MOTHER TERESA WOMEN'S UNIVERSITY
KODAIKANAL – 624 102

M.Sc.(Information Technology)
(EFFECTIVE FROM JUNE 2018-2019 ONWARDS)

OBJECTIVES

1. To produce employable IT workforce, that will have sound knowledge of IT and business fundamentals that can be applied to develop and customize IT based solutions

2. To develop academically competent and professionally motivated personnel, equipped with Goal oriented , critical thinking and with ethical values.

3. To develop skilled manpower in the various areas of information technology ;

Software Development, Computer-Languages, Software engineering, Data base management and Web based applications etc.

SPECIFIC OUTCOMES FOR M.Sc. INFORMATION TECHNOLOGY

PSO1: Understand of the Opportunities in the field of IT.

PSO2: Apply fundamental principles and methods of Computer Technology to a wide range of applications and mathematical and scientific reasoning to a variety of computational problems.

PSO3: Develop foundational and advanced skills to install and maintain computer networks, troubleshoot hardware and software problems.

PSO4: Design and implement software systems that meet specified design and performance requirements

PSO5: Apply advanced algorithmic and mathematical concepts to the design and analysis of software.

PSO6: Adhere to do higher studies or progress as an entrepreneur.

PSO7: Get confidence to survive and get succeed in IT industry.

PSO8: Get proficiency in the practice of computing, and to prepare them for continued professional development.

PSO9: Apply sound principles to the synthesis and analysis of computer systems

MOTHER TERESA WOMEN'S UNIVERSITY, KODAIKANAL

M.SC IT

ALLOCATION OF PAPERS AND CREDITS FOR PG PROGRAMME
EFFECT FROM - 2018-2019 ACADEMIC YEAR ONWARDS

I Semester

S.NO	SUB CODE	Theory/ Practical	Title of the Paper	Credit Points	Hours	Int.	Ext	TOT
01.	PITT11	Theory	Programming in C & C++	5	5	25	75	100
02.	PITT12	Theory	Data Structures and Algorithms	5	5	25	75	100
03.	PITT13	Theory	Digital Principles and Computer Organization	5	5	25	75	100
04.	PITP11	Practical	C, C++ and Data Structures Lab	5	5	25	75	100
05.	PITE11	Elective	Elective – I	5	5	25	75	100
			Total	**25**	**25**			**500**

II Semester

S.NO	SUB CODE	Theory/ Practical	Title of the Paper	Credit Points	Hours	Int.	Ext	TOT
01.	PITT21	Theory	Advanced Operating System	5	5	25	75	100
02.	PITT22	Theory	Java Programming	5	5	25	75	100
03.	PITT23	Theory	Computer Networks	5	5	25	75	100
04.	PITP22	Practical	Programming in JAVA Lab	5	5	25	75	100
05.	PITE22	Elective	Elective – II	5	5	25	75	100
			Total	**25**	**25**			**500**

III Semester

S.NO	SUB CODE	Theory/ Practical	Title of the Paper	Credit Points	Hours	Int.	Ext	TOT
01.	PITT31	Theory	Relational Database Management System	5	5	25	75	100
02.	PITT32	Theory	Web Technology	5	5	25	75	100
03.	PITT33	Theory	Software Engineering	5	5	25	75	100
04.	PITP33	Practical	RDBMS Lab	5	5	25	75	100
05.	PITE33	Elective	Elective – III	5	5	25	75	100
			Total	**25**	**25**			**500**

IV Semester

S.NO	SUB CODE	Theory/ Practical	Title of the Paper	Credit Points	Hours	Int.	Ext	TOT
01.	PITT41	Theory	Digital Image Processing	5	5	25	75	100
02.	PITT42	Theory	Mobile Computing	5	5	25	75	100

03.	PITP44	Project	Major Project	5	-	25	75	100
			Total	**15**	**15**			**300**

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

SEMESTER-1

PITT11-PROGRAMMING IN C & C++

Objectives:

OBJ1: To understand the basic concepts of C & C++ Language
OBJ2: To learn about the concepts of pointers and functions

COURSE OUTCOMES:

CO1 : Know about the basic concepts for object oriented programming
CO2: Learn about the concepts of pointers and functions

Unit I:

Fundamentals of C - Declarations-Variables – Data Types – Expressions – Relational and Logical operations – Control Statements – Conditional Statements – Arrays – Strings

Unit II:

Pointers - Functions: user defined – Local and Global specification – Boolean Functions – Friend Functions – Standard input and output – Files.

Unit III:

Principles of Object-Oriented Programming, What is C++? – Applications of C++ - C++ Statements – Structure of C++ Program, Tokens, Expressions and Control Structures – Functions in C++ - Classes and Objects.

Unit IV:

Constructors and Destructors – Type Conversions – Inheritance: Extending Classes.

Unit V:

Pointers, Virtual Functions and Polymorphism – Operator Overloading, Managing Console I/O Operations, Files

Text Book

1. E.Balagurusamy, “Programming in ANSI C” Tata McGraw Hill, 2002

Reference Books

2. Byron S.Gotfried, “Programming with C”, McGraw Hill Publication
3. Herbert Schildt, “Teach Yourself C++”, III Edition, Tata McGraw Hill 5th Edition, 2000
4. E.Balagurusamy, “Programming in ANSI C++” Tata McGraw Hill, 2002

SEMESTER – I

PITT12 – DATASTRUCTURES AND ALGORITHMS

Objectives:

OBJ1 :To introduce algorithm analysis frame work for recursive and nonrecursive algorithms
OBJ2: To acquire knowledge on ADTs such as List, Stack and Queue

COURSE OUTCOMES:

CO1 : Explore the binary trees and the priority queues with their applications
CO2 :Learn the various hashing techniques and Set ADT
CO3 :Exposure on graphs, its representation, traversal and applications

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.

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

SEMESTER-1

PITT13-DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION

Objectives:

OBJ1:To understand the basic concepts of number systems
OBJ2: To learn about the concepts of circuit diagrams

COURSE OUTCOMES:

CO1: Learn about the concepts of circuit diagrams and digital principles
CO2:Understand the basic concepts of number systems

Unit I:

Introduction to Computers – Number Systems – Data Types – Data Representations – Fixed Point, Floating Point, Gray, Excess – 3, Alphanumeric Codes – Binary Codes – Error Detection Codes

Arithmetic Logic Unit: Binary Half Adder, Full Adder and Their Designs – Positive and Negative Numbers, Binary Addition & Subtraction Using 1s, 2s, 9s Complements, Binary Multiplication

Unit II:

Digital Logic Circuits: Digital Computers – Logic Gates – Boolean Algebra –Map Simplification – Combinational Circuits – Flip Flops – Sequential Circuits

Digital Components: Integrated Circuits –Decoders – Multiplexers – Registers – Shift Registers – Binary Counters.

Memory Unit :Classification of Memory: Primary – Secondary – Cache Memory – Associate Memory – Virtual Memory – RAM, ROM

Unit III:

Register Transfer Language – Register Transfer – Bus and Memory Transfer – Arithmetic Micro Operations – Logic Micro Operations – Shift Micro Operations – Arithmetic Logic Shift Unit.

Basic Computer Organization and Design: Instruction Codes – Computer Registers – Computer Instructions – Timing and Control Instruction Cycle – Memory Reference Instructions – Input – output and interrupt complete computer description – Design of a Basic Computer – Design of Accumulator Logic.

Unit IV:

Arithmetic and Logic Units – Stack Organisation – Instruction Formats – Addressing Modes – Data Transfer and Manipulation – Microprocessor Organization – Addressing Sequencing – Micro Program Example.

Unit V:

Introduction to Parallel Processing – Parallelism in Uniprocessor System – Parallel Computer Structure.

Text and Reference Books:

1. Digital Principles and Applications, Albert Paul Malvino, Donald P.Leach, McGraw Hill.
2. Computer System Architecture, M.Morris Mano, Prentice Hall of India.
3. Digital Computer Fundamentals, Thomas C.Bartee, McGraw Hill.
4. Computer Organization, Hamachar V.C.,Vranesic Z.G., Zaky S.G., Tata McGraw Hill.
5. Computer Architecture and Organization, J.P.Hayes, McGraw Hill, Singapore.

PITP11-PROGRAMMING IN C & C++ - LAB
SEMESTER-1

course outcomes

CO1: To practice to implement the concepts using array,pointers,structures

CO2:To practice using the searching and sorting techniques

CO3:To practice to implement the functions & operator overloading

CO4: practice to implement the concept of inheritance and polymorphism

C Programs

1. Swapping
2. Print floyd's triangle
3. Addition using pointers
4. Stack using array
5. Searching using structures
    a. Linear search
    b. Binary search
6. Sorting
    a. Bubble sort
    b. Insertion sort
    c. Selection sort
7. Matrix
    a. Add matrices
    b. Subtract matrices
    c. Transpose matrix
8. Merge two files
9. **C++ Programs**

1. Classes and objects
2. Function overloading
3. Constructors
4. Friend function
5. Inline function
6. Operator overloading
7. Conversion function
8. Inheritance
9. Polymorphism
10. Files

SEMESTER-11

PITT21 – ADVANCED OPERATING SYSTEM

Objective(s):

OBJ1 :To learn the concepts of operating systems.

OBJ2 :To learn about the various issues in operating systems.

OBJ3 :To familiarize with the important mechanisms in operating systems.

OBJ4 :To appreciate the emerging trends in operating systems

COURSE OUTCOME:

CO1 : Learn about the various issues in operating systems

CO2 : Appreciate the emerging trends in OS

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 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–IIISTORAGE 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 –IVI/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 Systems‖, Second Edition, Addison Wesley, 2001.
2. D M Dhamdhere, ―Operating Systems: A Concept-based Approach‖, Second Edition, Tata McGraw-Hill Education, 2007.
3. Charles Crowley, ―Operating Systems: A Design-Oriented Approach‖, Tata McGraw Hill Education‖, 1996.
4. William Stallings, ―Operating Systems: Internals and Design Principles‖, Seventh Edition, Prentice Hall, 2011.

PITT22-JAVA PROGRAMMING

Objectives:

OBJ1 : To understand the basic concepts of JAVA programming

OBJ2 :To learn about the concepts of OOPS

OBJ3 :To know about the basic threads

OBJ4 :To know how to import various io packages

OBJ5 :To understand about the java networking

COURSE OUTCOMES:

CO1 : Know the concepts of Java.

CO2: Know about the concepts of JAVA with networking.

Unit I

Introduction: Introduction to java – Java and Internet – Byte codes – Features of Java – Java development Environment – Java character set – operators – control statements – simple programs.

Unit II

Object Orientation in Java: Classes – Methods – Inheritance – Packages – Interfaces – programming examples.

Exception Handling: Fundamentals – Exception types – Try catch block – throw- throw clause – finally – user defined Exceptions.

Unit III

Threads: Thread model – Thread priorities – Runnable interface – creating a thread- multiple threads – Synchronization – interthread communication – suspending- resuming and stopping threads.

Unit IV

Input/Output: String handling – Exploring java io. Package.

Applets: Applet basics – AWT classes – Window fundamentals – working with frame windows – graphics – AWT controls – Swing – Layout Managers – Menus – Event Handling.

Unit V

Java Networking: Basics – Socket overview – TCP/IP client sockets- TCP/IP server sockets– URL – Datagram sockets.

Concepts of Advanced Java Programming: JAVA SCRIPTS – Servlets – JDBC – EJB – JSP.

Text Book

1. Patrick aught on- Herbert Scheldt- “JAVA2- The complete reference” Tata McGraw Hill Fifth Edition- New Delhi 2002

Reference Books

1. Deitel H M and Deiltel P J “JAVA – How to Program “ Pearson Education - New Delhi 2003
2. Hubbard John R- “Schaum’s Outline of Theory and Problems of Programming with Java” Tata Mcgraw Hill- Second Edition- New Delhi 2004
3. Chitra A “Internet and Java Programming” ISTE 2002.

SEMESTER - II

PITT23– COMPUTER NETWORKS

Objective(s):

OBJ1 :To study layered architecture of computer networks and protocols.
OBJ2 :To learn the various mediums used in the physical layer.
OBJ3 :To study the functionalities of data link layer.

COURSE OUTCOMS :

CO1 :Learn the routing algorithms and the use of IP addressing in the network layer.
CO2 :Understand the working of transport layer.
CO3 :Learn to design secure network applications.

UNIT – I INTRODUCTION, PHYSICAL LAYER

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.

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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.

SEMESTER-11

PITP22-PROGRAMMING IN JAVA LAB

COURSE OUTCOME

CO1 :To practice to implement the basic programming structure in java
CO2 :To practice using the concepts of packages
CO3 :To demonstrate using event handling activity

1. Demonstrate the Program structure of Java
2. Demonstrate the String Operations
3. Demonstrate Package Creation and use in Program
4. Demonstrate Inner Class
5. Demonstrate Inheritance
6. Demonstrate 2D Shapes on Frames
7. Demonstrate Text and Fonts
8. Demonstrate Event Handling for various types of Events
9. Multicasting Techniques
10. Swing Components
11. Demonstrate the use of Dialog Box
12. Create a Dialog Box
13. Create a Tool Bar- Menu & Popup Menu
14. Implement File Handlings
15. Demonstrate Applet Programming
16. Implement Generic Programming
17. Demonstrate JDBC on Applet/Application
18. Demonstrate Multithreading
19. Implement Client Server Networking

SEMESTER-111

PITT31-RELATIONAL DATABASE MANAGEMENT SYSTEMS

Objectives:

OBJ1 :To understand the basic concepts of databases

OBJ2 :To learn about the concepts of query processing

OBJ3 :To know about the basic concepts for transaction management

COURSE OUTCOMES:

CO1 : Learn about the concepts of RDBMS and query processing

CO2 : Know about transaction management

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

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-1II

PITT32-WEB TECHNOLOGY

Objectives:

OBJ1 :To understand the basic concepts of internet

OBJ2 :To learn about the concepts of .NET framework

OBJ3 :To know about the basic concepts for object oriented programming

COURSE OUTCOMES:

CO1 : Know the client /server technology

CO2 : Learn to know the .net framework

UNIT-I

Introduction : Introduction to Internet- Web Client/Server Model- Protocols for Web Client/Server communication

UNIT-II

Components of .NET Framework- Overview of IIS- ISAPI Extensions- ISAPI Filters.

UNIT-III

Overview of .NET Framework : Web Forms- Common Language Runtime and Class Library- Managed Components- Web Services- COM+ Component services.

UNIT-IV

Crash Course in VB.NET : Data Types- Arrays- Functions- Flow Control- Exception Handling- Constructors and Destructors- Class Properties- Inheritance

UNIT-V

Polymorphism- Interfaces- Implementing polymorphism using Interfaces- Multithreaded Programming.

Text Book

1. Visual Basic Programming 2005 Black Book- Steven Holzner et al- Dreamtech Press.

SEMESTER-111

PITT33-SOFTWARE ENGINEERING

Objectives:

OBJ1 :To understand the basic concepts of software engineering

OBJ2 :To learn about the concepts of project designs

OBJ3: To know about the verification and validation concepts for projects

COURSE OUTCOMES:

CO1 : Understand the Software engineering concepts

CO2 : Learn about software project management and cost estimation techniques.

Unit I:

Introduction to Software Engineering – Definition and Size Factors – Quality And Productivity Factors – Managerial Issues

Unit II:

Planning as Software Project: Defining the Problem – Developing A Solution Strategy – Planning the Development Process – Planning An Organizational Structure – Other Planning Activities

Unit III:

Software Cost Estimation: Software Cost Factors – Software Cost Estimation Techniques – Staffing Level estimation – Estimating Software Maintenance Costs

Software Requirements Definition : Software Requirements Specification – Formal Specification Techniques – Languages And Pre Processors For Requirement Specification

Unit IV:

Software Design: Fundamental Design Concept – Module and Modularization Criteria – design Notations – Design Techniques – Detailed Design Considerations Real Time And Distributed System Design – Test Plans And Milestones, Walkthroughs And Inspections – Design Guidelines

Unit V:

Verification and Validation: Quality Assurance – Walkthroughs And Inspections, Static Analysis – Symbolic Execution – Unit Testing And Debugging – System Testing – Formal Verification

Software Maintenance: Enhancing Maintainability During Development – Managerial Aspects of Software Maintenance – Configuration Management – Source Code Metrics – Other Maintenance Tools And Techniques

TEXT BOOK

1. Software Engineering Concepts – Richard Fairley

REFERENCE BOOKS:

2. Software Engineering Design – H.C Shooman

PITP33-RDBMS LAB

SEMESTER-111

COURSE OUTCOME

CO1 :To practice to implement to create a database
CO2 :To implement to handle records in a table
CO3:To practice database management

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

4.**Database Management**
Creating Views
Creating Column Aliases
Creating Database Users
Using GRANT and REVOKE

SEMESTER – IV

PITT41– DIGITAL IMAGE PROCESSING

Objective(s):

OBJ1 :To learn about the basic concepts of digital image processing and various image transforms.

OBJ2 :To familiarize the student with the image enhancement techniques

OBJ3 : To expose the student to a broad range of image processing techniques and their applications.

COURSE OUTCOMES:

CO1 : Knowledge about the use of current technologies those are specific to image processing systems.

CO2 :Chance tomexpose the students to real-world applications of image processing.

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.

SEMESTER-1V

PITT42- MOBILE COMPUTING

Objectives:

OBJ1 :To clearly understanding the mobile communications environment

OBJ2 :To get clear idea about Satellite Systems

COURSE OUTCOMES:

CO1 :Make clear idea about the GSM Technology

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

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.

SEMESTER - I
ELECTIVE – I
PITE11– SOFT COMPUTING

Objective(s):

OBJ1 :To give students knowledge of soft computing theories fundamentals,

OBJ2 :To learn the fundamentals of non-traditional technologies and approaches to solving hard real-world problems.

OBJ3: 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

COURSE OUTCOME

CO1: Introduce the ideas of fuzzy sets, fuzzy logic To become familiar with neural networks that can learn from available examples and generalize to form appropriate rules for inferencing systems

CO2 :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 Applications‖, Prentice Hall of India, 2003.
2. N.P.Padhy,‖Artificial Intelligence and Intelligent Systems‖, Oxford University Press, 2005.
3. J.S.R. Jang, C.T. Sun and E. Mizutani, ―Neuro-Fuzzy and Soft Computing‖, Pearson Education, 2004.

Reference Book(s):

1. SimanHaykin, ―Neural Networks ‖, Prentice Hall of India, 1999
2. Timothy J. Ross, ―Fuzzy Logic with Engineering Applications‖, Third Edition, Wiley India, 2010
3. S.Y.Kung, ―Digital Neural Network‖, Prentice Hall International, 1993.
4. Aliev.R.A and Aliev,R.R, ― Soft Computing and its Application‖, World Scientific Publishing Company, 2001.
5. Wulfram Gerstner and WennerKristler, ―Spiking Neural Networks‖, Cambridge University Press.
6. Bart Kosko, ―Neural Networks and Fuzzy Systems: Dynamical Systems Application to Machine Intelligence‖, Prentice Hall, 1992.

SEMESTER - II

ELECTIVE – II

PITE22– DATA WAREHOUSING AND DATA MINING

Objective(s):

OBJ1: To make the students to understand data mining principles and techniques

OBJ2 :To discover the knowledge imbibed in the high dimensional system.

OBJ3 :To study algorithms for finding the hidden interesting patterns in data.

COURSE OUTCOME

CO1 : Expose the students to the concepts of Data warehousing Architecture and Implementation.

CO2 :Chance to Know the overview of developing areas – Web mining, Text mining and Big Data Mining Tools of Data mining.

UNIT – I INTRODUCTION TO DATAWAREHOUSING

Evolution of Decision Support Systems- Data Warehousing Components –Building a Data Warehouse, Data Warehouse and DBMS, Data Marts, Metadata, Multidimensional Data Model, OLAP vs. OLTP, OLAP Operations, Data Cubes, Schemas for Multidimensional Database: Stars, Snowflakes and Fact Constellations.

UNIT – II DATAWAREHOUSE PROCESS AND ARCHITECTURE

Types of OLAP Servers, 3 –Tier Data Warehouse Architecture, Distributed and Virtual Data Warehouses. Data Warehouse Implementation, Tuning and Testing of Data Warehouse. Data Staging (ETL) Design and Development, Data Warehouse Visualization, Data Warehouse Deployment, Maintenance, Growth, Business Intelligence Overview - Data Warehousing and Business Intelligence Trends - Business Applications - Tools – SAS.

UNIT – III INTRODUCTION TO DATA MINING

Data Mining - KDD versus Data Mining, Stages of the Data Mining Process- Task Primitives, Data Mining Techniques - Data Mining Knowledge Representation – Data Mining Query Languages, Integration of a Data Mining System with a Data Warehouse – Issues, Data preprocessing – Data Cleaning, Data Transformation, Feature Selection, Dimensionality Reduction, Discretization and Generating Concept Hierarchies - Mining Frequent Patterns Association- Correlation.

UNIT – IV CLASSIFICATION AND CLUSTERING

Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods - Clustering techniques – Partitioning Methods - k-means- Hierarchical Methods - Distance-based Agglomerative and Divisible Clustering, Density-Based Methods – Expectation Maximization - Grid Based Methods – Model-Based Clustering Methods – Constraint – Based Cluster Analysis – Outlier Analysis.

UNIT – V TRENDS IN DATAMINING AND BIG DATA MINING

Introduction to Big Data-Case Studies on Big Data Mining Tools: Apache Hadoop, Apache Mahout and R - Mining Complex Data Objects, Spatial Databases, Temporal Databases, Multimedia Databases, Time Series and Sequence Data; Text Mining – Web Mining- Application and Trends in Data Mining.

Text Book(s):

1. Jiawei Han and MichelineKamber, ―Data Mining: Concepts and Techniques‖, Morgan Kaufmann Publishers, Third Edition, 2011.
2. Paul Zikopoulos, Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, ―Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming‖, McGraw-Hill Osborne Media, First Edition, 2011.

Reference Book(s):

1. Mehmed Kantardzic, ―Datamining Concepts, Models, Methods, and Algorithms‖, Wiley Interscience, 2003.
2. Alex Berson and Stephen J. Smith, ―Data Warehousing, Data Mining and OLAP‖, Tata McGraw Hill Edition, Tenth Reprint 2007.
3. G. K. Gupta, ―Introduction to Data Mining with Case Studies‖, Easter Economy Edition, Prentice Hall of India, 2006.
4. Gareth James, Daniela Witten, Trevor Hastie, RobertTibshirani, ―An Introduction to Statistical Learning: with Applications in R‖, Springer, 2014.

SEMESTER - II
ELECTIVE – II

PITE22– CRYPTOGRAPHY AND NETWORK SECURITY

Objective(s):

OBJ1 :To understand security design principles

OBJ2 :To learn secure programming techniques

OBJ3 :To understand the mathematics behind cryptography

COURSE OUTCOMES

CO1 : know the standard algorithms used to provide confidentiality, integrity and authenticity

CO2 : Understand the security requirements in operating systems and databases

CO3: Learn about the security applications in wireless environment.

UNIT – IINTRODUCTION& NUMBER THEORY

Services, Mechanisms and attacks-the OSI security architecture-Network security model-Classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition techniques, steganography).FINITE FIELDS AND NUMBER THEORY: Groups, Rings, Fields-Modular arithmetic-Euclid‟s algorithm-Finite fields- Polynomial Arithmetic –Prime numbers-Fermat‟s and Euler‟s theorem-Testing for primality -The Chinese remainder theorem- Discrete logarithms.

UNIT – IIBLOCK CIPHERS & PUBLIC KEY CRYPTOGRAPHY

Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES)-Triple DES-Blowfish-RC5 algorithm. Public key cryptography: Principles of public key cryptosystems-The RSA algorithm-Key management - Diffie Hellman Key exchange-Elliptic curve arithmetic-Elliptic curve cryptography.

UNIT – IIIHASH FUNCTIONS AND DIGITAL SIGNATURES

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC –MD5 - SHA - HMAC – CMAC - Digital signature and authentication protocols – DSS – EI Gamal – Schnorr.

UNIT – IVSECURITY PRACTICE & SYSTEM SECURITY

Authentication applications – Kerberos – X.509 Authentication services - Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls - Firewall designs - SET for E-Commerce Transactions. Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security.

UNIT V E-MAIL, IP & WEB SECURITY

E-mail Security: Security Services for E-mail-attacks possible through E-mail - establishing keys privacy-authentication of the source-Message Integrity-Non-repudiation-Pretty Good Privacy-S/MIME. IPSecurity: Overview of IPSec - IP and IPv6-Authentication Header-Encapsulation Security Payload (ESP)-Internet Key Exchange (Phases of IKE, ISAKMP/IKE Encoding). Web

Security: SSL/TLS Basic Protocol-computing the keys- client authentication-PKI as deployed by SSLAttacks fixed in v3- Exportability-Encoding-Secure Electronic Transaction (SET).

Text Book(s):

1. William Stallings, Cryptography and Network Security, 6 th Edition, Pearson Education, March 2013.
2. Charlie Kaufman, Radia Perlman and Mike Speciner, "Network Security", Prentice Hall of India, 2002.

Reference Book(s):

1. Behrouz A. Ferouzan, "Cryptography & Network Security", Tata Mc Graw Hill, 2007.
2. Man Young Rhee, "Internet Security: Cryptographic Principles", "Algorithms and Protocols", Wiley Publications, 2003.
3. Charles Pfleeger, "Security in Computing", 4th Edition, Prentice Hall of India, 2006.
4. Ulysess Black, "Internet Security Protocols", Pearson Education Asia, 2000.
5. Charlie Kaufman and Radia Perlman, Mike Speciner, "Network Security, Second Edition, Private Communication in Public World", PHI 2002.
6. Bruce Schneier and Neils Ferguson, "Practical Cryptography", First Edition, Wiley Dreamtech India Pvt Ltd, 2003.
7. Douglas R Simson "Cryptography – Theory and practice", First Edition, CRC Press, 1995.

SEMESTER -III
ELECTIVE –III

PITE33– SOFTWARE PROJECT MANAGEMENT

Objective(s):

OBJ1 :To estimate the cost associated with a project

OBJ2 :To plan and monitor projects for the risk management

OBJ3 :To explore the process of monitoring and controlling

COURSE OUTCOMES

CO1:Manage people and organization of teams

CO2: Study various software development standards

UNIT – I INTRODUCTION

Project Definition – Contract Management – Activities covered by Software Project Management – Overview of Project Planning – Stepwise Project Planning - Project evaluation - Strategic Assessment – Technical Assessment – Cost Benefit Analysis – Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation

UNIT – II ACTIVITY PLANNING

Objectives – Project Schedule – Sequencing and Scheduling Activities – Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity on Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning And Control

UNIT – III MONITORING AND CONTROL

Creating Framework – Collecting the Data – Visualizing Progress – Cost Monitoring – Earned Value – Prioritizing Monitoring – Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types of Contract – Stages in Contract Placement – Typical Terms of a Contract – Contract Management – Acceptance

UNIT – IV MANAGING PEOPLE AND ORGANIZING TEAMS

Understanding Behavior – Organizational Behavior – Selecting The Right Person For The Job – Instruction in the Best Methods – Motivation – The Oldham Hackman Job Characteristics Model – Working In Groups – Becoming A Team – Decision Making – Leadership – Organizational Structures – Stress – Health And Safety – Case Studies

UNIT – V DEVELOPMENT AND MANAGEMENT STANDARDS

Microsoft solution Framework - PMBOK Guide - NASA practices - PRINCE 2 - Capability Maturity Model - Integration - open source tools for managing projects: Project information flow - basic infrastructure - collaborative document writing

Text Book(s):

1. Bob Hughes, Mike Cotterell, “Software Project Management”, Fifth Edition, Tata McGraw Hill, 2011
2. Adolfo Villafiorita, “Introduction to Software Project Management”, CRC Press 2014

Reference Book(s):

1. Ramesh, Gopalaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.
2. Royce, “Software Project Management”, Pearson Education, 1999
3. Jalote, “Software Project Management in Practice”, Pearson Education, 2002

SEMESTER - III
ELECTIVE – III

PITE33– BIG DATA ANALYTICS

Objective(s):

OBJ1 :To know the fundamental concepts of big data and analytics.

OBJ2 :To explore tools and practices for working with big data

OBJ3 :To learn about stream computing.

OBJ4: To know about the research that requires the integration of large amounts of data.

Course Outcome:

CO1: learn about stream computing.

CO2: know about the research that requires the integration

UNIT – I INTRODUCTION TO BIG DATA

Introduction – understanding Big data-capturing bigdata-Volume-velocity-variety-veracity-Benefiting Big Data –Management of bigdata- organazing big data- Technology challenges

UNIT – II BIGDATA SOURCES AND ARCHITECTURE

Big data sources-people to people communication-m2m- big data applications- Examining big data types- structured data – unstructured data- semi structured data-integrating data type into big data environment-Big data Architecture.

UNIT – II HADOOP

Big Data – Apache Hadoop & Hadoop EcoSystem – Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce - Data Serialization- Hadoop Architecture, Hadoop Storage. Hadoop MapReduce paradigm, Map and Reduce tasks, Job, Task trackers-: HDFS- Hive Architecture and Installation, Comparison with Traditional Database, HiveQL - Querying Data - Sorting and Aggregating, Map Reduce Scripts, Joins &Subqueries, HBase

UNIT – IV ANALYTICS AND BIG DATA

Basic analytics-Advanced analytics-operationalzed analytics-Monetizing analytics-modifying business intelligence products to handle big data- big data analytics solution-understanding text analytics-tools for big data.

UNIT – V DATA VISUALIZATION & R

Introduction-excellence in visualization- types of chart-Business Intelligence: Tools-skills- applications – Health care- Education-retail – E- Governance – Working eith R- Import a data set in R- plotting a histogram-Big data mining

Text Book(s):

1. Anil Maheshwari, Data Analytics Made Accessible: 2017 edition Kindle Edition
2. Judith Hurwitz, Alan Nugent, Dr. Fern Halper, Marcia Kaufman " Big Data for Dummies " wiley India Pvt.Ltd.New Delhi, 2014

Reference Book(s):

1. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, “Professional Hadoop Solutions”, Wiley, ISBN: 9788126551071, 2015.
2. Chris Eaton, Dirk deroos et al., “Understanding Big data ”, McGraw Hill, 2012.
3. Tom White, “HADOOP: The definitive Guide”, O Reilly 2012. 6 IT2015 SRM(E&T)
4. Tom Plunkett, Brian Macdonald et al, “Oracle Big Data Handbook”, Oracle Press, 2014.
5. JyLiebowitz, “Big Data and Business analytics”, CRC press, 2013.
6. VigneshPrajapati, “Big Data Analytics with R and Hadoop”, Packet Publishing 2013.

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