M.Sc. (INFORMATION TECHNOLOGY) COURSE PATTERN FROM 2014 – 2015 ONWARDS

SEM	SUBJECT CODE	COURSE	SUBJECT TITLE	HRS / WEEK	CREDIT	CIA MARK	SE MARK	TOTAL MARK
I	14PIT1C1	Core I	Structured and Object Oriented Programming	6	5	40	60	100
	14PIT1C2	Core II	Data Structures and Algorithms	6	5	40	60	100
	14PIT1C3	Core III	Data Communication and Networking	6	5	40	60	100
	14PIT1C4P1	Core IV	Data Structures Lab using C	3	3	20	30	50
	14PIT1C4P 2	Core IV	Object Oriented Programming Lab	3	2	20	30	50
	14PIT1CE1	Core Based Elective – I #		6	5	40	60	100
	TOTAL			**30**	**25**	**200**	**300**	**500**
II	14PIT2C5	Core V	Advanced Java Programming	6	5	40	60	100
	14PIT2C6	Core VI	Management Information Systems	6	5	40	60	100
	14PIT2C7	Core VII	Mobile Communications	6	5	40	60	100
	14PIT2C8P1	Core VIII	Advanced Java Programming Lab	3	3	20	30	50
	14PIT2C8P2	Core VIII	RDBMS Lab	3	2	20	30	50
	14PIT2CE2	Core Based Elective – II #		6	5	40	60	100
	TOTAL			**30**	**25**	**200**	**300**	**500**
III	14PIT3C9	Core IX	Advanced Operating Systems	6	5	40	60	100
	14PIT3C10	Core X	Open Source Technology	6	5	40	60	100
	14PIT3C11	Core XI	Web Technology	6	5	40	60	100
	14PIT3C12P1	Core XII	Open Source Lab	3	3	20	30	50
	14PIT3C12P2	Core XII	Web Technology Lab	3	2	20	30	50
	14PIT3CE3	Core Based Elective -III #		6	5	40	60	100
	14PIT3EC1	Extra Credit - I #	Business Intelligence		5*		100*	100*
	TOTAL			**30**	**25**	**200**	**300**	**500**
IV	14PIT4CE4	Core XIII	.Net Technology	6	5	40	60	100
	14PIT4CE5	Core XIV	.Net Technology Lab	6	5	40	60	100
	14PIT4EC2	Extra Credit – II #	Information Security		5*		100*	100*
	14PITPW	Project Work	Project Work	18	15	120	180	300
	TOTAL			**30**	**25**	**200**	**300**	**500**
GRAND TOTAL				**120**	**100**	**800**	**1200**	**2000**

*Not Considered for Grand Total and CGPA
Core Based Electives

One subject to be opted for each Core Based Electives

Semester	Course Title
I	Software Project Management
I	Multimedia Systems & Design
I	Pattern Recognition
II	Database Systems
II	Human Computer Interaction
II	Genetic Algorithm
III	IT Infrastructure and Management
III	E – Commerce
III	Ontology and Semantic Web

Core I : Structured and Object Oriented Programming

Semester : I
Subject Code : 14PIT1C1 **Max. Marks : 100**
Hours : 6 **Internal Marks : 40**
Credits : 5 **External Marks: 60**

Objectives:
To give the syntax and semantics of all the constructs in C and to impart the Object Oriented Programming skills in C++

UNIT I **18 Hrs**
Introduction to C - Basic Structure of C Programs –Tokens – keywords & Identifiers - Constants -Variables – Data Types – Operators – Expressions – Input and Output Functions - Decision Making and Branching Statements: Simple if(), if..else – Nesting of if() – else if Ladder – switch Statement – Looping Statements.

UNIT II **18 Hrs**
User Defined Functions: Elements of Functions – Definition of Functions – Function Declarations – Function Calls – Return Values and Types - Arrays: Single and Two Dimensional Arrays –Structures and Unions: Introduction – Defining, Declaring and Accessing Structure Members – Unions – Pointers: Understanding Pointers – Declaring and Accessing Pointers.

UNIT III **18 Hrs**
Principles of Object Oriented Programming(OOP): Basic Concepts – Structure of C++ Programs – Differences between C and C++ - Function Call by Reference and Return by Reference - In-line functions – Default Arguments- Function Overloading. Classes and Objects: Defining Member Functions – Private Member Functions – Static Member Functions – Array of Objects – Friend functions – Constructors - Parameterized Constructors – Copy constructor – Dynamic Constructors – Destructors.

UNIT IV **18 Hrs**
Operator Overloading: Defining Operator Overloading – Overloading Unary and Binary operators – Overloading Binary Operators using Friend Functions – Rules for overloading operators. Inheritance: Introducing Inheritance –Defining Derived Classes, Single, Multilevel, Multiple, Hierarchical and Hybrid Inheritances – Virtual Base class - Pointers to Objects – 'this' Pointer.

UNIT V **18 Hrs**
Virtual functions: Pointers to Derived Classes – Virtual Functions – Pure Virtual Functions – Console I/O and Files: C++ Stream Classes – Formatted Console I/O Operations – Managing output Manipulators – Opening and Closing Files – Random access file – Error handling during File Operations – Command-line Arguments - Class and Function Templates – Exception Handling.

Text Books
1. E. Balagurusamy, *Programming in ANSI C*, Tata McGraw-Hill Publishing Company Limited, Fifth Edition, 2011. **UNIT I & II**
2. E. Balagurusamy, *Object Oriented Programming with C++,* Tata McGraw-Hill Publishing Company Limited, Fourth Edition, 2008. **UNIT III, IV & V**

Reference Book

Herbert Schildt, *Teach yourself C++*, Tata McGraw-Hill Publishing Company, Third Edition, 2008.

Core II : Data Structures and Algorithms

Semester : I
Subject Code : 14PIT1C2 **Max. Marks : 100**
Hours : 6 **Internal Marks : 40**
Credits : 5 **External Marks: 60**

Objectives:

To study the various concepts of data structures and algorithms using trees, graphs, sorting, searching, and algorithm design techniques.

UNIT I **18 Hrs**

Lists, Stacks and Queues: Abstract Data Types (ADTs) - The Stack ADT - The Queue ADT

UNIT II **18 Hrs**

Trees: Introduction - Binary Trees - Representing Binary Trees in Memory - Traversing Binary Trees - Traversal Algorithms using Stacks - Header Nodes: Threads. Binary Search Trees - Searching and Inserting in Binary Search Trees - Deleting in a Binary Search Tree - AVL Search Trees - Insertion in an AVL Search Tree - Deletion in an Search Tree - m-way Search Trees - Searching Insertion and Deletion in an m-way Search Tree - B Trees - Searching Insertion and Deletion in B Trees - Heap: Heapsort. Path Lengths: Huffman's Algorithm - General Trees.

UNIT III **18 Hrs**

Graphs and Their Applications: Introduction - Graph Theory Terminology - Sequential Representation of Graphs - Warshall's Algorithm - Linked Representation of a Graph - Operations on Graphs - Traversing a Graph - Topological Sorting.

UNIT IV **18 Hrs**

Sorting and Searching: Introduction-Sorting - Insertion Sort - Selection Sort – Merging - Merge Sort - Radix Sort -Searching and Data Modification - Hashing**.**

UNIT V **18 Hrs**

Algorithm Design Techniques: Greedy Algorithms - Divide and Conquer - Dynamic Programming - Randomized Algorithms - Backtracking Algorithms.

Text Books

1. Mark Allen Weiss, *Data Structures and Algorithm Analysis in C,* Pearson publishing Company Limited, Second Edition, Reprint, Eleventh Impression.
   UNIT I Chapter 3
   UNIT V Chapter 10
2. Seymour Lipschutz *Data Structures* (Schaum's Outlines), Tata McGraw-Hill Publishing Company Limited, Fourth Reprint, 2006.
   UNIT II Chapter 7
   UNIT III Chapter 8
   UNIT IV Chapter 9

Core III : Data Communication and Networking

Semester : I
Subject Code : 14PIT1C3 **Max. Marks : 100**
Hours : 6 **Internal Marks : 40**
Credits : 5 **External Marks: 60**

Objectives:

To study the various layers of networking to understand the concepts of data communication and networking.

UNIT I **18 Hrs**

Introduction: Data Communications – Networks – The Internet - Protocol and Standards Network Models: Internet Model. The OSI model – Layers in the OSI model. Physical Layer: Multiplexing: FDM – WDM –TDM– Guided Media – Circuit Switched Networks – Telephone Network

UNIT II **18 Hrs**

Data Link Layer: Error Detection and Correction –Types of Errors – Error Detection and Correction – Data Link Control and Protocols: Flow and Error Control – Stop and Wait ARQ – Go-Back-N ARQ – Selective Repeat ARQ – HDLC – Connecting Devices – Point-To-Point Protocol.

UNIT III **18 Hrs**

Network Layer: Internetworks – Addressing: Internet Address – Classful addressing – Subnetting – Supernetting – Routing: Routing Techniques – Static versus dynamic routing –IP: Datagram – Fragmentation – Unicast Routing – Unicast Routing Protocols: Distance Vector Routing – Link State Routing.

UNIT IV **18 Hrs**

Transport Layer: Process to Process Delivery – User Datagram Protocol – Transmission Control Protocol – Congestion Control and Quality of Service: Data traffic – Congestion – Congestion control – Congestion control in TCP – Quality of Services – Techniques to Improve QOS

UNIT V **18 Hrs**

Application Layer: Name space – Domain Name Space – DNS in the Internet – Electronic Mail – File Transfer Protocol. Cryptography: Symmetric Key Cryptography – Public-Key Cryptography – Digital Signature – User Authentication – Key management.
Firewall – Virtual Private network.

Text Book:

1. BEHROUZ A FOROUZAN, Data Communications and Networking, 3rd Edition, Tata McGraw-Hill, 2004

Core IV(a) : Data Structures Lab using C

Semester : I
Subject Code : 14PIT1C4P1 **Max. Marks : 50**
Hours : 3 **Internal Marks : 20**
Credits : 3 **External Marks: 30**

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1. To push and pop an element from STACK.
2. To insert and delete an element from QUEUE.
3. Binary Search Tree (BST):
   - (i) Creating a BST
   - (ii) Searching an element in a BST
   - (iii) Inserting an element in a BST
4. Heap sort
   - (i) Building a heap
   - (ii) Heap sort
5. To find the shortest paths between every pair of vertices.
6. Graph Traversal (Breadth First Search (BFS) and Depth First Search (DFS))
7. Finding the K^{th} smallest element from a given list of elements.
8. Implementing Dijkstra's algorithm
9. Implementing Prim's algorithm.

Core IV(b) : Object Oriented Programming Lab

Semester : I
Subject Code : 14PIT1C4P2 **Max. Marks : 50**
Hours : 3 **Internal Marks : 20**
Credits : 2 **External Marks: 30**

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1. a) Develop a C++ Program to find biggest among the three numbers using else..if ladder and conditional Operator.

   b) Develop a C++ Program to find sum of digits of a given number using while, do..while and for loops.

2. a) Develop a C++ Program to find the value of nCr using recursive function.

   b) Develop a C++ Program to sort the given set of numbers using an Array.

3. a) Develop a Program to define a class named as Stack and perform PUSH and POP operations using class and objects.

   b) Develop a Program to overload the constructors and member functions.

4. a) Develop a Program to define a class named as *Time* and overload a binary operator using member function in order to obtain the sum of two times.

   b) Develop a Program to overload the friend function in order to obtain the sum of two complex numbers.

5. a) Develop a Program to display the Student information by inheriting College and Hostel classes.

   b) Develop a simple C++ application for Hierarchical Inheritance.

6. a) Develop a Program for virtual functions.

   b) Develop a Program to display the Formatted Output using I/O manipulators.

7. a) Develop a Program to handle the Random Access File.

   b) Develop a Program to handle the Exceptions.

Core Based Elective I : Software Project Management

Semester : I
Subject Code : 14PIT1CE1 **Max. Marks : 100**
Hours : 6 **Internal Marks : 40**
Credits : 5 **External Marks: 60**

Objectives:
To provide a clear and provocative discussion of the economics, metrics and management strategies of modern software development needed to plan and execute software project successfully.

UNIT – I **18 Hrs**
Conventional Software Management : The waterfall model, conventional software Management performance. Evolution of Software Economics : Software Economics, pragmatic software cost estimation. Improving Software Economics : Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections. The old way and the new : The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

UNIT – II **18 Hrs**
Life cycle phases : Engineering and production stages, inception, Elaboration, construction, transition phases. Artifacts of the process : The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts. Model based software architectures : A Management perspective and technical perspective. Work Flows of the process : Software process workflows, Iteration workflows

UNIT – III **18 Hrs**
Checkpoints of the process: Major mile stones, Minor Milestones, Periodic status assessments. Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning. Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations. Process Automation : Automation Building blocks, The Project Environment.

UNIT – IV **18 Hrs**
Project Control and Process instrumentation : The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation. Tailoring the Process : Process discriminants.

UNIT – V **18 Hrs**
Modern Project Profiles, Next generation Software economics, modern process transitions. Case Study: The command Center Processing and Display system- Replacement (CCPDS-R)

Text Book
1. Software Project Management, Walker Royce: Pearson Education, 2005.
   UNIT – I: Chapters 1,2,3,4 **UNIT – II:** Chapter 5,6,7,8
   UNIT–III: Chapter 9,10,11,12 **UNIT – IV:** Chapters 13, 14
   UNIT – V: Chapters 15,16,17

Reference Books:
1. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.
2. Software Project Management, Joel Henry, Pearson Education.
3. Software Project Management in practice, Pankaj Jalote, Pearson Education.2005.

Core V : Advanced Java Programming

Semester : II
Subject Code : 14PIT2C5 **Max. Marks : 100**
Hours : 6 **Internal Marks : 40**
Credits : 5 **External Marks: 60**

Objectives
To Impart sound knowledge in Object Oriented Programming skills in JAVA

UNIT I **18Hrs**
An overview of Java – Java Buzzwords- Data Types, Variables and Arrays - Operators –Control Statements- Introducing Classes: Class Fundamentals – Declaring Objects – Introducing Methods – Constructors – The **this** keyword – Garbage Collection – Overloading Methods – Call by value, Call by reference – Recursion – Understanding static – final – Nested and Inner classes.

UNIT II **18Hrs**
Inheritance: Inheritance Basics – Using super – Method overriding –Dynamic Method Dispatch-Using Abstract Classes - Final with Inheritance- Object class. Packages and Interfaces: Declaring Packages – Access Protection – Importing Packages – Defining, Implementing, Applying Interfaces - Exception Handling: Exception Types – try, catch – throw – throws – finally – Creating User-defined Exception classes.

UNIT III **18Hrs**
Multithreaded Programming: The Java Thread Model – Creating a Thread – Thread Priorities-Synchronization – Inter-thread communication. String Handling –The Collection Interfaces and Utility Classes: List,Set,Map,Enumeration,Iterator and Comparator-ArrayList, LinkedList, Vector, Stack,Properties,HashTable, StringTokenizer, and Date classes.

UNIT IV **18Hrs**
Files and IO Streams: File – The Byte Streams – The Character Streams – Serialization. Networking –Networking classes and interfaces – InetAddress class , TCP/IP Client and Server sockets–URL-Datagrams. The Applet class- Applet Architecture- The HTML APPLET tag – Passing parameters to Applets – Event handling- Working with Graphics, Color and Font classes.

UNIT V **18Hrs**
Swing Component classes- JApplet- Text Fields, Buttons, Combo boxes, Tabbled and Scroll Panes- The Life Cycle of a Servlet- GenericServlet class,HttpServlet class- Reading Servlet Parameters-Handling HTTP Request and Responses.

Text Book
Herbert Schildt, *The Complete Reference Java 2*, Fifth Edition, TMH Education Pvt. Ltd.
Chapters:

Reference Book
Herbert Schildt with Joe O' Neil, *Java – Programmer's Reference*, TMH.

Core VI : Management Information Systems

Semester : II
Subject Code : 14PIT2C6 **Max. Marks : 100**
Hours : 6 **Internal Marks : 40**
Credits : 5 **External Marks: 60**

Objectives:

To study the various concepts like E-business, decision support systems, and developing business strategies of Management Information Systems.

UNIT I **18Hrs**

Foundations of Information Systems in Business: Foundation Concepts:Information System in Business. Foundation Concepts: The Components of Information Systems. Competing with Information Technology: Fundamentals of Strategic Advantage-Using Information Technology.

UNIT II **18Hrs**

E-Business Systems:E-Business Systems-Functional Business Systems. Enterprise Business Systems: Getting All the Geese Lined Up: Managing at the Enterprise Level. Enterprise Resource Planning: The Business Backbone. Supply Chain Management: The Business Network.

UNIT III **18Hrs**

Electronic Commerce Systems: Electronic Commerce Fundamentals-E-commerce Applications and Issues.

UNIT IV **18Hrs**

Decision Support Systems: Decision Support in Business-Artificial Intelligence Technologies in Business.

UNIT V **18Hrs**

Developing Business/IT Strategies: Planning Fundamentals-Implementation Challenges.
Developing Business/IT Solutions: Developing Business Systems-Implementing Business Systems.

Text Book:

1. James A.O 'Brien and George M Marakas, *Management Information Systems*, Tata McGraw-Hill Publishing Company Limited, Ninth Edition, 2010.

UNIT I **:** Chapters 1 & 2
UNIT II **:** Chapters 7 & 8
UNIT III **:** Chapter 9
UNIT IV **:** Chapter 10
UNIT V **:** Chapters 11 & 12

Core VII : Mobile Communications

Semester : II
Subject Code : 14PIT2C7 **Max. Marks : 100**
Hours : 6 **Internal Marks : 40**
Credits : 5 **External Marks: 60**

Objectives:

To study the various concepts like GSM, CDMA, and 3G of Mobile Communications.

UNIT I **18Hrs**

Mobile Computing – Dialog Control – Networks – Middleware and Gateways – Application and Services – Developing Mobile Computing Applications – Standards – Standard Bodies – Players in Wireless Space. Mobile Computing Architecture: Architecture for Mobile Computing – Three Tier Architecture – Design Considerations for Mobile Computing

UNIT II **18Hrs**

Mobile Computing Through Telephony: Evolution of Telephony - Multiple Access Procedure – Mobile Computing Through Telephone - Voice XML - TAPI – Emerging Technologies: Bluetooth – RFID – Mobile IP – IPV6.

UNIT III **18Hrs**

GSM: Global System for Mobile Communications – GSM Architecture – GSM Entities – Call Routing in GSM – GSM Address and Identifiers – Network Aspects in GSM.
SMS: Mobile Computing Over SMS – SMS – Value Added Services through SMS.

UNIT IV **18Hrs**

GPRS: GPRS and Packet Data Network – GPRS Network Architecture – Data Services in GPRS – Billing and Charging in GPRS. WAP: Evolution of Wireless Data and WAP – GPRS Applications.

UNIT V **18Hrs**

CDMA and 3G: Introduction – Spread – Spectrum Technology – Direct Sequence Spread Spectrum (DSSS) – IS-95 265 – Architecture CDMA versus GSM – Wireless Data.
Wireless LAN: Introduction – Wireless Advantages – Wireless LAN Architecture – Types of Wireless LAN – Mobility in Wireless LAN – Wireless LAN Security.

Text Book

1. Mobile Computing – Asoke K Talukder, Roopa RYavagal, Tata MC Graw Hill Publishing Company Limited 2005.

Core VIII(a) : Advanced Java Programming Lab

Semester : II
Subject Code : 14PIT2C8P1 **Max. Marks : 50**
Hours : 3 **Internal Marks : 20**
Credits : 3 **External Marks: 30**

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1. Program for multiplying two matrices.

2. Program for finding area and circumference of a circle using class and object.

3. Define a class Stack and implement the PUSH and POP operations and enhance the Stack class by automatically extending the size when the stack pointer reaches the maximum value.

4. Define an interface named as Area and three implementing classes namely Circle, Rectangle and Triangle. Display the area of the circle, area of the Rectangle and area of the Triangle by invoking interface reference.

5. Program to prepare an EB-Bill using the package concept.

6. Program to handle the following Exceptions
   i) DivideByZeroException
   ii) ArrayIndexOutOfBoundsException
   iii) NumberFormatException
   iv) NullPointerException and
   v) User defined exceptions

7. Program for arranging the given names in alphabetical order and display the number of names in palindrome.

8. Menu driven program using Vector utility class

9. Program for handling multiple threads.

10. Program for displaying contents of a given file, copying contents between files and updating an existing file.

11. Program using ServerSocket and Socket classes.

12. Program using DatagramSocket and DatagramPacket classes

13. Applet programs for displaying geometrical object on a window and passing parameters to an applet

14. Program for implementing simple calculator using Swing controls.

15. Simple Servlet program to display the factorial of a given number using HttpServlet class.

Core VIII(b) : RDBMS Lab

Semester : II
Subject Code : 14PIT2C8P2 **Max. Marks : 50**
Hours : 3 **Internal Marks : 20**
Credits : 2 **External Marks: 30**

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1. SQL - Data Definition Language

   Table Creation
   Table Altering
   Drop table

2. SQL - Data Manipulation Language

   Data Insertion, Updation, Deletion
   Tuple variable
   Pattern Matching
   Build-in Function
   Set operations
   Join Operation
   Nested Subqueries
   Views

3. PL/SQL Procedure

   Reverse the string
   Delete any record and count it
   Student Mark sheet preparation
   Pay Roll preparation
   Joining two tables in to one table
   Find factorial number using recursive function
   Find Fibonacci series using recursive function.

4. SQL Forms

   Student Mark System
   Pay Roll Preparation

Core Based Elective II : Database Systems

Semester : II
Subject Code : 14PIT2CE2 **Max. Marks : 100**
Hours : 6 **Internal Marks : 40**
Credits : 5 **External Marks: 60**

Objectives
To impart knowledge about relational database system and distributed database.

UNIT I **18Hrs**
Introduction – Database-Systems Applications – Purpose – View of Data – Database Architecture – Database Users and Administrators – Introductions to the Relational Database – keys – Formal Relational Query Languages – The Relational Algebra.

UNIT II **18Hrs**
Introduction to SQL: SQL Data Definition – Basic Structure of SQL Queries – Additional Basic Operations – Set Operations – Aggregate Functions – Nested Subqueries – Modifications of the Database – Join – Views – Integrity Constraints – Authorization.

UNIT III **18Hrs**
E-R Model: The Entity Relationship Model – Constraints – Entity-Relationship Diagrams. Database Design: Normalization – Pitfalls in Relational Database Design – Non-Loss Decompositions – Functional Dependencies – First, Second, Third Normal Forms – BCNF – Multi-valued Dependencies – Join Dependencies.

UNIT IV **18Hrs**
Transactions: Transaction Concept – Storage Structure – Transaction Atomicity and Durability – Transaction Isolation – Serializability. Concurrency Control: Lock-Based Protocols – Timestamp-Based Protocols – Validation – Based Protocol. Recovery and Atomicity.

UNIT V **18Hrs**
Database-System Architecture: Centralized and Client-Server Architectures – Server System Architecture – Distributed Systems. Distributed Database: Homogeneous and Heterogeneous Database – Distributed Data Storage – Distributed Transaction.

Text Books
1. Abraham Silberschatz, Henry F.Korth and S.Sudersan, *Database System Concepts*, McGraw-Hill International Edition, Sixth Edition, 2011.
   UNIT I, II, IV & V
2. C.J Date, *An Introduction to Database System*, Pearson Education Ltd., Seventh Edition, Fourth Indian Reprint 2002.
   UNIT III

Reference Books
1. Ramez Elmasri, Shamkant B. Navathe, *Fundamentals of Data Base Systems*, Addison Wesley, Third Edition, 2000
2. Connolly and Begg, *Database Systems,* Pearson Education Ltd., Fourth Edition, 2008

Core IX : Advanced Operating Systems

Semester : III
Subject Code : 14PIT3C9 **Max. Marks : 100**
Hours : 6 **Internal Marks : 40**
Credits : 5 **External Marks: 60**

Objectives
To impart the basic concepts of operating system and its structures. Also to provide the fundamentals of distributed operating systems and insight study of DOS features such as message passing, distributed shared memory, synchronizations and distributed file systems

UNIT I **18Hrs**
Introduction**:** What is an Operating System – History of Operating Systems – Computer Hardware Review – Operating System Zoo – Operating System Concepts – Operating System Structure

UNIT II **18Hrs**
Fundamentals**:** What is a Distributed Computing System – Distributed Computing System Models – What is a Distributed Operating System – Issues in Designing a Distributed Operating System – Distributed Computing Environment (DCE)
Computer Networks: Networks Types – LAN Technologies – WAN Technologies – Communication Protocols – Internetworking – ATM Technology

UNIT III **18Hrs**
Message Passing: Desirable Features of a Good Message-Passing System – Issues in IPC by Message Passing – Synchronization – Buffering – Multidatagram Messages – Encoding and Decoding of Message Data – Process Addressing – Failure Handling – Group Communication

UNIT IV **18Hrs**
Distributed Shared Memory: General Architecture of DSM Systems – Design and Implementation Issues of DSM – Granularity – Structure of Shared Memory Space – Consistency Models – Replacement Strategy – Thrashing – Other Approaches to DSM – Heterogeneous DSM – Advantages of DSM
Synchronization: Clock Synchronization – Event Ordering - Mutual Exclusion – Deadlock – Election Algorithms

UNIT V **18Hrs**
Distributed File Systems: Desirable Features of a Good Distributed File System – File Models – File Accessing Models – File Sharing Semantics – File Caching Schemes – File Replication – Fault Tolerance – Atomic Transactions – Design Principles

Text Books
1. Andrew S. Tanenbaum, *Modern Operating Systems*, PHI Pvt. Ltd, Third Edition, 2010.
UNIT I : Chapter 1
2. Pradeep K. Sinha, *Distributed Operating Systems Concepts and Design*, PHI Pvt. Ltd, 2008.
UNIT II : Chapter 1 (1.1, 1.3, 1.5, 1.6, 1.7) & Chapter 2
UNIT III : Chapter 3 **UNIT IV :** Chapter 5 & 6 **UNIT V:** Chapter 9

Core X : Open Source Technology

Semester : III
Subject Code : 14PIT3C10 **Max. Marks : 100**
Hours : 6 **Internal Marks : 40**
Credits : 5 **External Marks: 60**

Objectives
To understand the concepts of Linux, Apache, MySQL and PHP.

UNIT I **18Hrs**
Introduction: Open Source – Open Source vs. Commercial Software – What is Linux? - Free Software – Where I can use Linux? Linux Kernel – Linux Distributions.

UNIT II **18Hrs**
Introduction: Linux Essential Commands – File System Concept – Standard Files – The Linux Security Model – Vi Editor – Partitions creation – String Processing – Investigating and Managing Processes – Network Clients – Installing Application.

UNIT III **18Hrs**
Introduction: Apache Explained – Starting, Stopping, and Restarting Apache – Modifying the Default Configuration – Securing Apache – Set User and Group – Consider Allowing Access to Local Documentation – Don't Allow public_html Web sites – Access control with .htaccess

UNIT IV **18Hrs**
Introduction to MY SQL: The Show Databases and Table – The USE command – Create Database and Tables – Describe Table – Insert, Select, Update, and Delete statement – Some Administrative detail – Table Joins – Loading and Dumping a Database.

UNIT V **18Hrs**
PHP Introduction: General Syntactic Characteristics – PHP Scripting – Commenting your code – Primitives, Operations and Expressions – PHP Variables – Operators and Expressions - Control Statement – Array – Functions – Basic Form Processing – File and Folder Access – Cookies – Sessions – Database Access with PHP – MySQL – MySQL Functions – Inserting Records – Selecting Records – Deleting Records – Update Records.

Text Book
1. James Lee and Brent Ware, *Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP*, Dorling Kindersley(India) Pvt. Ltd., 2008.
   - **UNIT I:** Chapter 1, 2
   - **UNIT II:** Chapter 2
   - **UNIT III:** Chapter 3
   - **UNIT IV:** Chapter 5
   - **UNIT V:** Chapter 12

Reference Book
1. Rosebrock, Eric Filson, *Setting Up LAMP: Getting Linux, Apache, MySQL, and PHP and working Together*, Eric Published by John Wiley and Sons, 2004.

Core XI : Web Technology

Semester : III
Subject Code : 14PIT3C11 **Max. Marks : 100**
Hours : 6 **Internal Marks : 40**
Credits : 5 **External Marks: 60**

Objectives:
To provide fundamental concept of Internet, JavaScript, XML, JSP, ASP with a view to developing professional software development skills.

UNIT I **18Hrs**
Internet Basics: Basic Concepts – Internet Domains – IP Address – TCP/IP Protocol - The WWW – The Telnet — Introduction to HTML: Web server - Web client / browser - Tags – Text Formatting – Lists – Tables – Linking Documents - Frames.

UNIT II **18Hrs**
JavaScript: JavaScript in Web Pages – The Advantages of JavaScript – Writing JavaScript into HTML – Syntax – Operators and Expressions – Constructs and conditional checking – Functions – Placing text in a browser – Dialog Boxes – Form object's methods – Built in objects – user defined objects.

UNIT III **18Hrs**
XML: Comparison with HTML – DTD – XML elements – Content creation – Attributes – Entities – XSL – XLINK – XPATH – XPOINTER – Namespaces – Applications – integrating XML with other applications.

UNIT IV **18Hrs**
JSP Fundamentals: Basics – Directive basics – Page directive – The taglib directive – The include directive – JSP Standard Actions – Java Beans – Error Handling.

UNIT V **18Hrs**
ASP: Introduction to ASP – Objects – Components – Working with HTML forms – Connecting to Microsoft SQL Server & MS–Access Database – SQL statements with connection object – Working with record sets.

Text Books

1. "Web Enabled Commercial Application Development Using HTML, DHTML, JavaScript, Perl CGI", Ivan Bayross, BPB Publication. **UNIT I & II**
2. "XML Bible", Elliotte Rusty Harold, 2nd Edition, Wrox Publication. **UNIT III**
3. "Beginning Java Server Pages", Vivek Chopra, Sing Li, Rupert Jones, Jon Eaves, John T. Bell, Wrox Publications. **UNIT IV**
4. "Practical ASP", Ivan Bayross, BPB Publication. **UNIT V**

Core XII(a) : Open Source Lab

Semester	**: III**		
Subject Code	**: 14PIT3C12P1**	**Max. Marks**	**: 50**
Hours	**: 3**	**Internal Marks**	**: 20**
Credits	**: 3**	**External Marks**	**: 30**

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1. Write a shell program to find the details of a user session.

2. Write a shell program to change the extension of a given file.

3. Create a MySql table and execute queries to read, add, remove and modify a record from that table.

4. Write a server side PHP program that displays marks, total, grade of a student in tabular format by accepting user inputs for name, number and marks from a HTML form.

5. Write a PHP program that adds products that are selected from a web page to a shopping cart.

6. Write a PHP program to access the data stored in a mysql table.

7. Write a PHP program interface to create a database and to insert a table into it.

8. Write a PHP program using classes to create a table.

9. Write a PHP program to upload a file to the server.

10. Write a PHP program to create a directory, and to read contents from the directory.

Core XII(b) : Web Technology Lab

Semester	**: III**		
Subject Code	**: 14PIT3C12P2**	**Max. Marks**	**: 50**
Hours	**: 3**	**Internal Marks**	**: 20**
Credits	**: 2**	**External Marks**	**: 30**

1. Write a XML program for job listing in HRML.
2. Write a JavaScript code block, which checks the contents entered in a form's text element. If the text entered is in the lower case, convert to upper case.
3. Write a JavaScript code block, which validates a username and password.
    a) If either the name or password field is not entered display an error message.
    b) The fields are entered do not match with default values display an error message.
    c) If the fields entered match, display the welcome message.
4. Write a JavaScript code to display the current date and time in a browser.
5. Write a JSP Program for user authentication.
6. Write a JSP Program for a simple shopping cart.
7. Write a JSP Program to prepare a bio data and store it in database.
8. Write an ASP Program using Response and Request Object.
9. Write an ASP Program using AdRotator Component.
10. Write an ASP program using database connectivity for student's record.

Core Based Elective III : IT Infrastructure and Management

Semester : III
Subject Code : 14PIT3CE3 **Max. Marks : 100**
Hours : 6 **Internal Marks : 40**
Credits : 5 **External Marks: 60**

Objectives:

To provide the basic knowledge of designing, implementing and managing the infrastructure of an IT environment.

UNIT I **18 Hrs**

Evolution of Computer – Computer Basics – Network and Internet – Computing resources – Information technology – IT infrastructure management – Challenges in IT infrastructure management – design issues of IT organizations and IT infrastructure – Determining customer's requirements – IT systems management process – IT service management process – Information design system process – Patterns of IT systems management – IT infrastructure library.

UNIT II **18 Hrs**

Service level management – financial management – IT service continuity management – capability management – availability management – configuration management – incident management

UNIT III **18 Hrs**

Problem management – change management – release management – introduction to storage – backup and storage – archive and retrieve – disaster recovery – space management – database and application protection – Bare machine recovery (BMR) – Data retention.

UNIT IV **18 Hrs**

Security management introduction – Computer security – Internet security – Physical security – Identity management – access control system – intrusion detection – IT Ethics introduction – Intellectual property.

UNIT V **18 Hrs**

Privacy and law – computer forensics – ethics and internet – cyber crimes – emerging trends in IT – E-Commerce – Electronic data interchange – Global system for Mobile Communication – Bluetooth – Infrared technology.

Text Book:

1. "IT Infrastructure and its Management", Phalguni Gupta, Surya Prakash, Umarani Jayaraman, Tata McGraw Hill Education Private Limited, Second Reprint 2010

UNIT I: Chapters 1, 2
UNIT II: Chapters 3, 4
UNIT III: Chapter 4, 5
UNIT IV: Chapter 6, 7
UNIT V: Chapter 7, 8

Reference Book:

1. Rich Schiesser, IT Systems Management, Prentice Hall of India Private Ltd., New Delhi, 2005.

Extra Credit – 1 : Business Intelligence

Semester	**: III**		
Subject Code	**: 14PIT3EC1**	**Max. Marks**	**: 100**
Hours	**: -**	**Internal Marks**	**: -**
Credits	**: 5**	**External Marks**	**: 100**

Objective:
This course aims to introduce techniques needed for applying intelligence in business applications.

UNIT I
Introduction to business intelligence and business decisions – Data warehouses and its role in Business Intelligence – Creating a corporate data warehouse – Data Warehousing architecture – OLAP vs. OLTP - ETL process – Tools for Data Warehousing – Data Mining – KDD Process

UNIT II
Applications of Data Mining in Business – Data Mining Techniques for CRM – Text Mining in BI - Web Mining – Mining e-commerce data – Enterprise Information Management - Executive Information Systems

UNIT III
Business Intelligence – Function, Process, Services & Tools - Application in different domains – Operational BI - Customizing BI – Managing BI projects vs Traditional IS projects – Managing BI projects – Best Practices in BI Strategy

UNIT IV
Knowledge Management(KM) – Definition – Data Vs Information Vs Knowledge – The ten key principle of KM – Knowledge Management Architecture – Knowledge Management Vs Knowledge Processing – KM approaches – KM Tools – KM Infrastructure – KM models - KM Strategies

UNIT V
Web Analytics and Business Intelligence – eCRM - Case Study: Web Trends – Boeing – EverBank – China Eastern

Text Book:

1. M.Raisinghani - Business Intelligence in the Digital Economy - Opportunities, Limitations and Risks, Idea Group publications, 2004.
2. Sumathy, Sivanandam, Introduction to Data Mining and its Applications, Springer Verlag, 2006
3. Yogesh Malhotra , Knowledge Management and Business Innovation, , Idea Group, 2001.

Core Based Elective XIII : .NET Technology

Semester	**: IV**		
Subject Code	**: 14PIT4CE4**	**Max. Marks**	**: 100**
Hours	**: 6**	**Internal Marks**	**: 40**
Credits	**: 5**	**External Marks**	**: 60**

Objective:
To understand the concepts of .NET technology

UNIT I **18Hrs**
Introduction: Integrated Development Environment - IDE Components -Setting Environment Options - Building a Console application -Variable-Variable as Objects - Constants-Arrays.

UNIT II **18Hrs**
Programming Fundamentals: Flow Control Statement-Writing & using procedures - Argument-Built-in Functions -The Textbox control -The List box, Checked List Box and Combo Box Controls-The Scrollbar or Track bar controls

UNIT III **18Hrs**
Working with Forms: Appearance of Forms - Loading or showing Forms - Dynamic Forms - Designing Menus - Common Dialog controls - Rich Text box Control –List view, Tree view, or Image List Controls - Handling Strings or Characters - Handling Dates or Times - Manipulating Folders or Files -Accessing Files

UNIT IV **18Hrs**
ADO .Net: The Basic Data - Access Classes-storing Data in datasets - Update Operations - Working with Typed Datasets - Data Binding - Designing Data Driven Interfaces.

UNIT V **18Hrs**
Building Web Applications: Understanding HTML or DHTML- working with HTML - Cascading Style Sheets - Server Side Technologies – Controls - ASP.Net Objects - Understanding Web Services.

Text Book
1. Evangelos Petroutsos, *Mastering Microsoft Visual Basic 2008,* Wiley India Edition, Wiley Reprint, 2009.

Core Based Elective XIV : .NET Technology Lab

Semester	**: IV**		
Subject Code	**: 14PIT4CE5**	**Max. Marks**	**: 100**
Hours	**: 6**	**Internal Marks**	**: 40**
Credits	**: 5**	**External Marks**	**: 60**

1. Placing Textboxes dealing with its properties.

2. Making use of placeholders, literals and controls.

3. Making use of list box, check box and radio button controls.

4. Setting up and using Adrotator control.

5. Making use required field validator and compare validator controls.

6. Using range validator, regular expression validator and validation summary.

7. Database connectivity through connected approach.

8. Data view with the help of grid view control.

9. Formatting data with a help of data list control.

10. Designing a ASP.Net client for web service.

Extra Credit – 2 : Information Security

Semester	**: IV**		
Subject Code	**: 14PIT4EC2**	**Max. Marks**	**: 100**
Hours	**: -**	**Internal Marks**	**: -**
Credits	**: 5**	**External Marks**	**: 100**

Objectives

To introduce the basic concepts of information security. To provide knowledge of security management and the technical components of security.

UNIT I

Introduction to Information Security: Critical Characteristics of Information – Components of an Information System – The Security Systems Development. Life Cycle – Security Professionals and the Organization. The Need for Security: Threats – Attacks

UNIT II

Risk Management: Overview – Risk Identification – Risk Control Strategies – Quantitative Versus Qualitative Risk Control Practices – Recommended Risk Control Practices. Planning for Security: Information Security Policy, Standards, and Practices – The Information Security Blueprint – Security Education, Training, and Awareness Program

UNIT III

Security Technology: Firewalls and VPNs: Firewalls – Intrusion Detection, Access Control, and Other Security Tools: Intrusion Detection and Prevention Systems (IDSs and IPSs) – Scanning and Analysis Tools .

UNIT IV

Physical Security: Physical Access Controls – Fire Security and Safety – Failure of Supporting Utilities and Structural Collapse. Implementing Information Security: Information Security Project Management – Technical Topics of Implementation

UNIT V

Security and Personnel: Positioning and Staffing the Security Function – Credentials of Information Security Professionals – Employment Policies and Practices – Security Considerations for Non-employees – Information Security Maintenance: Security Management Models

Text Book

1. Michael E. Whitman, Herbert J. Mattord, Principles and Practices of Information Security, Cengage Learning, Seventh Indian Reprint, 2011.

Reference Book

1. Charles P. Pfleeger, Shari Lawrence Pfleeger, Security in Computing, Pearson Education, Fourth Edition, 2008.

Project Work

Semester	**: IV**		
Subject Code	**: 14PITPW**	**Max. Marks**	**: 100**
Hours	**: 18**	**Internal Marks**	**: 40**
Credits	**: 5**	**External Marks**	**: 60**

Students carry out a project in software development companies