
JAYARAJ ANNAPACKIAM COLLEGE FOR WOMEN (AUTONOMOUS)

A Unit of the Sisters of St. Anne of Tiruchirappalli

Accredited with 'A' Grade (3rd Cycle) by NAAC

DST - FIST Supported College Since 2015

(Affiliated to Mother Teresa Women's University, Kodaikanal)

PERIYAKULAM – 625 601, THENI DT.

TAMIL NADU.



M.SC. COMPUTER SCIENCE 2019 - 2020

DEPARTMENT OF COMPUTER SCIENCE

PROGRAMME OUTCOMES P.G.

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Endow with in-depth knowledge, analyze and apply the understanding of their discipline for the betterment of self and society.
2.	Synthesize ideas from various disciplines, enhance the interdisciplinary knowledge and extend it for research.
3.	Gain confidence and skills to communicate orally/ verbally in research platforms and state a clear research finding.
4.	Develop problem solving and computational skills and gain confidence to appear the competitive examination.
5.	Enhance knowledge regarding research by accumulating practical knowledge in specific areas of research.
6.	Achieve idealistic goals and enrich the values to tackle the societal challenges.

PROGRAM SPECIFIC OUTCOME - P.G.

PSO	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO	PO MAPPED
PSO-1	Develop Domain Expertise: Acquire the basic knowledge of concepts and designs on modern computing platforms	PO - 1 PO - 4 PO - 5
PSO-2	Acquire Computing Skills and Ethics: Apply the knowledge of programming skills to produce effective designs and solutions for specific problems and data management for the betterment of the society.	PO - 1 PO - 4 PO - 5 PO - 6
PSO-3	Inculcate Research: Identify, analyze and synthesize scholarly literature relating to the field of computer science with life-long learning.	PO - 1 PO - 2 PO - 3 PO - 5
PSO-4	Develop Leadership Qualities: Communicate effectively, to function efficiently on teams to accomplish shared computing design and evaluation or implementation goals through projects.	PO - 3 PO - 4 PO - 6
PSO-5	Produce Efficient Techno-Entrepreneurs: To inculcate initiative and professional outlook skilled elite for better industry acceptance and apply their computing expertise to promote entrepreneurship.	PO - 2 PO - 3 PO - 4 PO - 6

M.SC. COMPUTER SCIENCE AND INFORMATION TECHNOLOGY (2017 - 2020)

In response to the current realities and emerging trends that affect the future of our students, the curriculum is restructured. It provides ample choice of subjects of study to our students, based on weighted credit point system. In addition to the core courses in their respective discipline, the learners are offered a number of Core-supportive and Extra Departmental Courses.

EXTRA CREDIT

During second semester, the students are asked to do a Case Study using Data Mining Techniques. Report should be submitted and Review will be conducted along with the second semester practical examinations. At the end of the second semester, students should undergo a mini project and viva will be conducted in the first week of the third semester.

The students can earn 2 extra credits each by doing a Case Study, Mini Project and a Self Study Paper. They can acquire more credits by undergoing certificate courses and self study courses offered by different faculties. For Case Study, Mini Project and Self Study papers, the pass will be indicated, credit will be given but not included for OPM.

PATTERN OF EVALUATION

For each paper there will be continuous internal assessment (CIA) and Semester Examination (External). The Weightage ratio is

Paper	Internal	External	Total
Theory	40	60	100
Practical	50	50	100
Project	50	50	100
Mini Project	100	-	100
Case Study	100	-	100
Self Study Paper	-	100	100

CIA COMPONENTS

Project		Mini Project	
Company Assessment	20	Presentation	20
I Review	10	Project Execution & Output	30
II Review	10	Viva	30
Attendance	5+5	Report	20
Total	50	Total	100

Practical		Case Study	
Internal Test(2)	25	Presentation	30
Lab Work	10	Techniques	20
Record	10	Viva	25
Attendance	05	Result & Report	25
Total	50	Total	100

M. Sc. (CS & IT)
Question Pattern (Internal)
(Mark should be converted into 30)

Time: 2 Hours

Maximum Marks: 60

PART A

- I. Answer the following (Ten Questions) (10X1=10)

PART B

- II. Answer ANY FOUR out of Six Questions. (4X5=20)

PART C

- III. Answer the following (Either or Choice) (2X15=30)

Question Pattern (External)

Time: 3 Hours

Maximum Marks: 60

PART A

- I. Answer the following (Ten Questions) (10X1=10)

PART B

- II. Answer ANY FOUR out of Six Questions. (4X5=20)

PART C

- III. Answer the following (Either or Choice) (2X15=30)

Self Study Paper - Question Pattern (External)

Time: 3 Hours

Maximum Marks: 100

PART A

- I. Answer ANY Six out of Ten Questions. (6X5=30)

PART B

- II. Answer ANY Five out of Eight Questions (5X8=40)

PART C

- III. Answer Any Three out of Six Questions (3X10=30)

P.G. COURSE PATTERN (2017-2020)

Sem.	Code	Title of the Paper	Hours	Credits
I	17PCS1C01	OOPs Design with C++	4	4
	17PCS1C02	Database Management System	4	4
	17PCS1C03	Data Structures and Algorithms	4	4
	17PCS1C04	Computer Organization	4	4
	17PCS1E1A/ 17PCS1E1B	Operating System/ Principles of Information Technology	4	3
	17PCS1CP1	Data Structure Lab Using C++	5	3
	17PCS1CP2	DBMS Lab	5	3
		Total	30	25
II	17PCS2C05	Java Programming	4	4
	17PCS2C06	Web Development Using DotNet Technologies	4	4
	17PCS2C07	Data Mining and Data Warehousing	4	4
	17PCS2E2A/ 17PCS2E2B	Mobile Computing/ Digital Image Processing	4	3
	17PCS2CP3	Java Programming Lab	4	3
	17PCS2CP4	Web Development Lab	4	2
	17PCS2I01	Data Analysis using R-Language	4	2
	17PGS2S01	Soft Skills	2	1
	17PCS2S01	Case Study Using Data Mining Techniques**	-	2*
		Total	30	23
III	17PCS3C08	Web Programming with PHP and MYSQL	4	4
	17PCS3C09	Mobile Application Development using Android	4	4
	17PCS3C10	Data Communication and Network Security	4	4
	17PCS3C11	Software Engineering	4	4
	17PCS3E3A/ 17PCS3E3B	Big Data and Data Analytics/ Enterprise Resource Planning	4	3
	17PCS3CP5	Web Programming with PHP and MYSQL Lab	5	3
	17PCS3CP6	Mobile Application Development using Android Lab	5	3
	17PCS3S02	Self Study - Software Testing ***	-	2*
	17PCS3M01	Mini Project (Summer Holidays)**	-	2*
		Total	30	25
IV	17PCS4R01	Project	-	18
	17PCS4A01	Comprehensive Examination	-	2*
		Total for all Semesters	120	90

*- Extra Credit

** - Internal Only

*** - External Only

OOPs DESIGN WITH C++

Semester: I

Hours: 4

Code : 17PCS1C01

Credits: 4

COURSE OUTCOMES:

- ❖ Develop programs in the procedural and object oriented paradigm with streams, classes, functions, data and objects.
- ❖ Describe the function overloading, constructor and function overloading with memory managements.
- ❖ Design and Develop programs in C++ using operator overloading and inheritance concepts of OOPs.
- ❖ Discuss and utilize virtual functions, polymorphism and generic functions in program development
- ❖ Apply and demonstrate the use of exception handling, I/O stream and file I/O

UNIT I

An Overview of C++: The Origins of C++ - Object Oriented Programming - C++ Fundamentals - Old -style vs. Modern C++ - Introducing C++ classes - Function overloading - Operator overloading - Inheritance - Constructors and Destructors - The C++ keywords - The general form of a C++ program. **Classes and Objects:** Classes - Structures and classes are related - Unions and classes are related - Friend functions - Friend classes - Inline functions - Parameterized constructors - Static class members - When constructors and destructors are executed - The scope resolution operator - Nested classes - Local classes - Passing objects to functions - Returning objects - object assignment. **12 Hours**

UNIT II

Arrays, Pointers, Reference, and the Dynamic Allocation Operators: Arrays of objects - Pointers to objects - Type checking C++ Pointers - The this pointer - Pointers to derived types - Pointers to class members - references. **Function Overloading, Copy Constructors and Default Arguments:** Function overloading - Overloading constructors - Copy constructors - Finding the address of an overloaded function - The overload anachronism - Default function arguments - Function overloading and ambiguity. **12 Hours**

UNIT III

Operator Overloading: Creating a member operator function - Operator overloading using a friend function - Overloading new and delete - Overloading some special operators - Overloading the comma operator. **Inheritance:** Base - class access control - Inheritance and protected members - Inheriting multiple base classes - Constructors, Destructors, and Inheritance - Granting access - Virtual base classes. **12 Hours**

UNIT IV

Virtual Functions and Polymorphism: Virtual functions - The virtual attribute is inherited - Virtual functions are hierarchical - Pure virtual functions - Using virtual functions - Early vs Late Binding. **Templates:** Generic functions - Applying generic functions - Generic classes. **12 Hours**

UNIT V

Exception Handling: Exception handling fundamentals - Handling derived - class exceptions - Exception handling options - Understanding terminate() and unexpected - The uncaught_exception() function - The exception and bad_exception classes - Applying Exception Handling. **The C++ I/O System Basics:** Old vs. Modern C++ I/O - C++ streams- The C++ stream classes- Formatted I/O-Overloading << and >>. **C++ File I/O:** <fstream> and the file classes- Opening and closing a file - Reading and writing text files- Unformatted and binary I/O. **12 Hours**

COURSE BOOK:

“**The Complete Reference C++**”, Fourth Edition, Herbert Schildt, Tata McGraw Hill Publication, 2011.

Unit I :	Chapters -11, 12	Pages (255 - 324)
Unit II:	Chapters - 13, 14	Pages (325 - 347), (359 - 381)
Unit III:	Chapters - 15, 16	Pages (383 - 441)
Unit IV:	Chapters - 17, 18	Pages (443 - 485)
Unit V :	Chapters - 19, 20, 21	Pages (487 - 551)

BOOKS FOR REFERENCE:

1. “**Object-Oriented Analysis and Design with Applications**”, Bobbi J. Young, Robert, A.Maksimchuk, Grady Booch, Jim Conallen, Michael W. Engel, Kelli A. Houston, Pearson Education Singapore Private Ltd., 3rd Edition , 2009
2. “**Thinking in C++**”, (Volume -1), Bruce Eckel, DORLING KINDERSLEY (INDIA)PVT, 2nd Edition , 2002
3. “**Big C++**”, Cay Horstmann & Timothy Budd, wiley - India edition.

DATABASE MANAGEMENT SYSTEM

Semester: I

Hours : 4

Code : 17PCS1C02

Credits : 4

COURSE OUTCOMES:

- ❖ Describe the DBMS architectures, design physical and logical databases, database modeling, relational, hierarchical and network models.
- ❖ Learn and apply Structured Query Language (SQL) for database definition and database manipulation.
- ❖ Normalize the databases in design phase and develop such knowledge in efficient designing of a database.
- ❖ Classify database storage structures and access techniques such as file organizations, indexing methods and hashing.
- ❖ Explain various transaction processing, concurrency control mechanisms and database protection mechanisms.

UNIT I

INTRODUCTION: Database system applications - Purpose of Database Systems - View of Data-Database Languages - Relational Databases - Database Design - Object Based and Semistructured Databases - Data Storage and Querying - Transaction Management - Data Mining and Analysis - Database Architecture - Database Users and Administrators - History of Database Systems. **RELATIONAL DATABASES: Relational Model:** Structure of Relational Databases - Fundamental Relational - Algebra Operations - Additional Relational Algebra Operations - Extended Relational Algebra Operations - Null Values - Modification of The Database. **12 Hours**

UNIT II

SQL: Background-Data Definition - Basic Structure of SQL Queries - Set Operations - Aggregate Functions - Null Values-Nested Sub Queries - Complex Queries - Views-Modification of the Database - Joined Relations. **DATABASE DESIGN: Database design and the E-R model:** Overview of the Design Process -The Entity Relationship Model - Constraints-Entity Relationship Diagrams-Entity Relationship Design Issues - Weak Entity Sets-Extended E-R features - Database Design for Banking Enterprise-Reduction to Relational Schemas - Other Aspects of Database Design - The Unified Modeling Language (UML). **12 Hours**

UNIT III

Relational Database Design: Features of Good Relational Designs - Atomic Domains and First Normal Form - Decomposition Using Functional Dependencies - Functional Dependency Theory - Decomposition Using Functional Dependencies - Decomposition Using Multivalued Dependencies-More Normal Forms - Database Design Process - Modeling Temporal Data. **Application Design and Development:** Triggers. **OBJECT BASED DATABASES AND XML: Object Based Databases:** Overview-Complex Datatypes - Structured Types and Inheritance in SQL - Table Inheritance - Array and Multiset Types in SQL - Object - Identity and References Types in SQL - implementing O-R Features - Persistent Programming Languages - Object - Oriented vs Object-Relational. **12 Hours**

UNIT IV

Indexing and Hashing: Basic Concepts-Ordered Indices - B⁺-Trees Index Files - B-Tree Index Files-Multiple Key Access-Static Hashing - Dynamic Hashing - Comparison Of Ordered Indexing and Hashing-Bitmap Indices - Index Definition in SQL. **Query Processing:** Overview - Measures of Query Cost - Selection Operation - Sorting - Join Operation - Other Operations - Evaluation of Expressions. **12 Hours**

UNIT V

Transactions: Transaction Concept - Transaction State - Implementation of Atomicity and Durability - Concurrent Executions - Serializability - Recoverability -Implementation of Isolation - Testing for Serializability - **Concurrency Control:** Lock Based Protocols-Timestamp Based Protocols - Validation Based Protocols - Multiple Granularity - Multiversion Schemes - Deadlock Handling - Insert and Delete Operations - Weak Levels of Consistency - Concurrency in Index Structures**. **Recovery System:** Failure Classification - Storage Structure - Recovery and Atomicity - Log-Based Recovery - Recovery With Concurrent Transactions - Buffer Management - Failure With Loss of Nonvolatile Storage - Advanced Recovery Techniques** - Remote Backup Systems. **12 Hours**

COURSE BOOK:

“Database System Concepts” Abraham Silberschatz’, Henry F. Korth, S.Sudarshan, McGraw-Hill International Edition, Fifth Edition 2006.

Unit I	: Chapters 1, 2	Pages (1 - 73)
Unit II	: Chapters 3, 6	Pages (75 - 120, 201 - 261)
Unit III	: Chapters 7, 8.6, 9	Pages (263 - 310, 329 - 334, 361 - 393)
Unit IV	: Chapters 12, 13	Pages (481 - 529, 531 - 568)
Unit V	: Chapters 15, 16, 17	Pages (609 - 718)

BOOKS FOR REFERENCE:

1. **“An Introduction to Database Systems”**, Vol.- 1, C. J. Date, Addison Wesley Publications.
2. **“Database Systems - Models, Languages, Design and Application Programming”**, 6th Edition, Ramez Elmasri, Shamkant B. Navathe, Pearson Education in South Asia, 2013.

DATA STRUCTURES AND ALGORITHMS

Semester: I

Hours: 4

Code : 17PCS1C03

Credits: 4

COURSE OUTCOMES:

- ❖ Develop deep knowledge on designing data structures and Algorithms
- ❖ Apply various data structures for solving any problems
- ❖ Implement stack, queue and graph techniques in real time problem solving.
- ❖ Use various standard algorithms on Trees, Tree Traversals and graph in developing programs efficiently.
- ❖ Developing real time applications using data structures.

UNIT I

INTRODUCTION : Algorithm - Algorithm Specification - Pseudo code Conventions - Recursive Algorithms - Performance Analysis: Space Complexity - Time Complexity - Amortized complexity - Asymptotic Notation (o, Ω, θ) - Practical Complexities - Performance Measurement - Randomized Algorithms: Basics of Probability Theory - Randomized Algorithm: An Informal Description - Identifying the repeated element - Primality Testing - Advantages and disadvantages
12 Hours

UNIT II

ELEMENTARY DATA STRUCTURES - Stacks and Queues - Trees -Terminology - Binary Trees - Dictionaries - Binary Search Trees - Priority Queues - Heaps - Heap Sort - Sets and Disjoint Set Union - Introduction - Union and Find operations - Graphs - Introduction - Definitions - Graph Representations - Divide and Conquer - General Method -Defective Chessboard - Binary Search - Finding the maximum and Minimum - Merge Sort - Quick Sort - Performance Measurement- Randomized Sorting Algorithms- Strassen's Matrix Multiplication.
12 Hours

UNIT III

THE GREEDY METHOD- The General Method- The container Loading - Knapsack Problem- Tree Vertex Splitting- Job Sequencing With Deadlines - Minimum Cost Spanning Trees: Prims Algorithm-Kruskals Algorithm-An optimal Randomized Algorithm(*) - Optimal Storage on Tapes-Optimal Merge Patterns- Single Source Shortest Paths. DYNAMIC PROGRAMMING: The General method- All Pairs Shortest Paths-Optimal Binary Search Trees-The Traveling SalesPerson Problem.
12 Hours

UNIT IV

**BASIC TRAVERSAL AND SEARCH TECHNIQUES- Techniques for Binary Trees
Techniques for Graphs:** Breadth First Search and Traversal- Depth First Search
and Traversal - **Connected Components and Spanning Trees- Biconnected
Components And DFS. Back Tracking-** The General Method - The 8 Queens
Problem - Sum of Subsets - Graph Coloring - Hamiltonian Cycles - Knapsack
Problem. **12 Hours**

UNIT V

BRANCH AND BOUND- The Method - Least Cost (LC) Search -The 15-puzzle:An
Example - Control Abstractions for LC_Search - Bounding - FIFO Branch-And-
Bound - LC Branch-And-Bound **0/1 Knapsack Problem** - LC Branch-And-Bound
Solution - FIFO Branch-and-Bound Solution **-Traveling Sales Person(*)** -
Efficiency Considerations. **12 Hours**

COURSE BOOK:

"Fundamentals of Computer Algorithms", Ellis Horowitz and Sartaj Sahni and
Sangathevar Rajesekaran, 2nd Edition, Universities Press (India) Private Limited, 2007.

Unit I : Chapters - 1-1.4	Pages (1-77)
Unit II : Chapters - 2.1-2.6, 3.1-3.6, 3.8	Pages (79-135,136-178, 192-196)
Unit III :Chapters - 4.1-4.9, 5.1, 5.3, 5.5, 5.9	Pages (210-268,272-276,284-288,293- 302,318-321)
Unit IV : Chapters - 6.1-6.4, 7.1-7.6	Pages (333-357, 359-393)
Unit V : Chapters - 8.1-8.4	Pages (399-431)

BOOKS FOR REFERENCE:

1. **"An Introduction to Data Structure with applications"**, Jean Paul Tremblay Paul
G.Sorenson, Tata McGraw-Hill publication, Second Edition, 1998.
2. **"Data Structures and Algorithms"**, Alfred V. Aho, John E. Hopcroft, Jeffrey D.
Ullman, Pearson Education in South Asia, 2008.

COMPUTER ORGANIZATION

Semester: I

Hours: 4

Code : 17PCS1C04

Credits: 4

COURSE OUTCOMES:

- ❖ Acquire knowledge of structure, function and characteristics of computer systems.
- ❖ Ability to understand the input/output organization and memory system of a computer.
- ❖ Discuss basic processing unit and pipelining.
- ❖ Explain the embedded systems and computer peripherals.
- ❖ Classify the different processor families and computer systems.

UNIT I

Basic Structure of Computers: Computer Types - Functional Units - Basic Operational Concepts - Bus Structures - Software - Performance - Multiprocessors and Multi Computers - Historical Perspective. **Machine Instructions and Programs:** Memory Operations - Instructions & Instruction Sequencing - Addressing Modes - Assembly Language - Basic Input/Output Operations - Stacks and Queues - Subroutines. **12 Hours**

UNIT II

Input/Output Organization: Accessing I/O Devices - Interrupts - Direct Memory Access - Buses - Interface Circuits. **The Memory System:** Some Basic Concepts - Semi Conductor Ram Memories - Read Only Memories - Speed, Size and Cost - Cache Memories - Virtual Memories - Secondary Storage. **12 Hours**

UNIT III

Basic Processing Unit: Some Fundamental Concepts - Execution of a Complete Instruction - Multiple-Bus Organization - Hardwired Control - Micro Programmed Control. **Pipelining:** Basic Concepts - Data Hazards - Instruction Hazards - Influence on Instruction Sets - Data Path & Control Considerations - Super Scalar Operation. **12 Hours**

UNIT IV

Embedded Systems: Examples of Embedded Systems - Processor Chips for Embedded Applications - A Simple Microcontroller. **Computer Peripherals:** Input Devices - Output Devices - Serial Communication Links. **12 Hours**

UNIT V

Processor Families: The ARM Family - The Intel IA-32 Family-The PowerPC Family-The Sun Microsystems SPARC Family. **Large Computer Systems:** Forms of Parallel Processing - Array Processors - The Structure of General Purpose Multiprocessors - Interconnection Networks - Memory Organization in Multiprocessors - Multicomputers. **12 Hours**

COURSE BOOK:

“Computer Organization”, Carl Hamacher, Zvonko Vranesic ,Safwat Zaky, 5th Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2014.

Unit I	:	Chapters- 1, 2.3-2.9 Pages (1-23, 36 - 80)
Unit II	:	Chapters- 4.1, 4.2, 4.4- 4.6, 5.1- 5.5, 5.7, 5.9 Pages (203 - 223, 234 - 259, 291 - 329, 337 - 343, 344 - 359)
Unit III	:	Chapters- 7, 8.1-8.6 Pages (411 - 445, 453 - 486)
Unit IV	:	Chapters- 9.1-9.3, 10 Pages (511 - 525, 553 - 574)
Unit V	:	Chapters- 11.1, 11.3 - 11.5, 12.1-12.5, 12.7 Pages (579 - 581, 585 - 596, 617 - 638, 645 - 648)

BOOKS FOR REFERENCE:

1. **“Computer Architecture and Organization”**, John P. Hayes, Tata McGraw-Hill Publishing Company Limited, Third Edition, 1998.
2. **“Computer System Architecture”**, 3rd Edition, M. Morris Mano, Pearson Education in South Asia, New Delhi, 2011
3. **“Computer Organization and Design: The Hardware/Software Interface”** Fourth Edition, David A. Patterson, John L. Hennessy, Reed Elsevier India Pvt. Ltd., Haryana 2010.

OPERATING SYSTEM

Semester: I

Hours: 4

Code : 17PCS1E1A

Credits: 3

COURSE OUTCOMES:

- ❖ Describe the fundamental concepts of computer operating system.
- ❖ Explain the concepts of process, process scheduling and threads in Operating System.
- ❖ Analyse synchronization and deadlock in operating system and the methods to manage / avoid and implement them in multi-threaded programming system.
- ❖ Compare different types memory management techniques that are used in Operating Systems.
- ❖ Recognize file system, file interface, file protection and security mechanisms.

UNIT I

Introduction: What Operating System Do - Computer- system Organization- Computer -system Architecture- Operating System Structure- Operating System Operations- Process Management- Memory Management- Storage Management- Protection and Security. **System Structures:** Operating system design and implementation- Operating system structure- Virtual machines- Operating system generation. **12 Hours**

UNIT II

Process Concept: Process Concept - Process scheduling- Operations on Processes- Inter Process Communication- Communication in Client Server System- **Multithreaded Programming:** Multithreading Models- Thread Libraries - Threading issues. **Process Scheduling:** Basic Concepts - Scheduling Criteria- Scheduling Algorithms- Thread Scheduling - Multiple Processors Scheduling. **12 Hours**

UNIT III

Synchronization: Critical Section Problem- Petersons Solution- Semaphores- Classic Problems of synchronization- Atomic Transactions. **Deadlocks:** System Model- Deadlock Characterization- Methods of Handling Deadlocks- Deadlock Prevention- Deadlock Avoidance- Deadlock Detection- Recovery from Deadlock. **12 Hours**

UNIT IV

Memory Management Strategies: Background- Swapping- Contiguous Memory Allocation - Paging- Structure of the Page Table- Segmentation. **Virtual Memory Management:** Background- Demand Paging- Copy on Write- Page Replacement- Allocation of Frames- Thrashing- Memory Mapped Files. **12 Hours**

UNIT V

File System: File Concept- Access Methods- Directory and Disk Structure- File Sharing. **Implementing File System:** File System Structure- File System Implementation- Directory Implementation- Allocation Methods- Free Space Management- Recovery. **System Protection:** Goals of protection - Principles of protection. **System Security:** The security problem-Program threats- System and networks threats- User Authentication- Implementing security Defenses- Firewalling to protect systems and networks. **12 Hours**

COURSE BOOK:

1. **“Operating System Concepts”**, Abraham SilberSchatz, Peter Baer Galvin, Creg Gagne, John Willy & Sons Inc., 8th Edition, 2014.

Unit I	: Chapter (1.1- 1.9), (2.6-2.8, 2.10) Pages: (3-30), (68-84, 88-89)
Unit II	: Chapter-(3.1- 3.4, 3.6) (4.2-4.4), (5.1- 5.5) Pages: (101-123, 128-170), (157-171), (183-206)
Unit III	: Chapters- (6.2, 6.3, 6.5, 6.6, 6.9), (7.1-7.7) Pages: (227-231, 234-244, 257-267), (283-306)
Unit IV	: Chapters- (8.1-8.6), (9.1-9.7), Pages: (315-345), (357-396)
Unit V	: Chapters-(10.1-10.3, 10.5), (11.1-11.5, 11.7), (14.1, 14.2), (15.1-15.3, 15.5-15.7) Pages: (421- 444, 446-451), (461-482, 486-490), (591-593), (621-638, 649-662)

BOOKS FOR REFERENCE:

1. **“Operating Systems”**, Gary J. Nutt, Pearson Education Asia, 2nd Edition.
2. **“Operating System”**, H.M. Deital, Pearson Education, Third Edition, 2011.

PRINCIPLES OF INFORMATION TECHNOLOGY

Semester: I

Hours: 4

Code : 17PCS1E1B

Credits : 3

COURSE OUTCOMES:

- ❖ Develop a deep understanding of computer basics and architectures.
- ❖ Analyze the impact of Information Technology in current scenario.
- ❖ Discuss the usages of multimedia applications, program control structures and categories of software.
- ❖ Identify the data communication methods and utilize the Internet tools for development.
- ❖ Summarize the emerging trends and analyze the security of Information Technology.

UNIT I

Computer Basics: Introduction - Evolution of Computers- Generations of Computers- Classification of computers- the computer system - Applications of Computers. **Computer Organization and Architecture :** Introduction - Central Processing Unit (CPU) - Communication among various Units - Instruction Format - Instruction Cycle - Instruction Set - Inside a Computer - Data Representation in Computer - Coding Schemes. **Computer Memory and Storage:** Introduction - Memory Hierarchy - Random Access Memory (RAM) - Read Only Memory (ROM)- RAM, ROM and CPU Interaction - Types of secondary storage Devices -Magnetic Tape- Magnetic Disk - Types of Magnetic Disk- Optical Disk Types of Optical Disks - Magneto Optical Storage Devices - Mass Storage Devices. **12 Hours**

UNIT II

Input Output Media: Introduction Types of Input Devices -Types of Output Devices -Computer Terminals. **Operating System :** Introduction - Operating System : Definition- Evolution of Operating System -Types of Operating system - Functions of Operating System. **Information Technology Basics:** Introduction - Information- Technology - Information Technology - Present Scenario- Role of Information Technology - Information Technology and Internet - Careers in IT Industry. **12 Hours**

UNIT III

Multimedia Essentials: Introduction - Multimedia: Definition - Building Blocks of Multimedia - Multimedia system - Multimedia Applications - Virtual Reality. **Computer Programming and Languages:** Introduction - Algorithm - Flowchart - Pseudo code - Program Control Structures- Programming Paradigms - Programming Languages - Generations of Programming Languages. **Computer Software:** Introduction: Software: Definition - Categories of Software - Installing and uninstalling software - Software Piracy - Software Technologies. **12 Hours**

UNIT IV

Data Communication and Computer Networks: Introduction - Data Communication - Transmission Media - Modulation - Multiplexing - Switching - Computer Network - Network Topologies - Communication Protocol- Network Devices. **The Internet:** Introduction - Evolution of Internet - Basic Internet Terms - Getting Connected to Internet - Internet Applications - Data over Internet. **Internet Tools:** Introduction - Web Browser - Browsing Internet Using Internet Explorer - Electronic Mail (E- Mail)- Search Engines - instant Messaging. **12 Hours**

UNIT V

Computer Security : Introduction - Computer Security : Definition - Malicious Programs - Cryptography - Digital Signature - Firewall - Users Identification and authentication - Security Awareness and Policies. **Emerging Trends in IT :** Introduction - Electronic Commerce (E- Commerce) - Electronic Data Interchange (EDI) - Mobile Communication - Bluetooth - Global Positioning System(GPS) Infrared Communication - Smart card - Imminent Technologies. **Artificial Intelligence (AI):** Introduction - Artificial Intelligence (AI): Definition - Knowledge-Based Systems - Searching Techniques - Natural Language Processing - Expert Systems - Neural Networks - Artificial Intelligence Languages. **12 Hours**

COURSE BOOK:

“**Introduction to Information Technology**”, IITL Education Solutions Limited, Person Education, 2008.

Unit I	: Chapters 1, 2, 3	Pages (1-81)
Unit II	: Chapters 4, 5, 7	Pages (88 - 138, 174 -188)
Unit III	: Chapters 8, 9, 10	Pages (194 - 258)
Unit IV	: Chapters 14, 15, 16	Pages (374 -462)
Unit V	: Chapters 17, 21, 22	Pages (468 - 489,586-636)

BOOKS FOR REFERENCE:

1. “**Information Technology for Digital Library Management and Automation**”, V.K. Jain, Atlantic Publishers & Distributors (P) LTD.2009.
2. “**Information Technology - The Breaking Wave**”, Dennis P.Curtin, Kim Foley, Kunal Sen, Cathleen Morin, Tata MacGraw -Hill Publishing Company Limited, New Delhi, 2008.

DATA STRUCTURE LAB USING C++

Semester: I

Hours: 5

Code : 17PCS1CP1

Credits: 3

COURSE OUTCOMES:

- ❖ Apply object-oriented programming features to program design and implementation.
 - ❖ Solve different programming concepts with functions, classes, to overload operators.
 - ❖ Execute inheritance and Pointers using classes and templates.
 - ❖ Develop program using Exception handling and file handling mechanisms.
 - ❖ Choose and apply appropriate advanced object-oriented programming concepts in problem solving.
1. Simple program using Classes and Objects.
 2. Function and Operator Overloading.
 3. Program to perform different types of Inheritance.
 4. String Manipulations using Constructor and Destructor using user defined functions.
 5. Electricity Bill using Abstract class & Virtual function.
 6. Student's mark list using files.
 7. Drawing different shapes using Polymorphism.
 8. Draw a Picture using Graphics.
 9. Program to Implement Stack and Queue.
 10. Program to perform different Sorting.
 11. Program to perform Linked List Operations
 12. Program to perform Binary Tree, Pre order, Post Order, In Order searching
 13. Customer Bill using Linked List.

DBMS LAB

Semester: I

Hours: 5

Code : 17PCS1CP2

Credits: 3

COURSE OUTCOMES:

- ❖ Write queries using Basic DDL, DML and DCL commands
 - ❖ Design data selection queries using operators and restrict data retrieval in order
 - ❖ Formulate sub queries and understand their purpose
 - ❖ Compose queries with aggregate and group functions for manipulating data
 - ❖ Join multiple tables using different join queries
 - ❖ Develop PL/SQL queries for solving real time problems and write PL/SQL Codes using procedures, triggers, cursors, views, exception and file handling etc.
1. Table Creation and Manipulation(DDL,DML,DCL)
 2. Working with Logical, Comparison, Conjunctive and Arithmetic Operators.
 3. Retrieving rows with Character, Aggregate and Date functions.
 4. Working with aggregate and date functions.
 5. Retrieving rows with Group functions and HAVING.
 6. Retrieving rows with Sub Queries.
 7. Queries using join operation.
 8. Creation and Manipulations of Views.
 9. Working with Sequence and Index.
 10. Simple PL/SQL programs with Control Structures.
 11. Creating and Calling Stored Procedures.
 12. Creating and Calling Functions.
 13. PL/SQL with Triggers.
 14. PL/SQL programs with Cursors (Implicit and Explicit).
 15. PL/SQL programs with Exception Handling (Built-in Exception and User defined).
 16. Creating and Calling Packages.

JAVA PROGRAMMING

Semester: II

Hours: 4

Code : 17PCS2C05

Credits: 4

COURSE OUTCOMES:

- ❖ Understand the principles of Object Oriented Programming.
- ❖ Demonstrate the concept of classes, package, interface and multithreading in Java.
- ❖ Apply the concept of exception handling and string handling in solving real time issues.
- ❖ Design web applications using Java & Java applet.
- ❖ Explore advanced Java concepts using Java Beans, Swing, Servlet and JDBC

UNIT I

An Overview of Java: Object Oriented Programming - A First Simple Program - A Second Short Program- Two Control Statements - Using Blocks of Code - Lexical Issues- Java Class Libraries **Data Types, Variables and Arrays:** Java is a strongly typed language-The Primitive Types - Integers - Floating Point Types - Characters - Booleans - A Closer Look at Literals - Variables - Type Conversion and Casting - Automatic Type Promotions in Expressions - Arrays. **Operators:** Arithmetic Operators - The Bitwise Operators -Relational Operators - Boolean Logical Operators - Assignment Operator - Conditional Operator (?) - Operator Precedence - Using Parentheses. **Control Statements:** Java Selection Statements - Iteration Statements - Jump Statements. **12 Hours**

UNIT II

Introducing Classes: Class Fundamentals - Declaring Objects - Assigning Object Reference Variables - Introducing Methods - Constructors - The this Keyword - Garbage Collection - The Finalize() Method - A Stack Class. **A Closer Look at Methods and Classes:** Overloading Methods - Using Objects as Parameters - A Closure look at Argument Passing - Returning Objects - Recursion - Introducing Access Control - Understanding Static - Introducing Final - Arrays Revisited - Introducing Nested and Inner Classes - Exploring the String Class - Using Command Line Arguments. **Inheritance:** Inheritance Basics - Using Super Creating a Multilevel Hierarchy - Constructor Calling - Method Overriding - Dynamic Method Dispatch - Using Abstract Classes - Using final with Inheritance - The Object Class - **Packages and Interfaces:** Packages - Access Protection - Importing Packages - Interfaces. **12 Hours**

UNIT III

Exception Handling: - Exception Handling Fundamentals -Exception Types - Uncaught Exceptions - Using try and catch - Multiple Catch Clauses - Nested try statements - throw - throws - finally - Java's Built-in Exceptions - Creating your Own Exception Subclasses - Chained Exceptions -Using Exceptions **Multithreaded Programming:** The Java Thread Model - The Main Thread - Creating a Thread - Creating Multiple Threads - Using isAlive() and join() - Thread Priorities - Synchronization - Interthread Communication - Suspending, Resuming and Stopping Threads - Using Multithreading - **String Handling:** The String Constructors - String Length - Special String Operations - Character Extraction - String Comparison - Searching Strings - Modifying a String - Data Conversion Using valueOf() - Changing the Case of Characters Within a String - Additional String Methods - String Buffer .

12 Hours

UNIT IV

The Applet Class : Applet Basics - Applet Architecture - An Applet Skeleton Simple Applet Display Methods - Requesting and Repainting - Using the Status Window - The HTML APPLET Tag - Passing parameters to Applets- getDocumentBase() and getCodeBase()- AppletContext and showDocument() - The AudioClip Interface - The AppletStub Interface - Outputting to the Console. **Event Handling:** Two event Handling mechanism- The Delegation Event model- Event classes-The Key Event Classes-Sources of events-event Listener Interfaces-Using the Delegation Event Model-Adapter classes- Inner classes. **Introducing the AWT: Working with windows, Graphics and Text:** AWT Classes - Window Fundamentals - Working with Frame Windows - Creating a Frame Window in an AWT Based Applet - Creating a Windowed Program - Displaying Information within a window - Introducing Graphics.

12 Hours

UNIT V

Regular Expressions and other Packages: Remote Method Invocation (RMI).
Java Beans: What is a java Bean - Advantages of Java Beans -Introspection -Bound and Constrained Properties - Persistence - Customizers - The Java Beans API.
Introducing Swing: The Origins of Swing - Swing Is Built on the AWT - Two key Swing Features - The MVC Connection - Components and Containers - The Swing Packages - A Simple Swing Application - Event Handling - Create a Swing Applet - Painting in Swing. **Exploring Swing:** JLabel and ImageIcon - JTextField - The Swing Buttons - JtabbedPane - Jlist - JComboBox - Trees - JTable. **Introducing Servlets** - Background-The life cycle of servlet- Servlet Development Options- Using Tomcat - A Simple Servlet - The Servlet API - The javax.servlet Package - Reading Servlet Parameters - The javax.servlet.http Package - Handling HTTP Requests and Responses - Using Cookies - Session Tracking. **Exception Handling, Debugging, and Advanced Topics:** JDBC: Using Java Database Connectivity - JDBC: Connecting to a Database - JDBC: Reading from a Database - JDBC: Getting Information about Result Sets - JDBC: Creating Tables. **12 Hours**

TEXTBOOKS

1. **“Java The Complete Reference”** Herbert Schildt, Tata McGraw-Hill Edition, Eighth Edition 2011.

Unit I : Chapters 2 - 5	Pages (17-108)
Unit II : Chapters 6 - 9	Pages (109-206)
Unit III: Chapters 10, 11, 15	Pages (207-257,371-395)
Unit IV: Chapters 23, 24, 25	Pages (747-815)
Unit V :Chapters 30, 31, 32,37, 38	Pages (1005-1009, 1021- 1069, 1199-1233)

2. **“JAVA 2 AWT, Swing, XML, and JAVA Beans PROGRAMMING Black Book”**, Steven Holzner, The Coriolis Group, USA, Edition 2005.

Unit V : Chapter : 24	Pages : (1099-1117)
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BOOKS FOR REFERENCE:

1. **“Programming with Java A Primer”** E. Balagurusamy, Tata McGrawHill Publishing Company Limited New Delhi, III Edition 2007.

2. **“Java Programming: A Practical Approach”**, C. Xavier, Tata McGraw Hill Education Private Limited, New Delhi, 2011.

WEB DEVELOPMENT USING DOTNET TECHNOLOGIES

Semester: II

Hours: 4

Code : 17PCS2C06

Credits: 4

COURSE OUTCOMES:

- ❖ Understand the basic structure of .NET framework, HTML Server Controls and Basic Web Server Controls.
- ❖ Explore and implement the Data List Web Server Controls, IE Web Controls and User Controls used for program development.
- ❖ Apply the Request And Response Objects and Additional Classes.
- ❖ Define and describe the working methods of various namespaces, IIS and page directives to create web applications.
- ❖ Demonstrate error handling, security in creating web services using ASP.NET mobile web SDK.

UNIT I

ASP.NET BASICS: ASP.NET Language Structure: Page Structure - Defining Your Own Procedures - Page - Compiler Directives. **HTML Server Controls:** HTML Anchor Control - HTML Table, HTML Table Row, and HTML Table Cell Controls - HTML Form and Form Input Controls - HTML Input File Control. **Basic Web Server Controls:** Label Control - Text Box Control - Button Control - Link Button Control - Image Button Control - Check Box Control - Radio Button Control - Hyper Link Control - Image Control. **12 Hours**

UNIT II

Data List Web Server Controls: Check Box list Control - Radio Button List Control - Drop Down List Control - List Box Control - Data Grid Control - Repeater Control. **Other Web Server Controls:** Calendar Control - AdRotator Control - Validation Control. **IE Web Controls:** Tree View Control - Tool Bar Control - Tab Strip and Multipage Controls. **12 Hours**

UNIT III

User Controls: Zip Code Lookup Control - LogIn Control - Bullet List Control - Fixed Page Text Control. **Request and Response Objects:** Request Object - Response Object - Cookies. **Additional Classes:** Encoding and Decoding - Page Caching - Random Numbers. **12 Hours**

UNIT IV

WORKING WITH DATA: System.Data and System.Data.OleDb Namespaces: OleDb Connection Class - OleDb Command Class - OleDb Transaction Class - OleDb Data Adapter Class - Data Set Class - Simple Sample Application. **System.Data.SqlClient Namespace:** Connecting to a SQL Server Database - Manipulating Data in a SQL Server Database - Retrieving Data from a SQL Server Database - Chat Sample Site. **Application Issues:** Creating an ASP.NET Application - Maintaining Session State - Maintaining Application State - Application and Session Objects Sample Application - Global.asax File - Web.Config File. **Working with IIS and Page Directives:** WWW Service Properties - Web Sites within IIS - Adding a Web Site - Web Site Properties - ASP.NET Applications. **12 Hours**

UNIT V

Error Handling: No Error Handling - Resume Next - On Error Goto Handler - Resume from Handler - Try/Catch Code Block - Err Object - Using the Custom Errors Section of Web.Config. **Code Behind and Code Libraries:** Code Behind Files - More Info Request Sample Page - Support Sample Tool - Include Files. **Creating Web Services:** Simple Web Service - Zip Code Web Service. **Security:** Authentication Control - IP Address Restrictions - Secure Communications Through SSL - Client Certificates. **Developing with Visual Studio.Net:** Creating an ASP.NET Application in Visual Studio .NET - Development Windows - Working with ASP.NET Pages in Visual Studio .NET - Debugging in Visual Studio .NET. **ASP.Net Mobile Web SDK:** Developing Mobile ASP.NET - Getting the ASP.NET Mobile Web SDK - Mobile ASP.NET Page Structure - Mobile Web Controls - Messenger Application. **12 Hours**

COURSE BOOK:

“**ASP .NET Developer’s Guide**”, Greg Buczek, Tata McGraw-Hill Edition 2011.

Unit I : Chapters: 1 - 3,	Pages: (3-106)
Unit II : Chapters: 4 - 6,	Pages: (107-247)
Unit III : Chapters: 7 - 9,	Pages: (249-309)
Unit IV : Chapters: 10 -11, 13, 14,	Pages: (313-375), (393-438)
Unit V : Chapters: 15 - 20,	Pages: (439-590)

BOOKS FOR REFERENCE:

1. “**The Complete Reference ASP.Net**”, Matthew Mac Donald, Tata McGraw Hill Edition 2008.
2. “**ASP.NET A Beginners Guide**”, Dave Mercer, Tata Mcgraw - Hill Edition, 2008.
3. “**Beginning ASP.NET 4 in C# and VB**” Imar Spaanjaars, Wiley India Edition, 2012.

DATA MINING AND DATA WAREHOUSING

Semester: II

Hours: 4

Code : 17PCS2C07

Credits: 4

COURSE OUTCOMES:

- ❖ Explain the functionality of the various data mining and data warehousing components.
- ❖ Compare and contrast the OLAP and data mining techniques such as data extraction, transformation and analyzing various data from data warehouses.
- ❖ Categorize the methodologies and algorithms used in data mining and data warehousing.
- ❖ Order the classification methods and clustering analysis.
- ❖ Describe and utilize a range of techniques for designing data warehousing and data mining systems for real-world applications.

UNIT I

Introduction:Data Mining- Definition - Kinds of Data Mined -Kinds of Patterns Mined - Technologies Used -Kinds of Applications Targeted - Major Issues in Data Mining. **Getting to Know Your Data:** Data Objects and Attribute Types - Basic Statistical Descriptions of Data - Data Visualization - Measuring Data Similarity and Dissimilarity. **12 Hours**

UNIT II

Data Preprocessing: Data Preprocessing: An Overview - Data Cleaning - Data Integration - Data Reduction - Data Transformation and Data Discretization. **Data Warehousing and Online Analytical Processing:** Data Warehouse: Basic Concepts - Data Warehouse Modeling: Data Cube and OLAP - Data Warehouse Design and Usage - Data Warehouse Implementation. **12 Hours**

UNIT III

Mining Frequent Patterns, Association and Correlations: Basic Concepts and Methods: Basic Concepts - Frequent Item Set Mining Methods - Patterns Interesting - Pattern Evaluation Methods. **Classification: Basic Concepts:** Basic Concepts - Decision Tree Induction - Bayes Classification Methods - Rule-Based Classification. **Classification: Advanced Methods:** Classification by Backpropagation - Support Vector Machines - Classification Using Frequent Patterns. **12 Hours**

UNIT IV

Cluster Analysis: Basic Concepts and Methods: Cluster Analysis - Partitioning Methods - Hierarchical Methods - Density-Based Methods - Grid-Based Methods. **Advanced Cluster Analysis:** Probabilistic Model-Based Clustering - Clustering High-Dimensional Data - Clustering Graph and Network Data - Clustering with Constraints. **12 Hours**

UNIT V

Outlier Detection: Outlier and Outlier Analysis - Outlier Detection Methods - Statistical Approaches - Proximity-Based Approaches - Clustering-Based Approaches - Classification-Based Approaches. **Data Mining Trends and Research Frontiers:** Mining Complex Data Types - Other Methodological of Data Mining - Data Mining Applications - Data Mining and Society - Data Mining Trends.
12 Hours

COURSE BOOK:

“Data Mining Concepts and Techniques”, Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers, III Edition , 2012.

Unit I : Chapters 1.1-1.7, 2.1-2.4 **Pages:** (1-33, 40-78)

Unit II: Chapters 3.1-3.5, 4.1-4.4 **Pages:** (83-120, 125-165)

Unit III: Chapters 6.1-6.3, 8.1-8.4, 9.2-9.4 **Pages:** (243-271, 327-363, 398-422)

Unit IV: Chapters 10.1-10.5, 11.1-11.4 **Pages:** (443-483, 497-538)

Unit V : Chapters 12.1-12.6, 13.1-13.5 **Pages:** (544-573), (585-625)

BOOKS FOR REFERENCE:

1. **“Data Mining - Practical Machine Learning Tools and Techniques”**, Ian H. Witten & Eibe Frank, Morgan Kaufmann Publishers, III Edition 2011
2. **“Introduction to Data Mining Techniques”**, Arun K. Pujari, University Press, II Edition 2010

MOBILE COMPUTING

Semester: II

Hours: 4

Code : 17PCS2E2A

Credits: 3

COURSE OUTCOMES:

- ❖ Grasp the concepts and features of mobile computing technologies and applications.
- ❖ Describe the functionalities and components of emerging technologies, global system for mobile communication and short message services.
- ❖ Demonstrate the general packet radio services and underlying wireless application protocols such as WAP, MMS and GPRS.
- ❖ Compare CDMA, 3G, wireless LAN and mobile communication networks and their technical features.
- ❖ Analyze and recognize the working principles of wireless devices with SYMBIAN OS and security issues in mobile computing.

UNIT I

Introduction: Mobile Computing - Dialogue Control - Networks - Middleware and gateways - Developing Mobile Computing Applications - Security in Mobile Computing - **Mobile computing Architecture:** Architecture for mobile computing - Three-Tier Architecture - Design considerations for mobile computing - **Mobile computing Through Telephony:** Evolution of telephony - Multiple Access Procedures - Satellite Communication Systems - Mobile Computing through Telephone - Developing an IVR Application - Voice XML - Telephony Application Programming Interface (TAPI) - Computer Supported Telecommunications Applications.

12 Hours

UNIT II

Emerging Technologies: Introduction-Bluetooth-Radio Frequency Identification - Wireless Broadband - Mobile IP- Internet Protocol Version 6 (IPV6) - Java Card. **Global System for Mobile Communication:** Global System for Mobile Communications - GSM Architecture - GSM Entities - Call Routing in GSM - PLMN Interface - GSM Addresses and Identifiers - Network Aspects in GSM - GSM Frequency Allocation - Authentication and Security - **Short Message Service:** Mobile computing over SMS - Short Message Services - Value Added Services through SMS - Accessing the SMS Bearer.

12 Hours

UNIT III

General Packet Radio Service: Introduction - GPRS and Packet Data Network - GPRS Network Architecture - GPRS Network Operations - Data Services in GPRS - Applications for GPRS - Limitations of GPRS - Billing and Charging in GPRS **Wireless Application Protocol:** Introduction - WAP - MMS - GPRS Applications.

12 Hours

UNIT IV

CDMA and 3G: Introduction - Spread - Spectrum Technology - Is-95 - CDMA versus GSM - Wireless Data - Third Generation Networks - Applications on 3G.

Wireless LAN: Introduction - Wireless LAN Advantages - IEEE 802.11 Standards - Wireless LAN Architecture - Mobility in Wireless LAN - Deploying Wireless LAN - Mobile Ad hoc Networks and Sensor Networks - Wireless LAN Security - WiFi versus 3G

12 Hours

UNIT V

Wireless Devices with SYMBIAN OS: Introduction to SYMBIAN - SYMBIAN OS Architecture - Application for SYMBIAN - Controls and Compound Controls - Active objects Localization - Security on the SYMBIAN OS - **Voice over Internet Protocol and Convergence:** Voice Over IP - H.323 Framework for Voice Over IP -Session Initiation Protocol(SIP) - Communication between H.323 and SIP - Real-Time Protocols - Convergence Technologies - Call Routing - Voice Over IP Applications - IP Multimedia Subsystem (IMS) - Mobile VoIP - Voice Over Wireless LAN. **Security Issues in Mobile Computing:** Introduction - Information Security - Security Techniques and Algorithms - Security Protocols - Public Key Infrastructure - Trust - Security Models - Security Framework for Mobile Environment.

12 Hours

COURSE BOOK:

“Mobile Computing, Technology, Application and Service Creation”, Second Edition, Asoke K Talukder, Hasan Ahamed, Roopa R Yavagal. Tata Mcgraw Hill Publishing Company Ltd, New Delhi, 2010.

UNIT I : Chapters: 1.3-1.6, 1.8, 1.9 2.4-2.6, 3 **Pages** (5-11, 16-18, 31-54, 59-82)

UNIT II : Chapters: 4, 5.1-5.7,5.9,5.11, 6 **Pages** (84-117, 116-131, 138-173, 175-171)

UNIT III: Chapters: 7, 8 **Pages** (174-190, 194-215)

UNIT IV: Chapters: 9, 10.1-10.8, 10.12 **Pages** (218-248, 251-278, 283-284)

UNIT V : Chapters: 14, 17, 20 **Pages** (358-383, 480-501, 565-596)

BOOKS FOR REFERENCE:

1. **“Mobile Communications”**, Jochen Schiller, IInd edition, Published by Dorling Kindersley (India) Pvt.Ltd., 2011.
2. **“Principles of Mobile Computing”**, Uwe Hansmann, Lothar Merk, Martin S. Nicklous, Thomas Stober, Second Edition, Springer Private Ltd., 2006.
3. **“Mobile Computing”**, Raj Kamal, Second Edition, Oxford University Press, 2011.

DIGITAL IMAGE PROCESSING

Semester: II

Hours: 4

Code : 17PCS2E2B

Credits: 3

COURSE OUTCOMES:

- ❖ Review the fundamental concepts of a digital image processing system.
- ❖ Apply various transformation functions and filters for image enhancement.
- ❖ Identify the image degradation models and analyze various image sharpening techniques used to reconstruct the image.
- ❖ Design & Synthesize Color image processing in real world application.
- ❖ Interpret various image compression and image segmentation techniques.

UNIT I

Introduction: Digital Image Processing - The Origins of Digital Image Processing - Examples of Fields that Use Digital Image Processing - Fundamental Steps in Digital Image Processing - Components of an image processing System. **Digital Image Fundamentals:** Light and the Electromagnetic Spectrum - Image Sensing and Acquisition - Image Sampling and Quantization - Some Basic Relationships between Pixels. **12 Hours**

UNIT II

Intensity Transformations and Spatial Filtering : Background - Some Basic Intensity Transformation Functions - Histogram Processing - Fundamentals of Spatial Filtering - Smoothing Spatial Filters - Sharpening Spatial Filters - Combining Spatial Enhancement Methods. **12 Hours**

UNIT III

Filtering in the Frequency Domain: Background - Preliminary Concepts -The Basics of Filtering in the Frequency Domain - Image Smoothing Using Frequency Domain Filters - Image Sharpening Using Frequency Domain Filters - Selective Filtering. **12 Hours**

UNIT IV

Image Restoration and Reconstruction: A Model of the Image Degradation/Restoration Process - Noise Models - Restoration in the Presence of Noise Only-Spatial Filtering - Periodic Noise Reduction by Frequency Domain Filtering - **Color Image Processing:** Basics of Full-Color Image Processing - Color Transformation - Smoothing and Sharpening - Noise in Color Images- Color Image Compression. **12 Hours**

UNIT V

Image Compression: Some Basic Compression Methods - Digital Image Watermarking - **Image Segmentation:** Region-Based Segmentation - Segmentation Using Morphological Watersheds - The Use of Motion in Segmentation. **12 Hours**

COURSE BOOK:

“Digital Image Processing”, Rafael C. Gonzalez, Richard E. Woods, Third Edition, PHI Learning Private Limited, New Delhi, 2013.

Unit I : Chapters (1.1-1.5, 2.2-2.5) **Pages** (1-30), (43-72)

Unit II : Chapters (3.1-3.7) **Pages** (104-173)

Unit III: Chapters (4.1- 4.2, 4.7- 4.10) **Pages** (199-210), (255-298)

Unit IV: Chapters (5.1-5.4, 6.4- 6.6, 6.8, 6.9) **Pages** (311-343), (424-443), (451-455)

Unit V : Chapters (8.2-8.3, 10.4-10.6) **Pages** (542-621), (763-785)

BOOKS FOR REFERENCE:

1. **“Digital Image Processing and Analysis”**, B. Chanda and D. Dutta Majumder, PHI Private Limited, New Delhi, Second Edition 2011.
2. **“Fundamentals of Digital Image Processing”**, Anil K. Jain, PHI Private Limited, New Delhi, 2010.

JAVA PROGRAMMING LAB

Semester: II

Hours: 4

Code : 17PCS2CP3

Credits: 2

COURSE OUTCOMES:

- ❖ Experiment the fundamental concepts and features of Java Programming language.
- ❖ Implement the basic principles of Object Oriented Programming such as inheritance, polymorphism, encapsulation and abstraction.
- ❖ Execute different exception handling mechanisms and multithreading in real time application development
- ❖ Develop Web based applications using Graphical User Interface in Java by importing applet, AWT, RMI, Java beans and SWING packages.
- ❖ Demonstrates Web based applications by Servlets, frames and JDBC-ODBC connectivity to have an interactive application.

1. Program using classes and objects
2. Program using Operators
3. Program using Control statements
4. Program using Inheritance
5. Packages and Interfaces
6. Exception Handling
7. Program using Multi Threading
8. Program using String Handling
9. Program using Applet
10. Program using AWT Controls
11. Program using RMI
12. Program using Java Beans
13. Program using Swing
14. Program using Servlet
15. Working with Frames
16. JDBC - ODBC Connectivity

WEB DEVELOPMENT LAB

Semester: II

Hours: 4

Code : 17PCS2CP4

Credits: 2

COURSE OUTCOMES:

- ❖ Write web based programs using decision and loop structures, procedures and functions.
 - ❖ Solve problems using arrays for sorting, calculating, and displaying of data.
 - ❖ Create window applications using forms, controls and events.
 - ❖ Design, build and debug web applications using ASP.NET controls.
 - ❖ Implement and demonstrate database driven ASP.NET web applications and web services.
1. Check the case of the Character
 2. Vowel Checking and Case Conversion
 3. Calculator
 4. Calendar Control - Using the SelectionMode property
 5. Quiz Creation
 6. Panel server control
 7. File and Folder Control
 8. Build a web site with Ad Rotator control
 9. Use of advance web controls like File upload, Hyperlink, Link button etc.
 10. Ad-rotator control.
 11. Validation controls.
 12. TreeView Control
 13. Data List and Repeater control.
 14. Validation techniques in E-Mail registration
 15. Applying Error Handling Mechanism
 16. Database Program using ADO.NET
 17. Data Grid control (showing records from Database).
 18. Simple Web creation using ASP.NET
 19. Hotel Reservation Using ASP.NET
 20. Database Access Using Stored Procedure

DATA ANALYSIS USING R - LANGUAGE

Semester: II

Hours: 4

Code : 17PCS2I01

Credits: 3

COURSE OUTCOMES:

- ❖ Discuss the basic concepts of R programming language such as variables, data types, functions and installation procedures.
- ❖ Explore the methods to read data and basic functions to work on data.
- ❖ Apply the control statements and loops to solve different problems.
- ❖ Use basic statistical concepts for data analysis.
- ❖ Evaluate data sets using nonlinear models, correlation and clustering.

UNIT I

Getting R: Downloading R- R Version-32-bit versus 64 -bit- Installing - Revolution R Community Edition- **The R Environment:** - Command Line Interface- RStudio- Revolution analytics RPE- **R Packages:** Installing Packages Loading Packages- Building a packages- **Basics of R:** Basic Math- Variables -data types - Vectors- Calling Functions- Function Documentation- Missing data. **12 Hours**

UNIT II

Advanced Data Structures: Data.frames-Lists- Matrices-Arrays. **Reading Data into R:** Reading CSVs-Excel data-Reading from databases-Data from other Statistical Tools- R Binary Files- Data included with R- Extract Data from Web Sites. **Statistical Graphics:** Base Graphics- ggplot2. **Writing R Functions:** Hello, world!- Function Arguments- Return Values - do.call. **12 Hours**

UNIT III

Control Statements: if and else- switch- ifelse - Compound Tests. **Loops, the Un - R Way to Iterate:** for loops - while loops- controlling loops. **Manipulating Strings:** paste - sprint - Extracting Text - Regular Expressions- **Probability Distributions:** - Normal Distributions- Binomial distributions- Poisson Distributions - Other Distributions. **12 Hours**

UNIT IV

Basic Statistics: Summary Statistics - Correlation covariance- T- Tests- ANOVA. **Linear Models:** Simple Linear Regression- Multiple Regression. **Generalized Linear Models:** Logistic Regression - Poisson Regression - Other Generalized Linear Models - Survival Analysis. **12 Hours**

UNIT V

Nonlinear Models: Nonlinear Least Squares - Splines - Generalized Additive Models - Decision Trees - Random Forests. **Time Series and Auto Correlation:** Autoregressive Moving Average - VAR - GARCH. **Clustering:** K-means - PAM - Hierarchical Clustering. **12 Hours**

TEXTBOOK

1. **“R for Everyone Advanced Analytics and Graphics”**, Jared P. Lander, Pearson Education, 2015.

Unit I: Chapters (1-4)

Pages (1-51)

Unit II: Chapters (5-8)

Pages (53-104)

Unit III: Chapters (9,10, 13,14)

Pages (105- 116, 155-186)

Unit IV: Chapters (15,16, 17)

Pages (187-245)

Unit V: Chapters (20, 21, 22)

Pages (297-357)

BOOKS FOR REFERENCE:

1. **“R Cookbook”**, Paul Teetor O’Reilly, 2011.
2. **“Data Analysis and Graphics Using R - an Example-Based Approach”**, John Maindonald & W. John Braun Third Edition, Cambridge University Press, 2010.

SOFT SKILLS

Semester: II

Hours: 2

Code : 17PGS2S01

Credit: 1

COURSE OUTCOMES:

- ❖ Develop their social, interpersonal, cognitive, ethical, professional, reading and communication skills.
- ❖ Increase their self-esteem and confidence.
- ❖ Achieve their short and long term goals.
- ❖ Prepare and formulate their resumes wisely.
- ❖ Face the mock group discussions and interviews with a challenge and choose their right career.

UNIT I: SOFT SKILLS

Introduction - Soft skills - Importance of soft skills - Selling your soft skills - Attributes regarded as soft skills - Soft skills - Social - Soft skills - Thinking - Soft skills - Negotiating - Exhibiting your soft skills - Identifying your soft skills - Improving your soft skills - will formal training enhance your soft skills - Soft Skills training - Train yourself - Top 60 soft skills - Practicing soft skills - Measuring attitude. **(6 Hours)**

UNIT II: CAREER PLANNING

Benefits of career planning - Guidelines for choosing a career - Myths about choosing a career - Tips for successful career planning - Developing career goals - Final thoughts on career planning - Things one should know while starting career and during his/her career. **(6 Hours)**

UNIT III: ART OF LISTENING AND SPEAKING

Two ears, one mouth - Active listening - Kinds of Listening, Common - poor listening habits - Advantages of listening - Listening Tips. Special features of Communication - Process - Channels of Communication - Net Work - Barriers - Tips for effective communication and Powerful presentation - Art of public speaking - Public Speaking tips - Over coming fear of public speaking. **(6 Hours)**

UNIT IV: ART OF READING AND WRITING

Good readers - Benefits - Types - Tips - The SQ3R Technique - Different stages of reading - Rates of Reading - Determining a student's reading rate - Increasing reading rate - Problems with reading - Effective reader - Importance of writing - Creative writing - Writing tips - Drawbacks of written communication. **(6 Hours)**

UNIT V: PREPARING CV / RESUME

Meaning - Difference among Bio-data, CV and Resume - The terms - The purpose of CV writing - Types of resumes - Interesting facts about resume - CV writing tips - CV/Resume preparation - the dos - CV/Resume preparation - the don'ts - Resume check up - Design of a CV - Entry level resume - The content of the resume - Electronic resume tips - References - Power words - Common resume blunders - Key skills that can be mentioned in the resume - Cover letters - Cover letter tips.
(6 Hours)

COURSE BOOK:

Dr. K. Alex, Soft Skills, Chand & Company Pvt. Ltd., New Delhi.

REFERENCE BOOK:

1. Dr. T. Jeya Sudha & Mr. M.R. Wajida : Soft Skills/Communication Skills, Begum New Century Book House (P) Ltd., Chennai.
2. S. Hariharen, N. Sundararajan & : Soft Skills, MJP Publishers, S.P. Shanmuga Priya Chennai.

SOFT SKILLS

Semester: II

Hours: 2

Code : 17PGS2S01

Credit: 1

QUESTION PATTERN

Part - A	3 Questions to be answered out of 5	Each Carries 4 marks	12 Marks
Part - B	2 Questions to be answered out of 4	Each Carries 9 marks	18 Marks

The Components of Internal Assessment for Soft Skill are as follows

Components	Marks
Test - I	30

Test - II	30
Mock Interview	30
Communication Skill	10
Total	100

CASE STUDY USING DATA MINING TECHNIQUES

Semester: II

Code : 17PCS2S01

Credits: 2

COURSE OUTCOMES:

- ❖ Identify the real world problem and develop its requirements.
- ❖ Design and develop solution for a set of requirements using data mining algorithm.
- ❖ Develop problem-solving and conflict resolution skills.
- ❖ Understand and apply the scientific methods and tools in problem solving.
- ❖ Demonstrate critical thinking skills, such as problem solving as it relates to social issues

WEB PROGRAMMING WITH PHP AND MYSQL

Semester: III

Hours: 4

Code : 17PCS3C08

Credits: 4

COURSE OUTCOMES:

- ❖ Discuss the basics of PHP and its advantages over other programming languages.
- ❖ Describe and use the features of PHP with variables, operators, flow control statements and arrays for developing web applications.
- ❖ Analyze the usage of PHP and MySQL in dynamic web development with error handling, securing and extending PHP.
- ❖ Gain the fundamentals knowledge of MySQL and its implementation with PHP.
- ❖ Create interactive web applications using PHP with MySQL

UNIT I

Understanding PHP Basics: Introducing PHP - Using Variables and Operators - Controlling Program Flow - Working with Arrays. **(12 Hours)**

UNIT II

Using Functions and classes - Working with files and directories - Working with Cookies, Sessions and headers. **(12 Hours)**

UNIT III

Handling Errors - Securing PHP - Extending PHP **(12 Hours)**

UNIT IV

Introducing MySQL - MySQL storage engines and data types - Securing MySQL - Using PHP with MySQL. **(12 Hours)**

UNIT V

Introducing PDO - Stored Routines - MySQL Triggers - MySQL Views - Practical Database Queries - Indexes and Searching. **(12 Hours)**

COURSE BOOKS:

1. **“PHP: A beginner’s guide”**, Vikram Vaswani, Tata McGraw-Hill Education, 2009.

Unit I : Chapters 1-4

Unit II : Chapters 5, 6, 9

Unit III: Chapters 10, 11, 12

2. **“Beginning PHP and MySQL: from novice to professional”** W. Jason Gilmore, Apress, Fourth Edition, 2010.

Unit IV: Chapters 25, 28 -30

Unit V : Chapters 31 - 36

BOOKS FOR REFERENCE:

1. **“The Complete Reference PHP”**, Steven Holzner, Tata McGraw-Hill Edition, 2008
2. **“PHP6 and MySQL 6 Bible”**, Steve Suehring, Tim Converse and Joyce Park, Wiley India Pvt. Ltd., Reprint 2011

MOBILE APPLICATION DEVELOPMENT USING ANDROID

Semester: III

Hours: 4

Code : 17PCS3C09

Credits: 4

COURSE OUTCOMES:

- ❖ Acquire the necessary Java fundamentals for Android Application Development.
- ❖ Explore and implement programs for handling pictures and menus with views.
- ❖ Design and develop Android application for emailing and networking in Android.
- ❖ Developing Android app using graphics and animations.
- ❖ Demonstrate the basics of Wi-Fi technologies.

UNIT I

Fundamentals of Java for Android Application Development - Getting an Overview of Android - Using Activities, Fragments, and Intents in Android.

(12 Hours)

UNIT II

Working with the User Interface Using Views and ViewGroups - Handling Pictures and Menus with Views.

(12 Hours)

UNIT III

Storing the Data Persistently - Emailing and Networking in Android.

(12 Hours)

UNIT IV

Working with Location Services and Maps - Working with Graphics and Animation - Audio, Video, and Camera.

(12 Hours)

UNIT-V

Threads and Services - Bluetooth, NFC, and Wi-Fi - Telephony and SMS.

(12 Hours)

COURSE BOOK:

1. **“Android Application Development (with KitKat Support) Black Book”**,

Pradeep Kothari & Kogent Learning Solutions Inc., Dreamtech Press, Edition 2014.

Unit I : Chapters 1,2,3

Unit II : Chapters 4,5

Unit III: Chapters 6,7

Unit IV: Chapters 8,9,10

Unit V : Chapters 11,12,13

BOOKS FOR REFERENCE:

1. **“Android Programming”**, B.M. Harwani, PEARSON, First Edition, 2013.
2. **“Advanced Android Application Development”**, Joseph Anzuzzi, Jr. Lauren Darcey, Shane Conder”, Pearson, Fourth Edition, 2015.
3. **“Professional Android 2 Application Development”**, Reto Meier, Wrox Wiley, 2010.

DATA COMMUNICATION AND NETWORK SECURITY

Semester: III

Hours: 4

Code : 17PCS3C10

Credits: 4

COURSE OUTCOMES:

- ❖ Describe the functions of each layer in OSI and TCP/IP model with its transmission media.
- ❖ Explain the functions of data link layer and its protocols.
- ❖ Classify the routing protocols and analyze the assignment of the IP addresses for the given network.
- ❖ Illustrate the Session layer design issues and Transport layer services.
- ❖ Enlighten the functions of Application and Presentation layers with their Protocols.
- ❖ Discuss the importance of cryptography and network security.

UNIT I

INTRODUCTION: Data Communication-Networks - Network Types - Internet History. **Network Models:** Protocol Layering - TCP/IP protocol suite - The OSI model. **Physical Layer** Data and Signals - Periodic Analog signals - Digital signals - Transmission impairment - Data Rate Limits - Performance. **Bandwidth Utilization: Multiplexing and Spectrum Spreading:** Multiplexing. **Transmission Media:** Guided Media - Unguided Media - Wireless. **(12 Hours)**

UNIT II

DATA LINK LAYER - Error Detection and Correction: Introduction - Block coding - Cyclic Codes - Checksum. **Data Link Control:** DLC Services - Data Link Layer Protocols. **Media Access Control (MAC):** Random Access - Controlled Access - Channelization. **Other Wired Networks:** ATM. **Wireless LANs:** IEEE 802.11 Project - Bluetooth. **Connecting Devices and Virtual LANs:** Connecting Devices - Virtual LANs. **(12 Hours)**

UNIT III

NETWORK LAYER: Introduction to Network Layer: Network-Layer Services - Packet Switching - Network Layer Performance - IPV4 Addresses. **Unicast Routing:** Introduction - Routing Algorithms - Unicast Routing protocols. **Next Generation IP:** IPv6 Protocol - Transmission from IPv4 To IPv6. **(12 Hours)**

UNIT IV

TRANSPORT LAYER: Introduction to Transport Layer: Introduction - Transport Layer Protocols. **Transport Layer Protocols:** Introduction - User Datagram Protocol - Transmission Control Protocol - SCTP. **Application Layer: Standard Client-Server Protocols** WWW and HTTP - FTP - Electronic Mail - Telnet - Secure Shell (SSH) - Domain Name Systems (DNS). **(12 Hours)**

UNIT V

TOPICS RELATED TO ALL LAYERS: Cryptography and Network Security: Introduction - Confidentiality - Other Aspects of Security - **Internet Security:** Network Layer Security - Transport Layer Security - Application Layer Security - Firewalls. **(12 Hours)**

COURSE BOOK:

“Data communications and Networking” Behrouz A Forouzan - TATA McGraw Hill, 5th Edition, Special Indian Edition 2013.

Unit I : Chapters 1(1.1-1.4), 2(2.1-2.3), 3(3.1-3.6), 6.1, 7(7.1-7.3)

Unit II : Chapters :10.1 - 10.4, 11.1-11.2, 12.1-12.3, 14.4, 15.2-15.3, 17.1-17.2.

Unit III : Chapters : 18.1-18.4, 20.1-20.3, 22.2, 22.4.

Unit IV: Chapters : 23.1-23.2, 24.1-24.4, 26.1-26.6.

Unit V : Chapters : 31.1-31.3, 32.1-32.4

BOOKS FOR REFERENCE:

1. **“Computer Networks”** By Andrew S. Tanenbaum, David J. Wetherall 5th Edition, Pearson Prentice Hall PTR, 2013.
2. **“Computer Networks: A Systems Approach”**, L. L. Peterson and B. S. Davie, 5th Edition, Morgan Kaufmann Publishers, 2011.
3. **“Cryptography and Network Security”** Fifth Edition, William Stallings, Pearson, 2011.

SOFTWARE ENGINEERING

Semester: III

Hours: 4

Code : 17PCS3C11

Credits: 4

COURSE OUTCOMES:

- ❖ Define various software application domains with different process models used in software development.
- ❖ Elucidate the need for software specifications and requirements with their gathering techniques.
- ❖ Convert requirements model into design model and demonstrate software and user interface design principles.
- ❖ Different SCM and SQA models, classify testing strategies and tactics and compare them
- ❖ Generate project schedule and construct, design and develop network diagram for different type of Projects.

UNIT I

Software and Software Engineering - The Nature of Software - The Unique Nature of WebApps - Software Engineering - The Software Process - Software Engineering Practice - Software Myths - **THE SOFTWARE PROCESS: Process Models: A Generic process Model - Process Assessment and improvement - Prescriptive process Models - Specialized Process Models- Unified process - personal and team process models.** (12 Hours)

UNIT II

MODELING: Principles that Guide Practice: Software Engineering Knowledge - Core Principles - Principles that guide Each Framework Activity. **Understanding Requirements:** Requirements engineering Establishing the Groundwork - Eliciting Requirements - **Requirements Modeling: Scenarios, Information, and analysis Classes:** Requirements Analysis - Scenario-Based Modeling - UML Models that supplement that use case - Data Modeling Concepts - Class-Based Modeling. (12 Hours)

UNIT III

Design Concepts: Design with the Context of software Engineering - The Design Process - Design Concepts - The design Model. **Architecture Design:** Software Architecture - Architecture Genres - Architecture Styles - Architecture Design. **QUALITY MANAGEMENT: Quality Concepts:** What is quality? - Software Quality - The Software Quality Dilemma - Achieving Software Quality. **(12 Hours)**

UNIT IV

Software Testing Strategies - A Strategic Approach to Software Testing - Strategic Issues - Test Strategies for Conventional Software - Validation Testing - System Testing - **Testing Conventional Applications:** Software Testing Fundamentals - Internal and External Views of Testing - White Box Testing - Basis Path Testing - Control Structure Testing - Black Box Testing. **(12 Hours)**

UNIT V

MANAGING SOFTWARE PRODUCTS: Project Management Concepts: - The Management Spectrum - People - The Product - The Process - The Project - The W5HH Principle - Critical Practices. **Project Scheduling:** Basic Concepts - Project Scheduling - Scheduling. **Risk Management:** Reactive versus Proactive Risk Strategies - software Risks - Risk Identification - Risk Projection - Risk Refinement. **(12 Hours)**

COURSE BOOK:

“Software Engineering a Practitioners Approach”, Roger S. Pressman, McGraw - Hill International Edition, Seventh Edition, 2013.

Unit I : Chapters : 1.1 - 1.6, 2.1 - 2.6,

Unit II : Chapters : 4.1 - 4.3, 5.1 - 5.3, 6.1 - 6.5

Unit III: Chapters : 8.1 - 8.4, 9.1 - 9.4, 14.1 - 14.4

Unit IV: Chapters : 17.1 -17.3, 17.6-17.7, 18.1 - 18.6

Unit V : Chapters : 24.1 - 24.7, 27.1 - 27.2, 27.5, 28.1 -28.5

BOOKS FOR REFERENCE:

1. **“Software Engineering Concepts”**, Richard Fairley, TATA McGraw - Hill Edition 1997.
2. **“Software Engineering”**, Ian Sommer Ville, Pearson Education, Ninth Edition, 2011.

BIG DATA AND DATA ANALYTICS

Semester: III

Hours: 4

Code : 17PCS3E3A

Credits: 3

COURSE OUTCOMES:

- ❖ Explain the challenging nature big data and differentiate it with existing technologies.
- ❖ Design strategies to collect, manage, store, query, and analyze various datasets.
- ❖ Develop hands-on experience on large-scale analytics tools to solve big data problems.
- ❖ Comprehend the impact of big data in business decisions and strategy designing.
- ❖ Exhibit New skills in Big data analytics

UNIT I

Big Data in the Enterprise: Search at Scale - Multimedia Content - Sentiment Analysis - Enriching and Contextualizing Data - Data Discovery or Exploratory Analytics - Operational Analytics or Embedded Analytics - Realizing Opportunities from Big Data - Taming the “Big Data”. **The New Information Management Paradigm:** What Is Enterprise Information Management? - New Approach to Enterprise Information Management for Big Data - Implications of Big Data to Enterprise IT. **(12 Hours)**

UNIT II

Big Data Implications for Industry: The Opportunity - Big Data Use Cases by Industry Vertical. **Emerging Database Landscape:** The Database Evolution - The Scale - Out Architecture - Database Workloads - Database Technologies for Managing the Workloads - Columnar Databases - Requirements for the Next Generation Data Warehouses - Polyglot Persistence: The Next Generation Database Architecture. **(12 Hours)**

UNIT III

Application Architectures for Big Data and Analytics: Big Data Warehouse and Analytics - Big Data Warehouse System Requirements and Hybrid Architectures- Enterprise Data Platform Ecosystem - BDW and EDW- How Does Traditional Data Warehouse processes map to tools in Hadoop Environment - How Hadoop Works - The Hadoop Suitability Works - Additional Considerations for Big Data Warehouse - Big Data and Master Data Management - Data quality Implications for Big Data -

Putting it all Together - A Conceptual BDW Architecture. **Data Modeling Approaches for Big Data and Analytics Solutions:** Understanding Data Integration Patterns - Big Data Workload Design Approaches - Map - Reduce Patterns, Algorithms, and Use Cases - NoSQL Data Modeling Techniques.

(12 Hours)

UNIT IV

Big Data Analytics Methodology: Challenges in Big Data Analysis - Big Data Analytics Methodology - Analyze and Evaluate Business Use Case - Develop Business Hypotheses. **Extracting Value from Big Data: In Memory Solutions, Real Time Analytics, And Recommendation Systems:** Building a Recommendation System.

(12 Hours)

UNIT V

Data Scientist: The New Skill: Data Scientist- The Big Data Workflow - Design Principles for Contextualizing Big Data - A Day in the Life of a Data Scientist.

(12 Hours)

COURSE BOOK:

“Big Data Imperatives: Enterprise Big Data Warehouse, BI Implementations and Analytics”, Soumendra Mohanty, Madhu Jagadeesh, and Harsha Srivatsa, Apress Media, 2013.

UNIT I : Chapters 1, 2

UNIT II : Chapters 3, 4

UNIT III : Chapters 5, 6

UNIT IV : Chapters 7, 8

UNIT V : Chapter 9

BOOKS FOR REFERENCE:

1. **“Big Data Principles and best practices of scalable real time data systems”**
Nathan Marz, James Warren Dreamtech Press Edition, 2015.
2. **“Big Data Analytics: Disruptive Technologies for changing the game”**, Dr. Arvind Sathi, Elsevier, 2013, ISBN 978-1-58347-380-1.

ENTERPRISE RESOURCE PLANNING

Semester: III

Hours: 4

Code : 17PCS3E3B

Credits: 3

COURSE OUTCOMES:

- ❖ Outline the concepts of reengineering and relate them to ERP system implementations.
- ❖ Analyze the strategic options for ERP identification and adoption.
- ❖ Design the ERP implementation strategies.
- ❖ Discuss the Generic Model of ERP and General ERP Implementation Methodology.
- ❖ Create reengineered business processes for successful ERP implementation in IT infrastructure.

UNIT I

Understanding ERP-based Enterprise Systems - Introduction - Definition of ERP and ES - ERP Enabled Business Transformation - Enterprise Potentials of ERP-ES - Reasons for High Demand for ERP Solutions - Evolution of ERP and ES - Modules of ERP - Emerging Standards - ERP Adaption Model - Critical Success Factors for ERP Implementation. **(12 Hours)**

UNIT II

Building Business Case for ERP-ES Systems: Introduction - ERP Project life Cycle - Stage I: Pre-Implementation Stage - Stage II: Implementation Stage - Stage III: Post-Implementation Stage - Need to adopt Global Best Business Practices - Need to adopt Global Best Processes - Need of ERP-based Integrated Information Systems in Manufacturing Firms - Gap Analysis in the usage of ERP for Manufacturing Planning - **Computer Architecture of ERP-ES:** Client-Server Computing Architecture. **(12 Hours)**

UNIT III

Evolution of ERP Solutions: Introduction - Technical Solution - Strategic Solution - Methodology - ERP Systems Evolution - Request for Information - Functional Requirement Specifications - Request for Proposal - Role of Management Consultants - Evaluation procedures - **ERP Enabled Business Process Re-engineering** : Introduction - Process Re-engineering - What Re-Engineering is and is not? - How Re-Engineering is different from Process Improvements - Characteristics of BPR - ERP and BPR - ERP in Modeling Business Processes - Workflow Management Systems in BPR - Steps to BPR - Five-stage Model of AS-IS/TO - BE Analysis. **(12 Hours)**

UNIT IV

ERP-ES Enabled Best Business Practices: Vendor-Managed Inventory (VMI) - Condition-based Maintenance (CBM) - **ERP Implementation Project Management:** Issues in ERP Project Management - **Managing Integration of Best-of-Breed ES Solution:** Need for Systems Integration - Deriving Value from Integration - Single ES vs. Best-of-Breed Solution - Systems Integration Strategy - Planning for Integration - Systems Integration Layers. **Business Benefits of ERP-ES:** How ES Create Business Benefits - Types of Benefits expected out of ES - Measuring Business Benefits of ES. **(12 Hours)**

UNIT V

Managing ERP-ES Enabled Change: Change management Strategies - Transformation of IT function - **IT Infrastructure Planning for ERP-ES:** IT Infrastructure planning and Methodology - System Architecture - Hardware - Software - System Software - Application Software - Relational Database - Communication Network Resource Planning - IT System Management Policy - Data Management Software Tools. **(12 Hours)**

COURSE BOOK:

“COURSE BOOK: of Enterprise Resource Planning”, Mahadeo Jaiswal and Ganesh Vanapalli, Macmillan India Ltd., Chennai 2005.

- Unit I : Chapter : 1
- Unit II : Chapters : 2, 3
- Unit III : Chapters : 5, 6
- Unit IV : Chapters : 7, 9, 10
- Unit V : Chapters : 11, 12

BOOKS FOR REFERENCE:

1. **“Enterprise Resource Planning Demystified”**, Alexis Leon, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2004.
2. **“Enterprise Resource Planning”**, Brady, Thomson Learning, 2001.

WEB PROGRAMMING WITH PHP AND MYSQL LAB

Semester: III

Hours: 5

Code : 17PCS3CP5

Credits: 3

COURSE OUTCOMES:

- ❖ Develop web programs using operators, arrays, functions, conditional and looping statements.
 - ❖ Demonstrate sessions, cookies and file manipulations in PHP for dynamic web designing.
 - ❖ Create web pages to implement the validation techniques.
 - ❖ Design interactive web pages using PHP with MySQL.
1. Creating simple webpage using PHP
 2. Use of conditional statements in PHP
 3. Use of looping statements in PHP
 4. Creating different types of arrays
 5. Usage of array functions
 6. Creating user defined functions
 7. Creation of files
 8. File manipulation using PHP
 9. Creation of sessions
 10. Creation of cookies
 11. Creating simple applications using PHP
 12. Validating input
 13. Formatting the output.
 14. Database connectivity in PHP with MySQL

MOBILE APPLICATION DEVELOPMENT USING ANDROID LAB

Semester: III

Hours: 5

Code : 17PCS3CP6

Credits: 3

COURSE OUTCOMES:

- ❖ Develop Android app using basic Android Programming concepts.
 - ❖ Experiment Integrated Development Environment for Android Application Development.
 - ❖ Design and Implement User Interfaces and Layouts for developing Android App.
 - ❖ Use Intents activity and broadcasting data in Android App.
 - ❖ Design Database Application and Content Providers.
1. Develop an application that uses GUI components, Font and Colours
 2. Develop an application that uses Layout Managers and event listeners.
 3. Develop a native calculator application.
 4. Write an application that draws basic graphical primitives on the screen.
 5. Develop an application that makes use of database.
 6. Develop an application that makes use of RSS Feed.
 7. Implement an application that implements Multi threading
 8. Develop a native application that uses GPS location information.
 9. Implement an application that writes data to the SD card.
 10. Implement an application that creates an alert upon receiving a message.
 11. Write a mobile application that creates alarm clock

SOFTWARE TESTING

Semester: III

Credits: 2

Code : 17PCS3S02

COURSE OUTCOMES:

- ❖ Acquire the basic knowledge of testing and SDLC.
- ❖ Evaluate the system with various testing techniques and strategies.
- ❖ Apply various testing techniques, including domain, Code, fault, usage and model-based.
- ❖ Execute program and test evaluations.
- ❖ Apply the software testing techniques in commercial environment

UNIT I

Principles of Testing, Software Development Life Cycle Models - Phases of Software Project - Quality, Quality Assurances and Quality Control - Testing, Verification and Validation - Process Model to represent Different Phases - Life Cycle Models.

UNIT II

Types of Testing. White Box Testing - What is White Box Testing - Static Testing - Structural Testing - Challenges in White Box Testing - **Black Box Testing:** What is Black Box Testing? - Why Black box testing? - When to do Black box testing? - How to do Black box testing? - **Integration Testing:** What is Integration Testing - Integration Testing as a type of Testing - Integration Testing as a phase of Testing - Scenario Testing - Defect Bash.

UNIT III

System and Acceptance Testing. System Testing Overview - Why is System Testing done? - Functional Versus Non-Functional Testing - Functional System Testing - Non-Functional Testing - Acceptance Testing - Summary of Testing Phases - **Performance Testing:** Introduction - Factors Governing Performance Testing - Methodology for Performance Testing - Tools for Performance Testing - Process for Performance Testing - Challenges.

UNIT IV

Testing of Object Oriented Systems: Introduction - Primer on Object - Oriented Software - Differences in OO Testing - **Usability and Accessibility Testing.** **Common People Issues:** Perceptions and Misconceptions about Testing - Comparison Between Testing and Development Functions - Providing Career paths for Testing Professionals - The Role of the Ecosystem and a call for Action.

UNIT V

Organization Structures for Testing Teams: Dimensions of Organization Structures - Structures in Single- Product Companies - Structures for Multi-Product Companies - Effects of Globalization and Geographically Distributed Teams on Product Testing - Testing Services Organizations - Success Factors for Testing Organization - **Test Planning, Management, Execution, and Reporting:** Test Reporting - Best Practices.

COURSE BOOK:

1. **“Software Testing: Principles and Practices”**, Srinivasan Desikan and Gopalaswamy Ramesh, Pearson Education, 2011.

Unit I : Chapters 1, 2

Unit II : Chapters 3, 4, 5

Unit III : Chapters 6,7

Unit IV : Chapters 11, 12,13

Unit V : Chapters 14, 15.5, 15.6

BOOKS FOR REFERENCE:

1. **“Software Testing Techniques”**, Boris Beizer, Dreamtech Publications, New Delhi-2003.
2. **“Software Testing: Effective Methods, Tools and Techniques”**, Renu Rajani and Pradeep Oak, Tata-McGraw-Hill Publishing Company Limited, 2008.

MINI PROJECT (Summer Holidays)

Semester: III

Code : 17PCS3M01

Credits: 2

COURSE OUTCOMES:

- ❖ Acquire practical knowledge within the chosen area of technology for project development.
- ❖ Apply knowledge of computing and information technologies to produce effective designs and solutions for specific computer-based problems.
- ❖ Identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach.
- ❖ Participate as an active and effective member of a project team to achieve specific computer-based outcomes.
- ❖ Describe the impact upon society of computers, and the technical and human aspects of this impact.
- ❖ Effectively communicate during project development and present results for the area of concentration.

PROJECT

Semester: IV

Code: 17PCS4R01

Credits: 17

COURSE OUTCOMES:

- ❖ Acquire practical knowledge within the chosen area of technology for project development.
- ❖ Apply knowledge of computing and information technologies to produce effective designs and solutions for specific computer-based problems.
- ❖ Identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach.
- ❖ Participate as an active and effective member of a project team to achieve specific computer-based outcomes.
- ❖ Describe the impact upon society of computers, and the technical and human aspects of this impact.
- ❖ Effectively communicate during project development and present results for the area of concentration.

M. Sc. (CS & IT)

Pattern of the Question Paper (Internal)

(Mark should be converted into 30)

Time: 2 Hours

Maximum Marks: 60

PART A

IV. Answer the following (Ten Questions) (10X1=10)

PART B

V. Answer ANY FOUR out of Six Questions. (4X5=20)

PART C

VI. Answer the following (Either or Choice) (2X15=30)

Pattern of the Question Paper (External)

Time: 3 Hours

Maximum Marks: 60

PART A

IV. Answer the following (Ten Questions) (10X1=10)

PART B

V. Answer ANY FOUR out of Six Questions. (4X5=20)

PART C

VI. Answer the following (Either or Choice) (2X15=30)

Pattern of the Question Paper - Self Study Paper (External)

Time: 3 Hours

Maximum Marks: 100

PART A

I. Answer ANY Six out of Ten Questions. (6X5=30)

PART B

II. Answer ANY Five out of Eight Questions (5X8=40)

PART C

III. Answer Any Three out of Six Questions (3X10=30)