

M.Sc. (COMPUTER SCIENCE) COURSE PATTERN FROM 2014 – 2015 ONWARDS

SEM.	SUBJECT CODE	COURSE	SUBJECT TITLE	HRS / WEEK	CREDIT	CIA MARK	SE MARK	TOTAL MARK
I	14PCS1C1	Core I	Mathematical Foundations for Computer Science	6	5	40	60	100
	14PCS1C2	Core II	OOAD and UML	6	5	40	60	100
	14PCS1C3	Core III	Advanced Java Programming	6	5	40	60	100
	14PCS1C4P1	Core IV	Advanced Java Programming Lab	3	3	20	30	50
	14PCS1C4P2	Core IV	Assembler Programming Lab	3	2	20	30	50
	14PCS1CE1	Core Based Elective – I#		6	5	40	60	100
	TOTAL				30	25	200	300
II	14PCS2C5	Core V	Design and Analysis of Algorithms	6	5	40	60	100
	14PCS2C6	Core VI	Advanced Computer Architecture	6	5	40	60	100
	14PCS2C7	Core VII	C# and .Net Framework	6	5	40	60	100
	14PCS2C8P	Core VIII	C# and .Net Lab	6	5	40	60	100
	14PCS2CE2	Core Based Elective – II#		6	5	40	60	100
	TOTAL				30	25	200	300
III	14PCS3C9	Core IX	Distributed Operating Systems	6	5	40	60	100
	14PCS3C10	Core X	Data Warehousing and Data Mining	6	5	40	60	100
	14PCS3C11	Core XI	Principles of Compiler Design	6	5	40	60	100
	14PCS3C12	Core XII	Open Source Technology	3	3	20	30	50
	14PCS3C12P	Core XII	Open Source Lab	3	2	20	30	50
	14PCS3CE3	Core Based Elective – III #		6	5	40	60	100
	14PCS3EC1	Extra Credit – I#	Cloud Computing		5*		100*	100*
	TOTAL				30	25	200	300
IV	14PCS4CE4	Core XIII	Middleware Technology	6	5	40	60	100
	14PCS4CE5	Core XIV	Middleware Technology Lab	6	5	40	60	100
	14PCS4EC2	Extra Credit – II #	Network Management		5*		100*	100*
	14PCSPW	Project Work		18	15	120	180	300
	TOTAL				30	25	200	300
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 Elective

Semester	Course Title
I	Microprocessors and Microcontrollers
I	Embedded Systems
I	Human Computer Interaction
II	Wireless and Mobile Communication
II	Multimedia Systems & Design
II	Digital Image Processing
III	Grid Computing
III	Soft Computing
III	Ontology and Semantic Web

Core I : Mathematical Foundations for Computer Science

Subject Code : 14PCS1C1

Hours : 6

Credits : 5

Max. Marks : 100

Internal Marks : 40

External Marks: 60

Objectives

To provide the knowledge of recurrence relations, formal languages, mathematical logic, coding theory and numerical methods.

UNIT I

18 Hrs

Recurrence Relation and Recursive Algorithms – Introduction – Recurrence Relations – Linear Recurrence Relations with Constant Coefficients – Homogeneous Solutions – Particular Solutions – Total Solutions – Solution by the Method of Generating Functions – Sorting Algorithms.

UNIT II

18 Hrs

Mathematical Logic :- Introduction – Statements and Notation – Connectives – (AND, OR, NOT) Negation, Conjunction, Disjunction, Conditional and Biconditional – Tautologies, Contradiction, Related Problems – Tautological Implication – Normal Forms – Theory of Inference.

UNIT III

18 Hrs

Formal Languages – Introduction – Russell’s Paradox and Noncomputability – Ordered Sets – Languages – Phrase Structure Grammars – Types of Grammars and Languages. Counting: Basics of Counting – Pigeonhole Principle – Permutations and Combinations – Binomial Coefficient.

UNIT IV

18 Hrs

Coding Theory – Introduction – Cryptography – Caesar Cipher Coding – Matrix Encoding – Scrambled Codes – Hamming Metric – Hamming Distance – Error Detecting Capability of an Encoding

UNIT V

18 Hrs

Numerical Methods – Polynomial Equations – Birge-Vieta Method, Bairstow Method, Graffe’s Root Squaring Method – Numerical Integration – Gauss-Legendre, Gauss-Chebyshev and Gauss-Laguerre Methods.

Text Books

1. C.L. Liu, *Elements of Discrete Mathematics*, Tata McGraw-Hill Publishing Company Limited, Second Edition, Eleventh Reprint, 2004.

UNIT I : Chapter 10 (Except 10.9 and 10.10) **UNIT III** : Chapter 2

2. J.P. Tremblay and R. Manohar, *Discrete Mathematical Structures with Applications to Computer Science*, Tata McGraw-Hill Publishing Company Limited, 2006.

UNIT II: Chapter

3. Kenneth H Rosen, *Discrete Mathematics and Its Applications with Combinatorics and Graph Theory*, Tata McGraw-Hill Publishing Company Limited, Sixth Edition, 2007.

UNIT III : Chapter 5

4. James L. Fisher, *Application Oriented Algebra*, Dun Donnelly Publisher, 1977.

UNIT IV : Chapter 9 (9.1 – 9.5)

5. M.K. Jain, S.R.K. Iyengar and R.K. Jain, *Numerical Methods for Science and Engineering*

Core II : OOAD and UML

Subject Code : 14PCS1C2

Hours : 6

Credits : 5

Max. Marks : 100

Internal Marks : 40

External Marks: 60

Objectives

To impart the concepts of Object oriented methodologies and Unified Modeling Language.

UNIT I

18 Hrs

Introduction: An overview of Object Oriented Systems Development - Object basics - Object Oriented Systems Development Life Cycle. Object Oriented Methodologies: Rumbaugh methodology - Booch methodology - Jacobson methodology - unified approach.

UNIT II

18 Hrs

Object Oriented Analysis: Identifying Use Cases - Object Analysis - Classification - Identifying Object Relationships - Attributes and Methods. Object Oriented Design: Object Oriented Design Process and Design Axioms – Designing Classes.

UNIT III

18 Hrs

UML: Importance of Modeling – Principles of Modeling – Object oriented modeling – Introducing UML. Basic Structural Modeling: Classes – Relationships – Common Mechanisms – Diagrams – Class diagrams.

UNIT IV

18 Hrs

Basic Behavioral Modeling: Interactions- Use Cases –Use Case Diagrams-Interaction Diagram – Activity Diagram. Advanced Behavioral Modeling: State Diagrams.

UNIT V

18 Hrs

Architectural Modeling: Artifacts – Deployments – Collaborations – Patterns and Frame works - Artifact Diagrams - Deployment Diagrams.

Text Books:

1. Ali Bahrami, “Object Oriented systems Development”, Irwin – McGraw Hill, New Delhi, 2008. **UNITS I & II:** Chapters 1-3, 4, 6-10
2. Grady Booch, James Rumbaugh, Ivar Jacobson, “The Unified Modeling Language User Guide” Pearson Education, New Delhi, 2004.
UNITS III, IV & V: Chapters: 1, 2 and 4, 5-20, 25, 26, 28, 30-32.

Reference Books:

1. Stephen R. Schach, “Introduction to Object Oriented Analysis and Design”, Tata McGraw-Hill, 2003.
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, “UML Toolkit”, OMG Press Wiley Publishing Inc., 2004.

Core III : Advanced Java Programming

Subject Code : 14PCS1C3

Hours : 6

Credits : 5

Max. Marks : 100

Internal Marks : 40

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 Exceptions.

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, Tabbed and Scroll Panes- The Life Cycle of a Servlet- GenericServlet class,HttpServlet class- Reading Servlet Parameters-Handling HTTP Request and Responses.

Text Book

1. Herbert Schildt, *The Complete Reference Java 2*, Fifth Edition, TMH Education Pvt. Ltd.

Reference Book

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

Core IV(a) : Advanced Java Programming Lab

Subject Code : 14PCS1C4P1

Hours : 3

Credits : 3

Max. Marks : 50

Internal Marks : 20

External Marks: 30

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 IV(b) : Assembler Programming Lab

Subject Code : 14PCS1C4P2
Hours : 3
Credits : 2

Max. Marks : 50
Internal Marks : 20
External Marks: 30

Assembly Language Program (using MASM):

1. 8-Bit Addition, Subtraction, Multiplication, Division
2. 16-Bit Addition, Subtraction, Multiplication, Division
3. Multibyte Addition, Subtraction
4. Summing the series of numbers in an array
5. Finding Biggest/Smallest number in an array of numbers
6. Block of data transfer
7. 1's complement of 8-bit number, 1's complement of 16-bit number,
2's complement of 8-bit number, 2's complement of 16-bit number
8. Shifting 8-bit number towards right, Shifting 8-bit number towards left,
Shifting 16-bit number towards right, Shifting 16-bit number towards left
9. Masking least significant 4-bits of 8-bit number,
Masking most significant 4-bits of 8-bit number
Masking LSB of 16-bit number
Masking MSB of 16-bit number
10. BCD to ASCII Conversion, ASCII to BCD Conversion
11. Packed BCD to Unpacked BCD Conversion, Unpacked BCD to Packed BCD Conversion
12. Comparison of two strings
13. Finding the length of the string
14. Finding number of occurrences of a character in a string
15. Sorting the array of elements in ascending/descending order

Core Based Elective – I : Microprocessors and Microcontrollers

Subject Code : 14PCS1CE1

Hours : 6

Credits : 5

Max. Marks : 100

Internal Marks: 40

External Marks: 60

Objectives

To realize the 8086 Microprocessor Architecture, Operations, Programming, and to understand the concepts of Embedded Systems and 8051 Microcontroller.

UNIT I

18 Hrs

8086 Architecture, Pin Configuration & Timing Diagram: Register Organization of 8086 – Architecture – Signal Description – Minimum Mode 8086 System and Timings – Maximum Mode 8086 System and Timings – The 8088.

UNIT II

18 Hrs

8086 Addressing Modes, Instruction Set and Assembler Directives: Machine Language Instruction Formats-Addressing Modes of 8086-Instruction Set of 8086: Data Transfer Instructions – Arithmetic Instructions – Logical Instructions – Rotate Instructions – Shift Instructions – Branch Instructions – Flag Manipulation and Processor Control Instructions – String Instructions – Interrupts and Interrupt Service Routines – Assembler Directives and Operators – Programming with an Assembler.

UNIT III

18 Hrs

8086 Assembly Language Programming: Addition, Subtraction, Multiplication and Division – Multi-byte Addition and Subtraction – Complements – Shifting – Masking – Sum of a Series – Block of Data Transfer – Finding the Smallest and the Biggest Number in an Array – Arranging a Series of Numbers in Ascending and Descending Order – Length of a String – Number of Occurrences of a Character in a String – Comparison of Two Strings

UNIT IV

18 Hrs

Introduction to Embedded Systems: An Embedded System – Processor in a System – Other Hardware Units – Software Embedded into a System – Exemplary Embedded Systems – Embedded System-On-Chip(SOC) and in VLSI Circuit

UNIT V

18 Hrs

Microcontroller 8051Architecture: Architecture of 8051 – Signal Descriptions of 8051-Register Set of 8051 – Important Operational Features of 8051 – Memory and I/O Addressing by 8051 – Interrupts of 8051-Instruction Set of 8051.

Text Books

1. A.K. Ray, K.M. Bhurchandi, *Advanced Microprocessors and Peripherals*, TMH Publications, Second Edition, 2009. (UNIT-I, UNIT-II, UNIT-III, UNIT-V)
2. Raj Kamal, *Embedded Systems - Architecture, Programming and Design*, TMH Publications, 2003. (UNIT-IV)

Core V : Design and Analysis of Algorithms

Subject Code : 14PCS2C5

Hours : 6

Credits : 5

Max. Marks : 100

Internal Marks : 40

External Marks: 60

Objectives:

To study the concepts of algorithms and analysis of algorithms using divide and conquer, greedy method, dynamic programming, backtracking, and branch and bound techniques.

UNIT I

18 Hrs

Introduction: Algorithm Definition – Algorithm Specification – Performance Analysis. Elementary Data Structures: Stacks and Queues – Trees – Dictionaries – Priority Queues – Sets and Disjoint Set Union – Graphs

UNIT II

18 Hrs

Divide and Conquer: The General Method – Defective Chessboard – Binary Search – Finding The Maximum And Minimum – Merge Sort – Quick Sort – Selection - Strassen's Matrix Multiplication.

UNIT III

18 Hrs

The Greedy Method: General Method - Container Loading - Knapsack Problem - Tree Vertex Splitting – Job Sequencing With Deadlines - Minimum Cost Spanning Trees - Optimal Storage On Tapes – Optimal Merge Patterns - Single Source Shortest Paths.

UNIT-IV

18Hrs

Dynamic Programming: The General Method – Multistage Graphs – All-Pairs Shortest Paths – Single-Source Shortest Paths - Optimal Binary Search Trees - String Editing - 0/1 Knapsack - Reliability Design - The Traveling Salesperson Problem - Flow Shop Scheduling.

Basic Traversal and Search Techniques: Techniques for Binary Trees – Techniques for Graphs – Connected Components and Spanning Trees – Biconnected Components and DFS.

UNIT-V

18 Hrs

Backtracking: The General Method – The 8-Queens Problem – Sum of Subsets – Graph

Coloring – Hamiltonian Cycles – Knapsack Problem

Branch and Bound: The Method - 0/1 Knapsack Problem.

Text Book

1. Ellis Horowitz, Satraj Sahni and Sanguthevar Rajasekaran, *Fundamentals of Computer Algorithms*, Universities Press, Second Edition, Reprint 2009.

Core VI : Advanced Computer Architecture

Subject Code : 14PCS2C6
Hours : 6
Credits : 5

Max. Marks : 100
Internal Marks : 40
External Marks: 60

Objectives:

To study the advanced computer Architecture, theories of parallel computing, network properties and applications of cost effective computer systems to meet the above requirements.

UNIT I

18 Hrs

Parallel computer models :- The state of computing - Multiprocessors and multicomputers – Multivector and SIMD computers.

UNIT II

18 Hrs

Program and Network properties:- Conditions of parallelism – Program partitioning and scheduling – program flow mechanisms – system interconnect architectures.

UNIT III

18 Hrs

Processors and memory hierarchy :- Advanced processor Technology – Super scalar and vector processors – Linear Pipeline Processors – Nonlinear pipeline Processors.

UNIT IV

18 Hrs

Multiprocessors and Multicomputers:- Multiprocessor System Interconnects – Message Passing Mechanisms – SIMD Computer Organizations – The Connection Machine CM 5 – Fine-Grain Multicomputers.

UNIT V

18 Hrs

Software for Parallel Programming:- Parallel Programming Models – Parallel Languages and Compilers – Dependence Analysis of Data Arrays.

Text Book

1. Kai Hwang, “Advanced Computer Architecture “, McGraw-Hill International Edn., Singapore , 1993. Chapters 1.1-1.3, 2, 4.1, 4.2, 6.2, 7.1, 7.4, 8 4, 8.5, 10.1, 10.2, 10.3

Reference Books:

1. Kai Hwang and Faye A.Briggs, “Computer Architecture and Parallel Processing”, McGraw-Hill International Editions, Singapore , 1985.

2. Michael J.Quinn, “Parallel Computing, Theory and Practice”, McGraw-Hill International Edn., Singapore , 1994.

Core VII : C# and .Net Framework

Subject Code : 14PCS2C7

Hours : 6

Credits : 5

Max. Marks : 100

Internal Marks : 40

External Marks: 60

Objectives:

To impart the basic fundamental knowledge of C# and .NET framework

UNIT I

18 Hrs

What is C#? – Why C#? – Evolution of C# - Characteristics of C# - Applications of C# - How does C# differ from C++ & Java – The origin of .Net Technology – The .Net framework – The Common Language Runtime - .Net Languages – Benefits of the .Net Approach – C# and the .Net – Literals – Variables – Data Types – Declaration and initialization of variables – Constant variables – Scope of Variables – Boxing and unboxing.

UNIT II

18 Hrs

Operators in C# - Expressions in C# - Decision making with if statement – Simple if statement – if..else statement – nested if..else statement – else if ladder – switch statement – ?: operator – while statement – do statement – for statement – foreach statement – jumps in loops – Declaring methods – main methods – invoking methods – nesting of methods – pass by value – pass by reference – Handling arrays in C#

UNIT – III

18 Hrs

Delegates – declaration – methods – instantiation – invocation – using delegates – multicast delegates – events – console class – console input – console output – formatted output – numeric formatting – types of errors – exceptions – syntax of exception handling – multiple catch statements – nested try blocks – throwing our own exceptions – checked and unchecked operators.

UNIT IV

18 Hrs

The IDE main window – Class view window – object browser – code window – compiling the code – code debugging – developing a simple vb.net console application – developing a simple vb.net project – Text box – Label – Button – RadioButton – CheckBox – GroupBox – ListBox – CheckedListBox – ComboBox.

UNIT V

18 Hrs

Database connectivity – Advantages of ADO.NET – Data providers – creation of a data table – retrieving data from tables – table updating – disconnected data access through dataset object – Server side controls – Calendar control – AdRotator control – Validation controls – List controls.

Text Books:

1."Programming in C#", E. Balagurusamy, Tata McGraw-Hill, 2006.

UNIT I: Chapters 1, 2, 4

UNIT II: Chapters 5, 6, 7, 8, 9

UNIT III: Chapters 16, 17, 18

2. “Visual Basic.Net”, C. Muthu, Vijay Nicole Imprints Private Limited, 2007.

UNIT IV: Chapters 2, 3, 4

UNIT V: Chapters 15, 16, 17

Reference Books:

1. Art Gittleman, "Computing with C# & the .NET Framework", Jones & Bartlett Learning, 2011

2. Herbert Schildt, "The Complete Reference: C#", Tata McGraw-Hill, 2004.

3. Andrew Troelsen, "C# and the .NET Platform", A! Press, 2003.

Core VIII : C# and .Net Lab

Subject Code : 14PCS2C8P
Hours : 6
Credits : 5

Max. Marks : 100
Internal Marks : 40
External Marks: 60

1. Write a C# program to read two integer values using the methods **Console.ReadLine()** and **int.Parse()** and then display their
 - Sum
 - Difference
 - Product
 - Integer Division
 - Modulus Division
2. Write a C# program to convert the given temperature in fahrenheit to celcius and display the values in a tabular form.
3. Programs in C# using if statement, if..else statement, nested if..else statement
4. Programs in C# using if else ladder and switch statement
5. Write a C# program to print the multiplication table using do..while loop
6. Programs in C# using pass by value and pass by reference methods.
7. Write a C# program that uses a method to sort an array of integers.
8. Write a C# program to sort a list of numbers using arrays.
9. Write a C# program to create and implement a delegate.
10. Write a C# program to create and implement an event handler.
11. Write a C# program using try and catch for exception handling
12. Write a C# program to implement nested try blocks.
13. Setting up and using Adrotator control
14. Making use of list box, check box and radio button controls.
15. Making use required field validator and compare validator controls.
16. Database connectivity through connected approach.

Core Based Elective – II : Wireless and Mobile Communication

Subject Code : 14PCS2CE2

Hours : 6

Credits : 5

Max. Marks : 100

Internal Marks : 40

External Marks: 60

Objectives:

To impart the basic knowledge of wireless and mobile communication.

UNIT I 18 Hrs

Introduction: Advantages of Digital Information – Introduction to Telephone System: Telephones – Control Functions – Telephone Traffic – Switching – Wireless Information Networks - Information Transmission – Cross Talk – Transmission Links - State Diagram for Telephone Network – Modems: Mobile Communication: Need for Mobile Communication - Requirements of Mobile Communication - History of Mobile Communication - Properties of Wireless Medium

UNIT II 18 Hrs

Introduction to Cellular Mobile Communication - Cellular Structure - Frequency Reuse - System Architecture - Traffic and Switching Techniques Mobile Communication Standards: Generation of Wireless Networks - Standards Organization - Global System for Mobile Communication - GSM Architecture - Advanced Mobile Phone Service - Digital Advanced Mobile Phone Service - Cordless Telephony Standards - Personal Access Communication Standards - Third Generation Wireless Standards.

UNIT III 18 Hrs

Mobility Management: Handoff Techniques - Handoff Detection and Assignment - Types of Handoff - Radio Link Transfer - Roaming Management. Frequency Management: Cellular System Spectrum - Adaptive Channel Allocation - Frequency Division - Spectrum Utilization - Channel Reservation for Handoff Calls - Control Channels - Channel Assignment Methods - Cell Splitting

UNIT IV 18 Hrs

Cordless Mobile Communication Systems - Multichannel Cordless Telephone System - Wireless Private Box Exchanges. Mobile Computing: Classification Of Mobile Data Networks - Cellular Digital Packet Data. Satellites in Mobile Communication - Satellite Classification - Global Satellite Communication - Changeover Form One Satellite to Other. Global Mobile Communication: .Requirements of Global Communication - Global User Number System Configuration - Third Generation Global Mobile System - Satellite Systems for Global Mobility

UNIT V 18 Hrs

Wireless Network Security: Wireless Threats - Authentication and Access Control - Secrecy in Communication - Security Arrangement in CDMA - Security of Wireless Data Networks. Wireless Local Loop Architecture: Components in WLL - Problems in WLL - Modern Wireless Local Loop - Local Multipoint Distribution Service. Wireless Application Protocol: Properties of WAP - Bearer Services - WAP Components Integration - WAP Client Supporting Networks.

Text Book:

1. T.G. Palanivelu and R.Nakkeran, Wireless and Mobile Communication, PHI Learning Private Limited. 2011.

Core IX : Distributed Operating Systems

Subject Code : 14PCS3C9
Hours : 6
Credits : 5

Max. Marks : 100
Internal Marks : 40
External Marks: 60

Objectives

To provide fundamentals of distributed operating systems and insight study of DOS features such as message passing, distributed shared memory, synchronizations, distributed file systems and the case study of Windows Vista

UNIT I

18 Hrs

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 II

18 Hrs

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 III

18 Hrs

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 IV

18 Hrs

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

UNIT V

18 Hrs

CASE STUDY: WINDOWS VISTA History of Windows Vista – Programming Windows Vista – System Structure – Processes and Threads in Windows Vista – Memory Management – Input/Output in Windows Vista – Security in Windows Vista

Text Book

1. Pradeep K. Sinha, *Distributed Operating Systems Concepts and Design*, PHI Pvt. Ltd, 2008.
UNIT I : Chapter 1 (1.1, 1.3, 1.5, 1.6, 1.7) & Chapter 2
UNIT II : Chapter 3
UNIT III : Chapter 5 & 6
UNIT IV : Chapter 9
2. Andrew S. Tanenbaum, *Modern Operating Systems*, PHI Pvt. Ltd., Third Edition, 2010
UNIT V : Chapter 11

Core X : Data Warehousing and Data Mining

Subject Code : 14PCS3C10

Hours : 6

Credits : 5

Max. Marks : 100

Internal Marks : 40

External Marks: 60

Objectives

To understand the practical methods and techniques for building a data warehouse. To understand data mining concepts, tasks and their techniques.

UNIT I

18 Hrs

Data Warehousing: Definition – Functional Requirements – Data Mart – MIS – Three Possible Approaches – Data Warehouse Usage Survey – Data Warehouse Characteristics – Data Warehouse Environment : Architecture Perspective – Software Architecture – A General Perspective, Three Layers – Software Architecture Design – Nonfunctional Architecture - Decision Support System Reference Architecture – Dimensions of a Data Warehouse Environment Architecture – Data Warehouse Environment Reference Architecture Functional Dimension – Data Dimension.

UNIT II

18 Hrs

Modeling and Design Techniques for the Central Data Warehouse – Basic Principles of Data Warehouse Modeling – User Requirements Capturing - Assessment and Prototyping – Requirements Modeling – Temporal Data Modeling – Styles – Conceptual Modeling – Restructuring the Temporal Model – Central Data Warehouse Design – Adding Temporal Domain Models – Building the Temporal Domain Model - Design of Generic Structures – Basic Temporal Design Techniques – Design for Query and Extract Performance – Data Partitioning.

UNIT III

18 Hrs

Data Mining : Introduction – Definitions – KDD vs Data Mining – DBMS vs DM – Other Related Areas – DM Techniques – Other Mining Problems – Issues and Challenges in Data Mining – DM Application Areas – Case Studies – Association Rules : Introduction – Methods to Discover Association Rules – A Priori Algorithm – Partition Algorithm – Pincer-Search Algorithm – Dynamic Itemset Counting Algorithm.

UNIT IV

18 Hrs

Clustering Techniques : Introduction – Clustering Paradigms – Partitioning Algorithms – *k*-Medoid Algorithms – Hierarchical Clustering – Categorical Clustering Algorithms – Decision Trees : Tree Construction Principle – Best Split – Splitting Indices, Criteria – Decision Tree Construction Algorithms – Decision Tree Construction with Presorting – Approximate Methods – Pruning Technique.

UNIT V

18 Hrs

Web Mining : Web Content Mining – Web Structure Mining – Web Usage Mining – Text Mining – Unstructured Text – Text Clustering – Temporal and Spatial Data Mining : Temporal Association Rules – Sequence Mining – The GSP Algorithm – Event Prediction – Problem – Time-Series Analysis – Spatial Mining – Spatial Mining Tasks – Spatial Clustering - Trends.

Text Books

1. IBM, *An Introduction to Building the Data Warehouse*, Prentice Hall of India, 2005.

UNIT I: Chapters I & II

UNIT II: Chapter III

2. Arun K Pujari, *Data Mining Techniques*, University Press, Tenth Edition, 2006.

UNIT III: Chapters III & IV

UNIT IV: Chapters V & VI

UNIT V: Chapters VIII & IX

Core XI : Principles of Compiler Design

Subject Code : 14PCS3C11

Hours : 6

Credits : 5

Max. Marks : 100

Internal Marks : 40

External Marks: 60

Objectives

To understand the various phases of a compiler and to develop skills in designing a compiler.

UNIT I

18 Hrs

Compiler - Phases of Compiler – Compiler writing tools – Lexical Analysis – Role of Lexical analyzer – Finite Automata – Regular Expression – From a Regular expression to an NFA , NFA to DFA – Design of Lexical Analyzer.

UNIT II

18 Hrs

Syntax Analyzer – CFG – Role of the Parser – CFG – Top Down Parsing – Recursive Descent Parsing, Predictive Parsers – Bottom up Parsing – Shift Reduce, Operator Precedence Parsers, LR Parsers.

UNIT III

18 Hrs

Syntax Directed Definition: Construction of Syntax Trees – Intermediate Code Generation – Intermediate Languages – Syntax Trees, Post Fix Form, Three Address Code – Boolean Expressions – Back Patching.

UNIT IV

18 Hrs

Symbol Table – Contents of Symbol Table – Data Structures for Symbol Table – Runtime Storage Administration – Implementation of Stack Allocation Scheme Block Structured Languages – Storage Allocation in Fortran.

UNIT V

18 Hrs

Code Optimization and Code Generation – Principles Sources of Optimization – Loop Optimization – Dag Representation of Basic Blocks. Code Generation – Problems in Code Generation – A Simple Code Generator – Register Allocation and Assignment – Peephole Optimization.

Text Books

1. Alfred V.Aho, Ravi Sethi, Jeffrey D.Ullman, *Compilers Principles , Techniques and Tools*, Narosa Publishing House, New Delhi.
Chapter 1 : (1.1,1.3), Chapter 3: (3.1,3.6,3.7,3.9), Chapter 4: (4.1,4.2,4.4 – 4.6),
Chapter 5: (5.1,5.2), Chapter 7: (7.5), Chapter 8: (8.1,8.4)
2. Alfred V.Aho, Jeffery D. Ullman, *Principles of Compiler Design*, Narosa Publishing House, New Delhi.
Chapter 9: (9.1,9.2), Chapter 10: (10.1,10.2,10.3),
Chapter 12: (12.1,12.2,12.3), Chapter 15: (15.2,15.4,15.5,15.7)

Core XII(a) : Open Source Technology

Subject Code : 14PCS3C12
Hours : 3
Credits : 3

Max. Marks : 50
Internal Marks : 20
External Marks: 30

Objectives

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

UNIT I 9 Hrs

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

UNIT II 9 Hrs

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 9 Hrs

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 – .htaccess

UNIT IV 9 Hrs

Introduction to MY SQL: The Show Databases and Create Database – The USE command – Create Tables and Show Table – Describe Table – Insert, Select, Update, and Delete statement – Table Joins – Loading and Dumping a Database.

UNIT V 9 Hrs

PHP Introduction: Embedding PHP with HTML – Language Syntax – Variables – Data Types – Operators – Flow control constructs – Writing PHP functions – Array functions – String functions – MySQL functions.

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 XII(b) : Open Source Lab

Subject Code : 14PCS3C12P
Hours : 3
Credits : 2

Max. Marks : 50
Internal Marks : 20
External Marks: 30

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 Based Elective - III : Grid Computing

Subject Code : 14PCS3CE3

Hours : 6

Credits : 5

Max. Marks : 100

Internal Marks : 40

External Marks: 60

Objectives:

To introduce the basic concept of Grid computing. To provide the overall knowledge of Grid computing.

UNIT I

18 Hrs

Introduction: Early and Current Grid Activities – An Overview of Grid Business Areas – Applications – Infrastructure. Grid Computing Organization and their Roles: Standards and Guidelines – Tool Kits and Framework – Grid-Based Solution to Solve Computing, Data and Network Requirements.

UNIT II

18 Hrs

The Grid Computing Anatomy: The Grid Problem – Concept of Virtual Organizations – Architecture. The Grid Computing Road Map: Autonomic Computing – Business on Demand and Infrastructure Virtualization – Service-oriented Architecture and Grid – Semantic Grids.

UNIT III

18 Hrs

Merging Grid Services Architecture with the Web Services Architecture: Service- Oriented Architecture – Web Service Architecture – XML, Related Technologies – XML. Messages and Enveloping – Service Message Description Mechanisms – Relationship between Web Service and Grid Service. Open Grid Services Architecture (OGSA): Architecture.

UNIT IV

18 Hrs

Some Sample Use Cases that Drive that Drive the OGSA: Commercial Data Center – National Fusion Collaboratory (NFS) – Online Media and Entertainment. Open Grid Services Infra Structure (OGSI): Grid Services – Specification – Service Data Concepts – Naming and Change Management Recommendations.

UNIT V

18 Hrs

OGSA Basic Services: Common Management Model – Service Domains – Policy Architecture – Security Architecture – Metering and Accounting – Common Distributed Logging – Distributed Data Access and Replication. Case Study: GLOBUS – The Grid Computing Toolkit.

Text Book

1. Joshy Joseph and Craig Fellenstein, *Grid Computing*, Pearson Education, 2005.

UNIT – I: Chapters 1,2

UNIT – II: Chapters 3,4

UNIT – III: Chapters 5,6

UNIT – IV: Chapters 7,9

UNIT – V: Chapters 10,11

Reference Book

2. S. Jaya Krishna, *Grid Computing*, ICFAI University Press, 2006.

Extra Credit – 1 : Cloud Computing

Subject Code : 14PCS3EC1
Hours : -
Credits : 5

Max. Marks : 100
Internal Marks : -
External Marks: 100

Objectives:

To study the concepts and methods of cloud computing using security, and disaster recovery techniques.

UNIT I

Cloud Computing: The cloud – Cloud Application Architecture – The value of cloud computing – Cloud Infrastructure Models – An overview of Amazon Web Services. **Amazon Cloud Computing:** Amazon S3 – Amazon EC2.

UNIT II

Moving into the Cloud: Software Licenses – The Shift to Cloud Cost Model – Service Levels for Cloud Applications – Security – Disaster Recovery.

UNIT III

Getting Ready for the Cloud: Web Application Design – Machine Image Design – Privacy Design – Database Management.

UNIT IV

Security: Data Security – Network Security – Host Security – Compromise Response.

UNIT V

Disaster Recovery: Disaster Recovery Planning – Disasters in the Cloud – Disaster Management. **Scaling A Cloud Infrastructure:** Capacity Planning – Cloud Scale.

Text Book

1. George Reese, *Cloud Application Architectures*, O'Reilly Publication, First Edition, April 2009, ISBN: 13: 978-81-8404-714-1.

Reference Book

1. Michael Miller, *Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online*, Que Publication, First Print, August 2008, ISBN-13: 978-0-7897-3803-5 ISBN-10: 0-7897-3803-1

Core - XIII : Middleware Technology

Subject Code : 14PCS4CE4

Hours : 6

Credits : 5

Max. Marks : 100

Internal Marks : 40

External Marks: 60

Objectives:

To understand the concepts of middleware technologies

UNIT- I

18 Hrs

Client-Server architecture: 2-tier model – 3-tier model – n-tier model – J2EE architecture – DOTNET architecture – MVC architecture.

UNIT- II

18 Hrs

Présentation services: Servlets – JSP – Interaction services: RMI – CORBA – XML – JAXP - JMS – Data Management services: JDBC

UNIT- III

18 Hrs

Component model: EJB : Session Beans : Stateless and Stateful – Entity Beans – CMP and BMP - Message Driven Beans

UNIT- IV

18 Hrs

ASP.NET : Introduction – architecture – ASP.NET Runtime – Internet Information Services – Visual Web Developer Web Server – ASP.NET Parser – Assembly – Page class. Web Server Controls – HTML Controls – AdRotator and Calendar controls – Validation Controls – Security Management.

UNIT- V

18 Hrs

ASP.NET and ADO.NET: System.Data, SqlClient and Xml namespaces – Provider objects and Consumer objects – Disconnected data access – GridView FormView. Web Services: Provider – WSDL – UDDI – SOAP – HTTP – Developing simple web services.

Text Books

1. James McGovern and Rahim Adatia, *J2EE 1.4 Bible*, Willey India Pvt. Ltd, New Delhi.
2. Richard Monson Haefel, *Enterprise Java Beans*, O'Reilly, Fourth Edition.

Core XIV : Middleware Technology Lab

Subject Code : 14PCS4CE5

Hours : 6

Credits : 5

Max. Marks : 100

Internal Marks : 40

External Marks: 60

1. a) Develop a server side application to display a welcome message on the browser by using servlets.
b) Develop an JSP application for user authentication.
2. Develop a simple RMI application for
 - a) Downloading and uploading files on the server by using multiple clients.
 - b) Display the Factorial of the given number.
3. Develop a simple J2EE application for
 - a) To display the student information system using stateful session beans.
 - b) To display the database record contents by using CMB entity beans.
4. Design a web page that makes uses of Ad Rotator Control
5. Design a web page involving Multi View or Wizard Control.
6. Create a table and insert a few records using Disconnected Access.
7. Develop a project to update and delete few records using Disconnected Access.
8. Develop a project to view the records using GridView, DetailsView, FormView Controls.
9. Data view with the help of grid view control.
10. Designing a ASP.Net client for web service.

Extra Credit – 2 : Network Management

Subject Code : 14PCS4EC2

Hours : -

Credits : 5

Max. Marks : 100

Internal Marks : -

External Marks: 100

Objectives:

This course provides an insight to network concepts, technologies. At the end of the course the students will have a bird's eye view of how network is implemented in the real world.

UNIT-I

Line Configuration – Topology – Transmission Mode – Categories of Network – Internetworks – OSI Model – Layered Architecture – Functions of the Layer – TCP/IP Protocol suite.

UNIT-II

Guided Media – Unguided Media – Transmission impairment – Performance – Networking Devices – Repeaters – Bridges – Routers – Gateways – Other devices

UNIT-III

LAN overview – Protocol & Standards – LAN Services – LAN Operating Systems Internet Architecture : Internet Protocol (IP) and Datagrams – Routing Protocols – UDP – TCP – Internet Standard Services – DNS

UNIT-IV

ISDN – Cable Modem – DSL – Frame Relay – Fast Ethernet – Gigabit Ethernet – ATM – SONET

UNIT-V

Software Architecture – Serial Port and Parallel Port programming – NetBIOS, TCP/IP and Socket Programming - Winsock and RPC Programming

Text Books:

1. Behrouz A.Forouzan, “Data Communication and Networking”, 2nd edition, McGraw Hill International , 2000. **(Unit I & II - Chapter 2, 3, 7, 21.1 to 21.5).**
2. Youlu Zheng, Shakil Akhtar, “Networks for Computer Scientists and Engineers”, Oxford University Press,2002 **(Unit-III,IV&V – Chapter 4(except 4.3), 5,6(except 6.4 & 6.7),11)**

Reference Book

1. Greg Tomsho, ED Titiel, David Johnson, ”Guide to Network Essentials”, Fifth Edition, Centage Learning, Indian Edition.

Project Work

Semester : IV

Subject Code : 14PCSPW

Hours : 18

Credits : 5

Max. Marks : 100

Internal Marks : 40

External Marks: 60

Students carry out a project in software development companies