inc., Second edition, 2004
3. William Stallings, "Data and Computer Communication", Pearson Education, Sixth Edition, 2000.
4. Andrew S. Tannenbaum, "Computer Networks", Pearson Education, Fourth Edition, 2003
5. D.E. Comer, "Internetworking with TCP/IP Vol- III", (BSD Sockets Version), Pearson Education, Second Edition, 2003.
6. W. Richard Stevens, "UNIX Network Programming Vol-I", Pearson Education, Second Edition, 1998.

CODE:PCSP22

6hours/5credits

Objectives:

1. To practice to implement to create a database
2. To know how to handle records in a table.
3. To practice database management.
4. The Student can gain the in-depth knowledge in handling the database.

1. Creating Database

Creating a Database

Creating a Table

Specifying Relational Data Types

Specifying Constraints

Creating Indexes

2. Table and Record Handling

INSERT statement

Using SELECT and INSERT together

DELETE- UPDATE- TRUNCATE statements

DROP- ALTER statements

3. Retrieving Data from a Database

The SELECT statement

Using the WHERE clause

Using Logical Operators in the WHERE clause

Using IN- BETWEEN- LIKE - ORDER BY- GROUP BY and HAVING

Clause

Using Aggregate Functions

Combining Tables Using JOINS

Subqueries

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4. Database Management

Creating Views

Creating Column Aliases

Creating Database Users

Using GRANT and REVOKE

CODE:PCST31   COMPILER DESIGN

6hours/5credits

Objectives:
1. To Understand the working of compiler
2. To learn the various parsing techniques and different levels of translation
3. To learn how to obtain specific object code from source language
4. The students can learn how to optimize the code and schedule for optimal performance.

UNIT – I FRONT END OF COMPILERS

The Structure of Compiler – Lexical Analysis: Role of Lexical Analyzer, Specification and Recognition of Tokens, Syntax Analysis: Top Down Parsing, Bottom up Parsing, LR Parsers: SLR, CLR, and LALR.

UNIT – II INTERMEDIATE CODE GENERATION

Syntax Directed Definitions, Evaluation Orders for Syntax Directed Definitions, Syntax Directed Translation Schemes, Intermediate Languages: Syntax Tree, Three Address Code, Postfix Code, Declarations, Translation of Expressions, Type Checking, Back Patching.

UNIT – III RUNTIME AND OBJECT CODE GENERATION

Storage Organization, Stack Allocation Space, Access to Non-local Data on the Stack, Heap Management - Issues in Code Generation - Design of Code Generator - Register Allocation and Assignment – Instruction Selection by Tree Rewriting – Optimal Code Generation for Expressions – Dynamic Programming Code Generation.

UNIT – IV CODE OPTIMIZATION

Basic Blocks and Flow Graphs – Optimization of Basic Blocks – Principal Sources of Optimizations – Data Flow Analysis – Constant Propagation – Partial Redundancy Elimination – Peephole Optimizations.

UNIT – V SCHEDULING AND OPTIMIZING FOR PARALLELISM

Code Scheduling Constraints – Basic Block Scheduling – Global Code Scheduling - Basic Concepts in Parallelization – Parallelizing Matrix Multiplication – Iteration Spaces – Affine Array Indexes.

Text Book(s):

1. Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, —Compilers: Principles, Techniques and Toolsl, Second Edition, Pearson Education, 2009.

Reference Book(s):

1. Randy Allen, Ken Kennedy, —Optimizing Compilers for Modern Architectures: A Dependence-based Approachl, Morgan Kaufmann Publishers, 2002.
2. Steven S. Muchnick, —Advanced Compiler Design and Implementationl, Morgan Kaufmann Publishers - Elsevier Science, India, Indian Reprint 2003.
3. Keith D Cooper and Linda Torczon, —Engineering a Compilerl, Morgan Kaufmann Publishers Elsevier Science, 2004.
4. V. Raghavan, —Principles of Compiler Designl, Tata McGraw Hill Education Publishers, 2010.
5. Allen I. Holub, —Compiler Design in Cl, Prentice-Hall Software Series, 1993.

CODE :PCST32   **SOFTWARE ENGINEERING**   **6hours/5credits**

Objectives:

1. To be aware of generic models to structure the software development process.
2. To understand fundamental concepts of requirements engineering and requirements
3. To understand different notion of complexity at both the module and system level.
4. The Student can Work as an individual and as part of a multidisciplinary team to develop and deliver quality software.

UNIT – I SOFTWARE PROCESS MODELS

The Evolving Role of Software – Software – The changing Nature of Software – Legacy software — A generic view of process– A layered Technology – A Process Framework – The Capability Maturity Model Integration (CMMI) – Process Assessment –Personal and Team Process Models – Product and Process – Process Models – The Waterfall Model – Incremental Process Models – Incremental Model – The RAD Model – Evolutionary Process Models – Prototyping – The Spiral Model – The Concurrent Development Model – Specialized Process Models – The Unified Process.

UNIT – II REQUIREMENT ENGINEERING

Software Engineering Practice – Communication Practice – Planning Practice - Modeling Practice– Construction Practice –Deployment. Requirements Engineering - Requirements Engineering Tasks – Initiating the Requirements Engineering Process - Eliciting Requirements – Developing Use Cases – Building the Analysis Models –Elements of the Analysis Model – Analysis Pattern – Negotiating Requirements – Validating Requirements.

UNIT – III ANALYSIS MODELLING

Requirements Analysis – Analysis Modeling Approaches – Data Modeling Concepts – Object Oriented Analysis – Scenario Based Modeling – Flow Oriented Modeling – Class Based Modeling – Creating a Behaviour Model.

UNIT – IV DESIGN AND TESTING

Design Engineering – Design Process -Design Quality - Design Model - User Interface Design – Testing Strategies - Testing Tactics - Strategies Issues for Conventional and Object Oriented Software - Validation Testing – System Testing – Art of Debugging – Project Management

UNIT –V QUALITY AND MAINTENANCE

Software Evolution - Verification and Validation -Critical Systems Validation – Metrics for Process, Project and Product-Quality Management - Process Improvement – Risk Management - Configuration Management – Software Cost Estimation

Text Book(s):

1. Roger S. Pressman, —Software Engineering: A Practitioner's Approachl, McGraw Hill International edition, Seventh edition, 2009.
2. Ian Sommerville, —Software Engineeringl, Ninth Edition, Pearson Education, 2008.

Reference Book(s):

1. Stephan Schach, —Software Engineeringl, Tata McGraw Hill, 2007
2. Pfleeger and Lawrence —Software Engineering: Theory and Practicel, Pearson Education, Second edition, 2001

CODE: PCST33   **WEB PROGRAMMING**   **6hours/5credits**

Objectives:

1. To learn to design web pages using HTML5
2. To gain knowledge on creating interactive web pages using JavaScript, jQuery
3. To know to use Cascading Style Sheets (CSS) and DOM.
4. The students can Learn to develop server side scripting using PHP

UNIT – I   BASICS INTERNET PROTOCOLS, HTML5

Basic Internet Protocols - The World Wide Web - HTTP messages - Web servers and clients - Introduction to HTML5 - Editing HTML5 - W3C HTML validation service - Headings - Linking - Images - Special characters and horizontal rules - Lists - Tables - Forms - Internal linking - Meta elements - New HTML5 Form input types - Input and datalist elements and auto complete attribute - Page structure elements - Introduction to Canvas - Canvas Coordinate System - Rectangles - Drawing Arcs and Circles - Shadows

UNIT – II   JAVASCRIPT, JQUERY

Introduction to JavaScript - Syntax - Variables and data types - JavaScript Control Statements - Operators - Literals - Functions - Objects - Arrays - Built in objects - Event handling - Fundamentals of JQuery - JQuery selectors - JQuery methods to access HTML attributes - Traversing - Manipulators - Events - Effects

UNIT – III   CSS3, DOM

Types of CSS - Conflicting style sheets - Positioning Elements - Element Dimension - Box model and Text Flow - Media types - Media Queries - Drop-Down Menus - Text shadows - Rounded corners - Color - Box Shadows - Introduction to the Document Object Model - DOM History and Levels - Intrinsic Event Handling - Modifying Element Style - The Document Tree - Properties of window - DOM Collections - Using Timer and Dynamic Styles to Create Animated Effects - JavaScript Event Handling - Reviewing the load, mousemove, mouseover, mouseout events - Form processing with focus, blur, submit, reset - Event Bubbling - More Events

UNIT – IV   XML AND PHP

XML documents and vocabularies - XML versions and declarations - XML namespace - Representing data types : DTD, XML schema - XSLT - XPath - XQuery - Introduction to PHP - Converting Between Data Types - Arithmetic Operators - Initializing and Manipulating Arrays - String Comparisons - String Processing with Regular Expressions - Form Processing and Business Logic - Reading from a Database - Using Cookie - Dynamic Content.

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UNIT – V   AJAX AND WEB SERVICES

Ajax - Enabled rich internet applications with XML and JSON - Web Services Introduction - WCF Services Basics - SOAP - REST - JSON - Publishing and Consuming SOAP-Based Web Services, REST-Based XML Web Services, REST-Based JSON Web Services

Text Book(s):

1. P.J.Deitel, H.M.Deitel, "Internet and World Wide Web - How to program", Pearson Education Publishers, Fifth Edition, 2009.
2. Jeffrey C. Jackson, "Web Technologies - A Computer Science Perspective", Pearson Education, 2007.

Reference Book(s):

1. Robert. W. Sebesta, "Programming the World Wide Web", Pearson Education, Fourth Edition, 2007.
2. Kogent Learning Solutions Inc., "Html5 Black Book: Covers CSS3, JavaScript, XKL, XHTML, AJAX, PHP and jQuery", Dreamtech Press, 2011.
3. Joe Fawcett, Danny Ayers, Liam R. E. Quin, "Beginning XML", John Wiley & Sons Publisher, Fifth Edition, 2012
4. Bates, "Developing Web Applications", Wiley, 2006.

CODE:PCSP33   **WEB PROGRAMMING LAB**   **6hours/5credits**

Objectivs:

1. To develop the most important technologies that are being used today by web developers

2. To build a wide variety of web applications.

3. To develop Java based web programming.

4. The students can Built web applications using proven developer tools and message formats.

LIST OF EXPERIMENTS

1. Using InetAddress class, Socket Programming in Java
2. RMI
3. Client side scripting using
   - XHTML
   - Javascript – DOM
   - CSS
4. XML DTD, Parsers, XSLT, XPATH, SAX
5. Programming with AJAX, JQuery, JSON
6. Server Side programming (implement these modules using any of the server side scripting languages like PHP, Servlets, JSP etc.,
   - Gathering form data , Querying the database ,Response generation ,Session management , MySQL/JDBC/Oracle
7. Case Study – Sample Application development
8. Ruby-on-Rails setup and programming
9. Django, Jena – Integrating Databases and applications
10. JAX – RPC
11. WSDL
12. SOAP

CODE:PCST41   **DIGITAL IMAGE PROCESSING**   **6hours/5credits**

Objectives:

1. To learn about the basic concepts of digital image processing and various image transforms.
2. To understand the image enhancement techniques
3. To expose the student to a broad range of image processing techniques and their applications.
4. The Student can gain the Knowledge about the use of current technologies those are specific to image processing systems.

UNIT – I   FUNDAMENTALS OF IMAGE PROCESSING

Introduction - Steps in image processing systems - Image acquisition - Sampling and Quantization - Pixel relationships - Color fundamentals and models - File Formats, Image operations: Arithmetic, Geometric and Morphological - Introduction to MATLAB - Image operations using MATLAB.

UNIT – II   IMAGE ENHANCEMENT

Spatial Domain - Gray level transformations - Histogram processing - Spatial filtering - Smoothing and sharpening - Frequency domain: Filtering in frequency domain - DFT, FFT, DCT - Smoothing and sharpening filters - Homomorphic filtering - Image enchantment using MATLAB.

UNIT – III   IMAGE RESTORATION AND SEGMENTATION

Noise models - Mean Filters - Order Statistics - Adaptive filters - Band reject Filters - Band pass Filters - Notch Filters - Optimum Notch Filtering - Inverse Filtering - Wiener filtering.Segmentation: Detection of discontinuities - Edge operators - Edge linking and boundary Detection - Thresholding - Region based segmentation - Morphological Watersheds - Motion segmentation.

UNIT – IV   MULTI RESOLUTION ANALYSIS AND COMPRESSIONS

Multi Resolution analysis: Image pyramids - Multi resolution expansion - Wavelet transforms - Image compression: Fundamentals - Models - Elements of information theory - Error free compression - Lossy compression - JPEG standard, JPEG 2000, SPIHT, MPEG Standards. Image compression and enhancement using Wavelet transforms.

UNIT – V   IMAGE REPRESENTATION AND RECOGNITION

Boundary representation - Chain Code - Polygonal approximation, signature, boundary segments - Boundary description - Shape number - Fourier Descriptor, moments- Regional Descriptors - Topological feature, Texture - Patterns and Pattern classes - Recognition based on matching. Image Classification, retrieval. Image fusion - Digital compositing - Video motion analysis.

Text Book(s):

1. Rafael C.Gonzalez and Richard E.Woods, "Digital Image Processing", Pearson Education, Third Edition, 2009.
2. Anil K.Jain, "Fundamentals of Digital Image Processing", PHI, 2011.

Reference Book(s):

1. Milan Sonka, Vaclav Hlavac and Roger Boyle, "Image Processing, Analysis and Machine Vision", Thompson Learning, Second Edition, 2007.
2. Willliam K Pratt, "Digital Image Processing", John Willey, 2002.
3. Malay K. Pakhira, "Digital Image Processing and Pattern Recognition", PHI Learning Pvt. Ltd., First Edition, 2011.
4. Sanjit K. Mitra and Giovanni L. Sicuranza, "Non Linear Image Processing", Elsevier, 2007.
5. S.Sridhar, "Digital Image Processing", Oxford University Press, 2011.

Objectives:

1. To clearly understanding the mobile communications environment
2. To get clear idea about Satellite Systems.
3. To Interface a mobile computing system to hardware and networks.
4. The Student can develop the their knowledge in mobile computing system and how to interact with servers and database systems.

UNIT – I INTRODUCTION

Introduction: Applications – A Simplified Reference Model. Wireless Transmission: Frequencies for radio transmission – Signals – Antennas – Signal Propagation – Multiplexing – Modulation – Spread Spectrum – Cellular System.

UNIT – II MEDIUM ACCESS CONTROL

Medium Access Control: Motivation for a Specialized MAC- Hidden and exposed terminals – Near and far terminals – SDMA – FDMA – TDMA - Fixed TDM – Classical Aloha – Slotted Aloha – Carrier Sense Multiple Access – Demand assigned Multiple Access – PRMA Packet Reservation Multiple Access – Reservation TDMA – Multiple Access with Collision Avoidance – Polling – Inhibit Sense Multiple Access. CDMA - Spread Aloha multiple access. Comparison of S/T/F/CDMA.

UNIT – III TELECOMMUNICATION SYSTEMS

Telecommunication Systems: GSM - Mobile Services – System Architecture – Radio Interface – Protocols - Localization and Calling – Handover – Security. UMTS and IMT 2000: UMTS releases and standardization - UMTS System Architecture - UMTS Radio Interface –UTRAN - UMTS Handover.

UNIT – IV SATELLITE SYSTEM

Satellite System: History – Applications – Basics - Routing– Localization – Handover. Wireless LAN: IEEE 802.11- System Architecture – Protocol Architecture - Physical Layer – Medium Access Control Layer. Bluetooth: User scenarios – Architecture – Radio Layer – Baseband Layer – Link Manager Protocol.

UNIT – V MOBILE NETWORK LAYER

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Mobile Network Layer: Mobile IP - Goals, Assumption, and Requirements – Entities and Terminology – IP Packet delivery – Agent discovery – Registration. Dynamic Host Configuration Protocol - Mobile Transport Layer: Traditional TCP - Congestion Control – Slow Start – Fast Retransmit.

Text Book(s):

1. Jochen Schiller, "Mobile Communications",2nd Edition, eighth impression, Pearson Education, 2011.

Reference Book(s):

1. William Stallings,"Wireless Communication and Networks", 2nd Edition, Pearson Education, 2005.
2. Theodore Rappaport, "Wireless Communications: Principles and Practice", Prentice Hall Communications,1996.

CODE: PCSE11   **COMPUTER GRAPHICS**   **6HOURS/5CREDITS**

Objectives:

1. To Know and discuss hardware system architecture for computer graphics. This includes, but is not limited to: graphics pipeline, frame buffers, and graphic accelerators/co-processors.
2. To understand the current 3D graphics API .
3. Be able to discuss future trends in computer graphics and quickly learn future computer graphics concepts and APIs.
4. The Student can Familiar with key algorithms for modeling and rendering graphical data

UNIT I

Overview of Graphics System – output primitives: points and lines – line drawing algorithm – circle generating algorithm – ellipse generating algorithm – filled area primitives – character generation.

UNIT II

Two Dimensional transformation: basic transformation – Matrix representation – composite transformation and other transformation – window-to-viewport transformation, viewing – clipping – interactive input methods.

UNIT III

Three dimensional transformation: 3 D concepts – 3 D representation: polygon surfaces, curved line and surfaces, quadric surfaces – spline representation – cubic spline interpolation – Bezier curves – B Spline Curves and surfaces and Beta spline – fractal-geometric methods.

UNIT IV

Three dimensional geometric and modeling transformation – 3 D viewing – Visible surface detection methods – illumination models and surface-rendering methods.

UNIT V

Color Models and color applications: properties of light – standard primaries and the chromaticity diagram – all color models – conversion between HSV and RGB Models - Color selection – Design

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and animation sequences – general computer animation functions – computer animation languages – Key frame system – Motion specification.

REFERENCE BOOK

1. Donald Hearn and M.Pauline Baker – Computer Graphics, Pearson Education, Second Edition.

CODE: PCSE11   **SOFT COMPUTING**   6HOURS/5CREDITS

Objective(s):

1. To give students knowledge of soft computing theories fundamentals,
2. To learn the fundamentals of non-traditional technologies and approaches to solving hard real-world problems.
3. To learn and apply artificial neural networks, fuzzy sets and fuzzy logic, and genetic algorithms in problem solving and use of heuristics based on human experience.
4. The Student can Familiarize with genetic algorithms and other random search procedures useful while seeking global optimum in self-learning situations

UNIT – I   NEURAL NETWORKS - I

(Introduction and Architecture) Neuron, Nerve Structure and Synapse, Artificial Neuron and its Model, Activation Functions, Neural Network Architecture: Single Layer and Multilayer Feed Forward Networks, Recurrent Networks. Various Learning Techniques; Perception and Convergence Rule, Auto-Associative and Hetro-Associative Memory.

UNIT – II   NEURAL NETWORKS - II

(Back Propagation Networks) Architecture: Perceptron Model, Solution, Single Layer Artificial Neural Network, Multilayer Perception Model; Back Propagation Learning Methods, Effect of Learning Rule Co-Efficient ;Back Propagation Algorithm, Factors Affecting Back Propagation Training, Applications.

UNIT – III   FUZZY LOGIC - I

(Introduction) Basic Concepts of Fuzzy Logic, Fuzzy Sets and Crisp Sets, Fuzzy Set Theory and Operations, Properties of Fuzzy Sets, Fuzzy and Crisp Relations, Fuzzy to Crisp Conversion.

UNIT – IV   FUZZY LOGIC – II

(Fuzzy Membership, Rules) Membership Functions, Interference in Fuzzy Logic, Fuzzy If-Then Rules, Fuzzy Implications and Fuzzy Algorithms, Fuzzifications and Defuzzificataions, Fuzzy Controller, Industrial Applications

UNIT – V   GENETIC ALGORITHM

Basic Concepts, Working Principle, Procedures of GA, Flow Chart of GA, Genetic Representations, (Encoding) Initialization and Selection, Genetic Operators, Mutation, Generational Cycle, Applications.

Text Book(s):

1. S. Rajasekaran and G.A. VijayalakshmiPai, —Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis and Applicationsl, Prentice Hall of India, 2003.

2. N.P.Padhy,lArtificial Intelligence and Intelligent Systemsl, Oxford University Press, 2005.

3. J.S.R. Jang, C.T. Sun and E. Mizutani, —Neuro-Fuzzy and Soft Computingl, Pearson Education, 2004.

Reference Book(s):

1. SimanHaykin, —Neural Networks l, Prentice Hall of India, 1999

2. Timothy J. Ross, —Fuzzy Logic with Engineering Applicationsl, Third Edition, Wiley India, 2010

3. S.Y.Kung, —Digital Neural Networkl, Prentice Hall International, 1993.

4. Aliev.R.A and Aliev,R.R, — Soft Computing and its Applicationl, World Scientific