

**DEPARTMENT OF INFORMATION TECHNOLOGY
JAMAL MOHAMED COLLEGE (AUTONOMOUS)
TIRUCHIRAPPALLI – 620020**



**MASTER OF SCIENCE (COMPUTER SCIENCE)
SYLLABUS – 2017
UNDER CHOICE BASED CREDIT SYSTEM**

JAMAL MOHAMED COLLEGE (Autonomous), Tiruchirappalli-620 020

M.Sc. Programme –Course Structure under CBCS

(For the candidate admitted from the academic year 2017-2018 onwards)

| SEM | Course Code | Course | Course Title | Ins.Hrs / Week | Credit | Marks | | Total | |
|--------------------|---------------|-------------------|--|----------------|-----------|-----------|-----|------------|-------------|
| | | | | | | CIA | ESE | | |
| I | 17PCS1C1 | Core- I | Advanced Java Programming | 6 | 5 | 25 | 75 | 100 | |
| | 17PCS1C2 | Core – II | Python Programming | 6 | 5 | 25 | 75 | 100 | |
| | 17PCS1C3 | Core- III | Mathematical Foundations | 6 | 4 | 25 | 75 | 100 | |
| | 17PCS1C4P1 | Core- IV A | Advanced Java Programming Lab | 3 | 2 | 10 | 40 | 50 | |
| | 17PCS1C4P2 | Core- IV B | Python Programming Lab | 3 | 2 | 10 | 40 | 50 | |
| | 17PCS1CE1 A/B | Elective- I # | | 6 | 4 | 25 | 75 | 100 | |
| | TOTAL | | | | 30 | 22 | | | 500 |
| II | 17PCS2C5 | Core- V | Distributed Database Systems | 6 | 5 | 25 | 75 | 100 | |
| | 17PCS2C6 | Core- VI | Open Source Technology | 6 | 5 | 25 | 75 | 100 | |
| | 17PCS2C7 | Core- VII | Design and Analysis of Algorithms | 6 | 4 | 25 | 75 | 100 | |
| | 17PCS2C8P1 | Core- VIII A | RDBMS Lab | 3 | 2 | 10 | 40 | 50 | |
| | 17PCS2C8P2 | Core- VIII B | Open Source Lab | 3 | 2 | 10 | 40 | 50 | |
| | 17PCS2CE2 A/B | Elective- II # | | 6 | 4 | 25 | 75 | 100 | |
| | TOTAL | | | | 30 | 22 | | | 500 |
| III | 17PCS3C9 | Core- IX | .Net Technologies | 6 | 5 | 25 | 75 | 100 | |
| | 17PCS3C10 | Core- X | Principles of Compiler Design | 6 | 5 | 25 | 75 | 100 | |
| | 17PCS3C11 | Core- XI | Distributed Operating Systems | 6 | 4 | 25 | 75 | 100 | |
| | 17PCS3C12P1 | Core- XII A | .Net Technologies Lab | 3 | 2 | 10 | 40 | 50 | |
| | 17PCS3C12P2 | Core- XII B | Microprocessor Lab | 3 | 2 | 10 | 40 | 50 | |
| | 17PCS3CE3 A/B | Elective- III # | | 6 | 4 | 25 | 75 | 100 | |
| | 17PCS3EC1 | Extra Credit - I | J2EE Technology | - | 5* | - | 100 | 100* | |
| TOTAL | | | | 30 | 22 | | | 500 | |
| IV | 17PCS4C13 | Core- XIII | Middleware Technology | 6 | 5 | 25 | 75 | 100 | |
| | 17PCS4C14P | Core- XIV | Middleware Technology Lab | 6 | 5 | 20 | 80 | 100 | |
| | 17PCS4PW | Project | | 18 | 14 | - | 300 | 300 | |
| | 17PCS4EC2 | Extra Credit - II | Software testing and Quality Assurance | - | 5* | - | 100 | 100* | |
| | TOTAL | | | | 30 | 24 | | | 500 |
| GRAND TOTAL | | | | | | 90 | | | 2000 |

*Not considered for grand total and CGPA

Core Based Electives

| SEMESTER | COURSE CODE | COURSE TITLE |
|----------|-------------|--------------------------------------|
| I | 17PCS1CE1A | Advanced Computer Architecture |
| | 17PCS1CE1B | Embedded Systems |
| II | 17PCS2CE2A | Computer Networks |
| | 17PCS2CE2B | Cryptography and Network Security |
| III | 17PCS3CE3A | Microprocessors and Microcontrollers |
| | 17PCS3CE3B | Cloud computing |

SEMESTER- I: CORE - I: ADVANCED JAVA PROGRAMMING

Course Code : 17PCS1C1

Hours/Week : 6

Credit : 5

Maximum Marks : 100

Internal Marks : 25

External Marks : 75

Objective

To impart sound knowledge in Object Oriented Programming skills in JAVA

UNIT I

18 Hours

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. Inheritance: Inheritance Basics – Using super – Method overriding –Dynamic Method Dispatch- Using Abstract Class

UNIT II

18 Hours

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. Multithreaded Programming: The Java Thread Model – Creating a Thread – Thread Priorities - String Handling

UNIT III

18 Hours

The Collection Interfaces and Utility Classes: List, Set, Map, Enumeration - ArrayList, LinkedList, Vector, Stack, StringTokenizer and Date classes. Files and IO Streams: File – The Byte Streams:FileInputStream – FileOutputStream – SequenceInputStream – PrintStream. The Character Streams: FileReader – FileWriter – BufferedReader -BufferedWriter – Serialization

UNIT IV

18 Hours

Networking: Networking Basics – InetAddress- TCP/IP Client and Server Sockets–URL-Datagrams. Java Database Connectivity: Establishing a connection – Creation of data tables – Entering data into table – Table Updating – Use of PreparedStatement – obtaining metadata – using transactions

UNIT V

18 Hours

Understanding Layout Managers – Event Handling: Event Model – Event Classes – Event Listeners and Interfaces. Swing Component classes: Icons and JLabels - JText Fields – JButtons - JCombo boxes - JTabbed and JScroll Panes – JTrees– JTables

Text Books

1. Herbert Schildt, The Complete Reference Java 2, Fifth Edition, TMH Education Pvt. Ltd., 2002

UNIT I : Chapter 6, 7, 8

UNIT II : Chapter 9, 10, 11

UNIT III : Chapter 15, 17

UNIT IV : Chapter 18

UNIT V : Chapter 20, 26

2. C. Muthu, Programming with Java, Vijay Nicole imprints private Limited, 2004

UNIT IV : Chapter 18

Reference Book

Herbert Schildt with Joe O' Neil, Java – Programmer's Reference, TMH, 2004

SEMESTER– I: CORE – II: PYTHON PROGRAMMING

Course Code : 17PCS1C2
Hours/Week : 6
Credit : 5

Maximum Marks : 100
Internal Marks : 25
External Marks : 75

Objective

To provide fundamental concepts of python programming

UNIT I

18 Hours

Welcome to Python - What is Python – History of Python – Features of Python – Installing Python – Running Python - Comments - Operators - Variables and Assignment - Python Objects - Standard Types - Other Built-in Types - Internal Types - Standard Type Operators - Standard Type Built-in Functions - Categorizing the Standard Types - Unsupported Types

UNIT II

18 Hours

Introduction to Numbers – Integers - Floating Point Real Numbers - Complex Numbers – Operators - Built-in Functions - Sequences – Strings - Strings and Operators - String-only Operators - Built-in Functions - String Built-in Methods - Special Features of Strings

UNIT III

18 Hours

Lists – Operators - Built-in Functions - List Type Built-in Methods - Special Features of Lists - Tuples - Tuple Operators and Built-in Functions - Special Features of Tuples - Conditionals and Loops - if statement - else statement - else if statement - while statement - for statement - break statement - continue statement - pass statement - else statement

UNIT IV

18 Hours

Regular Expressions – Introduction – Special symbols and characters for Regular Expressions – Regular Expressions and Python – Network Programming – Introduction – Network programming in Python – Sockets : Communication end points

UNIT V

18 Hours

GUI Programming with TKinter – Introduction TKinter and Python Programming – Tkinter examples – Related modules and other GUIs – Web programming – Web surfing with Python – Advanced web clients.

Text Book

Chun, J Wesley, CORE Python Programming, 2nd Edition, Pearson, 2007 Reprint 2010.

| | | | |
|-----------------|-------------------|----------------|------------------|
| UNIT I | : Chapter 1, 2, 4 | UNIT II | : Chapter 5, 6 |
| UNIT III | : Chapter 6, 8 | UNIT IV | : Chapter 15, 16 |
| UNIT V | : Chapter 18, 19 | | |

Reference Book

Jeffrey Elkner, Chris Meyers Allen Downey, Learning with Python, Dreamtech Press, 2015

SEMESTER– I: CORE – III: MATHEMATICAL FOUNDATIONS

Subject Code : 17PCS1C3

Hours/Week : 6

Credits : 4

Maximum Marks : 100

Internal Marks : 25

External Marks : 75

Objective

To provide the knowledge of recurrence relations, formal languages, mathematical logic, Graphs, Sets and Functions

UNIT I

18 Hours

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 Hours

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 Hours

Modeling Computation: Introduction, Russell Paradox and Noncomputability, Ordered Sets, Languages, Phrase-Structure Grammars, Types of Phrase-Structure Grammars and Languages, Counting: Basics of Counting – Pigeonhole Principle – Permutations and Combinations – Binomial Coefficient

UNIT IV

18 Hours

Graphs and Planar Graphs: Basic Terminology, Multigraphs and Weighted Graphs, Digraphs and Relations, Representation of Graphs, Operations on Graphs, Paths and Circuits, Graph Traversals

UNIT V

18 Hours

Basic Structures: Sets, Functions, Sequences and Sums: Sets, Set Operations, Functions, Recursive Functions.

Text Books

1. C.L. Liu and D. P. Mohapatra, Elements of Discrete Mathematics. A Computer Oriented Approach, Tata McGraw-Hill Publishing Education (India) Private Limited, New Delhi, Fourth Edition, Second Reprint, 2013.

UNIT I : Chapter 9 (9.1 - 9.8) **UNIT III** : Chapter 6 (6.1 - 6.6)

UNIT IV : Chapter 4 (4.2-4.5 (4.5.1-4.5.2), 4.6-4.8 (4.8.1-4.8.4))

2. J.P. Tremblay and R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw-Hill Education Private Limited, 38th reprint 2010

UNIT II : Chapter 1 (1.1, 1.2 (1.2.1-1.2.3, 1.2.6, 1.2.8, 1.2.11), 1.3, 1.4)

3. Kenneth H Rosen, Discrete Mathematics and Its Applications with Combinatorics and Graph Theory, Tata McGraw-Hill Education (India) Private Limited, New Delhi, Seventh Edition, 6th reprint, 2013

UNIT III : Chapter 5 (5.1 - 5.4) **UNIT V** : Chapter 2 (2.1-2.4)

Reference Book

G. Shankar Rao, Mathematical Foundations of Computer Science, I. K. International Pvt Ltd, 2006

SEMESTER I: CORE – IV A: ADVANCED JAVA PROGRAMMING LAB

Subject Code : 17PCS1C4P1

Hours/Week : 3

Credits : 2

Maximum Marks : 50

Internal Marks : 10

External Marks : 40

1. Program to find area and circumference of a circle using class and object.
2. Program to find area & volume of rectangle using inheritance.
3. Program to illustrate the use of abstract methods
4. Program to prepare students mark sheet using package concept.
5. Program to demonstrate the multilevel inheritance using Net Beans.
6. Program to create a thread using Thread class and Runnable interface in Net Beans.
7. Program to arrange the given names in alphabetical order and display the number of names in palindrome using Net Beans
8. Program to demonstrate various Vector operations using Net Beans.
9. Program to print the contents of ArrayList in reverse order using Net Beans.
10. Program to list of all files and folder of a given directory using Net Beans.
11. Program to merge the two files using SequenceInputStream using Net Beans.
12. Program to find the machine and host IP address using Net Beans.
13. Program to send a file from one system to another using TCP/IP model.
14. Program to prepare EB-Bill with database JDBC using Net Beans.
15. Program to create a simple calculator using swing controls using Net Beans.
16. Program to prepare an employee salary report using Table in swing.

SEMESTER – I: CORE – IV B: PYTHON PROGRAMMING LAB

Subject Code : 17PCS1C4P2

Hours/Week : 3

Credit : 2

Maximum Marks : 50

Internal Marks : 10

External Marks : 40

1. Program to demonstrate arithmetic operations.
2. Program using numbers and operators.
3. Program to demonstrate string manipulation.
4. Program using user defined functions.
5. Program using lists.
6. Program using tuples.
7. Program using conditional statement.
8. Program using looping statement.
9. Program using continue, pass and else statement.
10. Program to demonstrate the use of regular expressions.
11. Program to demonstrate exception handling.
12. Program to demonstrate network programming.
13. Program to demonstrate GUI programming with Tkinter.
14. Program using web programming.
15. Program using advanced web clients.

SEMESTER - I: ELECTIVE – I: ADVANCED COMPUTER ARCHITECTURE

Course Code : 17PCS1CE1A
Hours/Week : 6
Credit : 4

Maximum Marks : 100
Internal Marks : 25
External Marks : 75

Objectives

To study the advanced computer Architecture, theories of parallel computing, network properties and applications of cost effective computer systems

UNIT I

18 Hours

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

UNIT II

18 Hours

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

UNIT III

18 Hours

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

UNIT IV

18 Hours

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

UNIT V

18 Hours

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

..... # **Self-study portion**

Text Book

Kai Hwang, “Advanced Computer Architecture, “McGraw-Hill International Edition Singapore, 1993.Chapters 1.1-1.3,2,4.1, 4.2, 6.2, 7.1, 7.4,84, 8.5, 10.1, 10.2, 10.3

UNIT I : Chapter I: Section 1.1 – 1.3

UNIT II : Chapter II: Section 2.1 – 2.3

UNIT III : Chapter IV: Section 4.1, 4.2

UNIT IV : Chapter VII: Section 7.1 – 7.4, Chapter VIII: Section 8.5, Chapter IX: Section 9.3

UNIT V : Chapter X: Section 10.1 – 10.2

Books for Reference

1. Kai Hwang and Faye A.Briggs, “Computer Architecture and Parallel Processing”, McGraw-Hill International Edition, Singapore, 1985.
2. Michael J.Quinn, “Parallel Computing, Theory and Practice”, McGrawHill, International Edition, Singapore, 1994.

SEMESTER - I: ELECTIVE – I: EMBEDDED SYSTEMS

Course Code : 17PCS1CE1B
Hours/Week : 6
Credit : 4

Maximum Marks : 100
Internal Marks : 25
External Marks : 75

Objective

To provide fundamental concepts of embedded systems, programming and real time operating systems.

UNIT I

18 Hours

Introduction to Embedded systems: Embedded Systems – Processor embedded into a system – software embedded in a system – Embedded hardware units and devices in a system – Embedded system on chip (SoC) – Complex system design and processors – Design process in embedded system - Challenges in Embedded system – Design examples in Embedded System – # Classification in Embedded System #

UNIT II

18 Hours

Devices and Communication buses for Devices Network: I/O types and examples – Serial communication devices – Parallel device ports – Interfacing features in device ports – Wireless devices – Timer and counting devices – Watchdog timer – Network embedded systems – Serial bus communication protocols – # Parallel bus device protocols #– Internet enabled systems

UNIT III

18 Hours

Device Drivers – interrupt service mechanism – Interrupt sources – Multiple interrupts – Direct memory access – Direct Memory Access - Device driver programming. Interprocess communication and synchronization of processes, threads and tasks – Multiple process in an application – Multiple threads in an application – Tasks – Task states – Semaphores – Semaphore functions – Message queue functions – Pipe functions – Socket functions – # RPC functions #

UNIT IV

18 Hours

Programming concepts and embedded programming in C,C++ and Java – Software programming in Assembly Language (ALP) and in high level language C – C program elements : Header and source files and preprocessor directives – Program elements : Macros and functions – data types, data structures, modifiers, statements, loops and pointers – Object oriented programming – Embedded programming in C++ - Embedded programming in Java. Program modeling concepts: Program Models – DFG models – Modeling of multiprocessor systems.

UNIT V

18 Hours

Real-Time operating systems: OS services – process management – Timer functions – Event functions – Device , File and I/O subsystems management – Interrupt routines in RTOS Environment and Handling of Interrupt source calls – Real time operating system – Basic design using an RTOS – RTOS task scheduling models, interrupt latency and response of the task as performance Metrics . Embedded Software Development and process tools: Introduction - Host and target machines – Linking and locating software – Getting Embedded software into the target system – Issues in Embedded system design.

Self-study portion

Text Book

Embedded systems – Architecture, Programming and Design by Raj Kamal, Second Edition– TMH, 2008.

| | |
|-----------------|--|
| UNIT I | : Chapters 1.1, 1.2, 1.3, 1.6, 1.7, 1.8, 1.10 and 1.11 |
| UNIT II | : Chapter 3.1, 3.2, 3.3, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, 3.11 and 3.12 |
| UNIT III | : Chapters 4.3, 4.4, 4.5, 4 & 4.9 Chapters 7.1, 7.2, 7.3, 7.4, 7.7, 7.11, 7.12, 7.14 & 7.16 |
| UNIT IV | : Chapters 5.1 to 5.7 & Chapters 6.1, 6.2 & 6.4 |
| UNIT V | : Chapters 8.1to 8.4, 8.6 to 8.10 & Chapters 13.1to 13.5 |

Reference book

Mohamed Ali Maszidi & Janice Gillispie Maszidi, “The 8051 Microcontroller and Embedded System”, Pearson Publishers, 2007.

SEMESTER –II: CORE– V: DISTRIBUTED DATABASE SYSTEMS

Subject Code : 17PCS2C5
Hours/Week : 6
Credit : 5

Maximum Marks : 100
Internal Marks : 25
External Marks : 75

Objective

To provide fundamental concepts of distributed database systems and its architecture.

UNIT I

18 Hours

Introduction – Distributed Data Processing – Distributed Database System – Promises of DBMS – Complicating Factors – Problem Areas – Relational Database Concepts – Normalization – Integrity Rules – Relational Data Languages – Relational DBMS – Data Communication Concepts – Types of Networks

UNIT II

18 Hours

Distributed DBMS Architecture: Architectural Models for Distributed DBMSs – Distributed DBMS Architecture – Alternatives Design Strategies – Distribution Design Issues – Fragmentation

UNIT III

18 Hours

Semantic Data Control: View Management – Data Security – Semantic Integrity Control – Query Processing Problem – Characteristics of Query Processing – Layer Query Processing – Query Optimization – Centralized Query Optimization – Join Ordering in Fragment Queries

UNIT IV

18 Hours

Transaction Management: Definition – Transaction Properties – Type of Transaction – Serializability Theory – Locking-Based Concurrency Control Algorithms – TimeStamp-Based Concurrency Control Algorithms – Deadlock Management

UNIT V

18 Hours

Reliability Concepts and Measures – Failures in Distributed DBMS – Local Reliability Protocols - Distributed Reliability Protocols – Dealing with Site Failures – Networking Partitioning.
..... # Self-study portion

Text Book

M. Tamer Ozsu and Patrick Valduriez, Principles of Distributed Database Systems, Second Edition, Pearson Education in South Asia

| | | | |
|-----------------|---|----------------|----------------------------|
| UNIT I | : Chapter 1.1-1.5, 2.1-2.5, 3.1, 3.2 | UNIT II | : Chapter 4.1-4.3, 5.1-5.3 |
| UNIT III | : Chapter 6.1-6.3, 7.1, 7.4, 7.5, 9.1-9.3 | | |
| UNIT IV | : Chapter 10.1-10.3, 11.1, 11.3, 11.4, 11.6 | UNIT V | : Chapter 12.1, 12.3-12.7 |

Reference Book

Stefano Ceri and Giuseppe Pelagatti, *Distributed Database Principles and Systems*, Second Reprint 2008, Tata McGraw-Hill Edition

SEMESTER –II: CORE– VI: OPEN SOURCE TECHNOLOGY

Subject Code : 17PCS2C6

Hours/Week : 6

Credit : 5

Maximum Marks : 100

Internal Marks : 25

External Marks : 75

Objective To learn various open source technologies.

UNIT I

18 Hours

Open Source Software – Overview – Definition – History of GNU/Linux and Free Software movement - Advantages of free software and GNU/Linux – GNU/Linux OS installation – Linux distributions.

UNIT II

18 Hours

Linux: Basic shell commands – Process Management – User and Group management – # Vi Editor # – Introduction to Scripting – What is Bash? – SED – AWK Conceptual overview.

UNIT III

18 Hours

MySQL – Connecting to and disconnecting from the server – MySQL data types – SHOW and CREATE databases – Creating a table – DESCRIBE command – INSERT command – SELECT command – DROP tables and databases – UPDATE, ALTER and DELETE operations – MySQL Like clause – MySQL aggregate functions – Table JOIN – Administrative details.

UNIT IV

18 Hours

PHP - #Basics of PHP # - Objects – Object Oriented Concepts – Classes and Objects in PHP – Declaring Methods – Declaring Properties – Declaring Constants - Inheritance – Constructors – Destructors – Form Handling - Form validation.

UNIT V

18 Hours

AJAX: What is AJAX made of? – uses and misuses of AJAX- Building a simple application with AJAX and PHP – Creating and Using XMLHttpRequest object – PHP,DOM and XML- PHP and JSON – Passing parameters and handling PHP errors.

Text Books

1. Narmatha S, Raajakumar V, “*Open Source Systems*”, Eswar Press, 2010.
UNIT I : Unit 1 – Chapter 1 (1.1, 1.2, 1.3, 1.4), Chapter 2.
UNIT II : Unit 1 – Chapter 3, 4, 5, Unit 4 – Chapter 5.
2. HajiramBeevi J, Khairunnisa and MunawaraBanu S, “*Primer on PHP*”, Yazhini Publication, 1st Edition, 2016
UNIT III : Chapter 8 **UNIT IV** : Chapter 10
3. BogdanBrinzareaLamandi, Cristian Darie, Audra Hendrix, “*AJAX and PHP- Building modern Web applications*”, 2nd edition, 2009.
UNIT V : Chapter 1, 2, 4.

Reference Book

James Lee and Brent Ware, Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, Dorling Kindersley(India) Pvt. Ltd., 2008.

SEMESTER- II: CORE VII: DESIGN AND ANALYSIS OF ALGORITHMS

Subject Code : 17PCS2C7

Hours : 6

Credit : 4

Maximum Marks : 100

Internal Marks : 25

External Marks : 75

Objective

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 Hours

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 Hours

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 Hours

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

18 Hours

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 Hours

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

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

| | | | |
|-----------------|---------------------------------|----------------|-------------------------|
| UNIT I | : Chapters 1 and 2 | UNIT II | : Chapter 3 (3.1 – 3.8) |
| UNIT III | : Chapter 4 | UNIT IV | : Chapter 5 and 6 |
| UNIT V | : Chapter 7 and 8 (8.1 and 8.2) | | |

Reference Book

Narasimha Karumanchi, Data Structures and Algorithms Made Easy, Second Edition, 2011.

SEMESTER – II: CORE-VIII A: RDBMS LAB

Subject Code : 17PCS2C8P1

Hours/Week : 3

Credit : 2

Maximum Marks : 50

Internal Marks : 10

External Marks : 40

1. SQL: Data Definition Languages

Table Creation - Primary Key, Candidate key,
Foreign Key, On Delete Cascade
Table Alteration - Rename table and Column name,
Add Column, Drop column,
Modify Column size and Data type
Drop Table

2. SQL: Data Manipulation Languages

Insertion
Updates
Deletion
String Operations
Set Operations
Tuple Variables
Aggregate Functions with Grouping and Having Clause
Ordering Tuples
Nested Subqueries – Set Membership (IN, NOTIN),
Set Comparison (SOME, ALL)
Subqueries in the From Clause
Join Operations – Equi Join, Leftouter join, Right outer join, Self Join.
Views

3. PL/SQL Procedure

Reverse the String
Find Factorial number using Recursive Function
Prepare Student Mark Sheet
Employee Pay Roll
EB – Bill

4. SQL forms

Pay Roll Preparation
Income Tax Calculation
Student Mark Sheet

SEMESTER – II: CORE-VIII B: OPEN SOURCE LAB

Subject Code : 17PCS2C8P2
Hours/Week : 3
Credit : 2

Maximum Marks : 50
Internal Marks : 10
External Marks : 40

1. Study of vi editor.
2. Trying out basic LINUX commands – ls, cp, cat, more, chmod, head, tail, mv, cd, pwd in vi editor.
3. Write a script to perform the following basic math operation
 - (i) Addition
 - (ii) Subtraction
 - (iii) Multiplication
 - (iv) Division
4. Writing a simple shell script using awk and sed.
5. Practicing DDL and DML commands using MySQL.
6. Practicing Queries using Aggregate functions, Group By, Having Clause and Order Clause.
7. Implement different types of joins in MySQL.
8. Write a PHP program to implement the concept of single inheritance.
9. Write a PHP program to implement the concept of constructor.
10. Write a PHP program to implement the concept of multilevel inheritance.
11. Write a PHP program to implement the concept of REQUEST variable
12. Develop a simple application using AJAX, PHP and MySQL
13. Write a PHP program to convert the PHP objects into JSON

SEMESTER - II: ELECTIVE – II: COMPUTER NETWORKS

Subject Code : 17PCS2CE2A
Hours/Week : 6
Credit : 4

Maximum Marks : 100
Internal Marks : 25
External Marks : 75

Objective To provide an overall knowledge in computer communication networks.

UNIT I

18 Hours

INTRODUCTION: Data communications – Networks – Internet. Network Models: The OSI Model – Layers in the OSI Model – TCP/IP Protocol suite – Physical Layer: Multiplexing – Transmission Media: Guided Media.

UNIT II

18 Hours

Data Link Layer: Error Detection and Correction- Introduction – Blocking coding – Cyclic Codes – Checksum. Data Link Control: Framing – # Flow and Error Control # – Protocols – Noiseless Channels – Noisy Channel – HDLC

UNIT III

18 Hours

Network Layer Design Issues – Routing Algorithms: The Optimality Principle – Shortest Path Algorithm – Flooding – Distance Vector Routing – Link State Routing – Hierarchical Routing – Broadcasting Routing – Congestion Control Algorithms – Network Layer in the Internet: The IP Version 4 Protocol – IP Addresses – # IP Version 6 #

UNIT IV

18 Hours

Transport Layer: Process to Process Delivery – User Datagram Protocol (UDP) – TCP. Application Layer: Name Space – Domain Name Space – Distribution of Name Space – DNS in the Internet – Remote Logging – E-Mail – # File Transfer #

UNIT V

18 Hours

Network Security: Cryptography - Introduction to Cryptography - Substitution Ciphers - Transposition Ciphers – DES – RSA – Digital Signature: Symmetric Key Signature – Public Key Signature – Communication Security: Firewalls – VPN. Authentication Protocols: Authentication Based on a Shared Secret Key - Establishing a Shared Key: The Diffie-Hellman Key Exchange. E-Mail Security: PGP – Web Security: Threats – # Secure Naming #- SSL

..... # **Self-study portion.**

Text Books

1. Behrouz A Forouzan, Data Communications and Networking, Fourth Edition, Tata McGraw-Hill, Special Indian Edition 2006

UNIT I : Chapter 1.1 – 1.3, 2.2 – 2.4, 6.1, 7.1

UNIT II : Chapter 10.1, 10.2, 10.4, 10.5, 11.1 – 11.6,

UNIT IV : Chapter 23.1 – 23.3, 25.1 – 25.4, 26.1 – 26.3

2. Andrew S. Tanenbaum, David J. Wetherall, Computer Networks, Fifth Edition, Pearson Education, Inc., Publishing as Prentice Hall, 2011

UNIT III : Chapter 5.1.1 – 5.1.5, 5.2.1 – 5.2.7, 5.3.1 – 5.3.5, 5.6.1 – 5.6.3

UNIT V : Chapter 8.1.1 – 8.1.3, 8.2.1, 8.3.1, 8.4.2, 8.4.3, 8.6.2, 8.6.3, 8.7.1, 8.7.2, 8.8.1, 8.9.1 – 8.9.3

Reference Book

William Stallings, Data and Computer Communication, PHI, Eighth Edition, 2009

SEMESTER II: ELECTIVE-II: CRYPTOGRAPHY AND NETWORK SECURITY

Subject Code : 17PCS2CE2B

Hours : 6

Credit : 4

Maximum Marks : 100

Internal Marks : 25

External Marks : 75

Objective To impart the basic knowledge of Cryptography and Network Security.

UNIT I

18 Hours

Overview: Computer Security Concepts- The OSI Security Architecture -Security Attacks -Security Services - Security Mechanisms - A Model for Network Security - Classical Encryption Techniques: Symmetric Cipher Model - Substitution Techniques -Transposition Techniques - Rotor Machines - Steganography

UNIT II

18 Hours

Block Ciphers and the Data Encryption Standard: Block Cipher Principles - The Data Encryption Standard - A DES Example - The Strength of DES - Differential and Linear Cryptanalysis - Block Cipher Design Principles - Advanced Encryption Standard - Finite Field Arithmetic - AES Structure - AES Transformation Functions - AES Key Expansion -An AES Example - AES Implementation

UNIT III

18 Hours

Block Cipher Operation: Multiple Encryption and Triple DES - Electronic Code Book -Cipher Oriented Storage Devices - Public-key Cryptography and RSA: Principles of Public-key Cryptosystems - The RSA Algorithm

UNIT IV

18 Hours

Cryptographic Hash Functions: Applications of Cryptographic Hash Functions - Two Simple Hash Functions - Requirements and Security - Hash Functions Based on Cipher Block chaining -Secure-Hash Algorithm (SHA) - SHA-3 - Message Authentication Codes - Message Authentication Requirements - Message Authentication Functions - Requirements for Message Authentication Codes - Security for MACS - MACs Based on Hash Functions: HMAC

UNIT V

18 Hours

Digital Signatures - Key Management and Distribution: Symmetric Key Distribution using Symmetric Encryption - Symmetric Key Distribution using Asymmetric Encryption -Distribution of Public keys - X.509 Certificates - Public-Key Infrastructure - User Authentication: Kereberos.

Text Book

William Stallings, "Cryptography and Network Security Principles and Practice", Fifth Edition, Pearson Education Inc, First Impression 2011.

UNIT I : Chapter 1: 1.1 - 1.6, Chapter 2: 2.1 - 2.5

UNIT II : Chapter 3: 3.1 - 3.6, Chapter 5: 5.1 - 5.6

UNIT III : Chapter 6: 6.1 - 6.7, Chapter 9: 9.1 - 9.2

UNIT IV : Chapter 11:11.1 - 11.6, Chapter 12: 12.1 - 12.4, 12.6

UNIT V : Chapter 13: 13.1. Chapter 14: 14.1 to 14.5, Chapter 15: 15.3

Reference Book

William Stallings, "Network Security Essentials Applications and Standards", Third Edition, Pearson Education Inc, Fifth Impression 2011

SEMESTER - III: CORE IX: .NET TECHNOLOGIES

Subject Code : 17PCS3C9
Hours/Week : 6
Credit : 5

Maximum Marks : 100
Internal Marks : 25
External Marks : 75

Objective

To understand the concepts of .NET technologies

UNIT I

18 Hours

Introduction: Integrated Development Environment - IDE Components -Setting Environment Options - Building a Console application. Variables and Data Types: Variables-Variable as Objects - Constants-Arrays

UNIT II

18 Hours

Programming Fundamentals: Flow Control Statement-Writing & using procedures – Arguments. Basic Windows controls: The Textbox control -The List box, Checked List Box and Combo Box Controls-The Scrollbar or Track bar controls

UNIT III

18 Hours

Working with Forms: Appearance of Forms - Loading or showing Forms - Designing Menus. More Windows Controls: Common Dialog controls - Rich Text box Control. The Tree View and List View Controls: Tree View Control – List View Control. Handling Strings or Characters - Handling Dates or Times

UNIT IV

18 Hours

Programming with ADO. Net: The Basic Data Access Classes-storing Data in datasets - Update Operations -Working with Typed Datasets - Data Binding. Building Web Applications: working with HTML - Cascading Style Sheets -Controls - ASP.Net Objects

UNIT V

18 Hours

ASP.NET 3.5: Building the style sheet for Masterpage.master – Creating the Content Master Page – Adding Elements to the Main Master Page – Adding Authentication – Building the Report.aspx page. ASP.NET Web Services: Using ASP.Net Web Services and WCF – Understanding Technologies Associated with Web Services – Creating a simple ASP.Net Web Service

Text Book

Evangelos Petroustos, *Mastering Microsoft Visual Basic 2008*, Wiley India Edition, Wiley Reprint, 2009

UNIT I : Chapter 1, 2

UNIT II : Chapter 3, 6

UNIT III : Chapter 7, 8, 9, 13

UNIT IV : Chapter 22 , 23 , 25

UNIT V : Chapter 26 , 27

Reference Book

Steven Holzner, *Visual Basic .NET Programming Black Book*, Dreamtech Press; 1 edition,2005)

SEMESTER III: CORE X: PRINCIPLES OF COMPILER DESIGN

Subject Code : 17PCS3C10

Hours : 6

Credit : 5

Maximum Marks : 100

Internal Marks : 25

External Marks : 75

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

UNIT I

18 Hours

Introduction to Compilers: Compilers and Translators – The Structure of a Compiler – Lexical Analysis – Syntax Analysis – Intermediate Code Generation – Optimization – Code Generation. Finite Automata and Lexical Analysis: The Role of Lexical analyzer Regular Expressions – Finite Automata – From a regular expression to Finite Automata – Minimizing the Number of States of a DFA.

UNIT II

18 Hours

The Syntactic Specification of Programming Languages: Context-free grammars – Derivations and parse trees. Basic Parsing Techniques: Parsers – Shift-reduce Parsing -Operator precedence parsing – Top-down Parsing – Predictive Parsers. Automatic Construction of Efficient Parsers: LR Parsers – The Canonical Collection of LR(0) items – Constructing SLR Parsing Tables - Constructing canonical LR Parsing Tables - Constructing LALR Parsing Tables.

UNIT III

18 Hours

Syntax Directed Translation: Syntax Directed Translation: Implementation of Syntax Directed Translation - Intermediate code – Postfix Notation – Parse Trees and Syntax Trees – Three-address Code, Quadruples and Triples – Boolean Expressions.

UNIT IV

18 Hours

Symbol Table: The Contents of Symbol table – Data Structures for Symbol table – Runtime storage Administration: Implementation of a Simple Stack allocation scheme - Implementation of a Block Structured Languages. Error Detection and Recovery: Errors – Lexical-phase Errors - Syntactic-phase Errors – Semantic Errors.

UNIT V

18 Hours

Introduction to Code Optimization: The Principal Sources of Optimization – Loop Optimization – The DAG Representation of Basic Blocks. Code Generation: Problems in Code Generation – A Machine Model – A Simple Code Generator – Register allocation and Assignment – Peephole optimization.

Text Book

Alfred V. Aho and Jeffrey D. Ullman, *Principles of Compiler Design*, 5th Edition, Narosa Publishing House, New Delhi, 2002

UNIT I : Chapter 1(1.1,1.3–1.8) Chapter 3 (3.1, 3.3 – 3.6)

UNIT II : Chapter 4 (4.1 – 4.2) Chapter 5 and Chapter 6 (6.1 – 6.5)

UNIT III : Chapter 7 (7.1 – 7.6 and 7.8)

UNIT IV : Chapter 9 (9.1 – 9.2) Chapter 10 (10.1– 10.2) and Chapter 11

UNIT V : Chapter 12 (12.1 – 12.3) Chapter 15 (15.2– 15.5 and 15.7)

Reference Books

1. Elements of Compiler Design, Dr. M. Joseph, University Science Press, 2011.
2. Compiler Design, Santara Chatto padhyay, PHI, New Delhi, 1st Edition, 2009.

SEMESTER –III: CORE– XI: DISTRIBUTED OPERATING SYSTEMS

Subject Code : 17PCS3C11

Hours/Week : 6

Credit : 4

Maximum Marks : 100

Internal Marks : 25

External Marks : 75

Objective

To understand the concepts of distributed operating systems

UNIT I

18 Hours

Fundamentals: What is Distributed Computing System - Distributed Computing System Models - What is Distributed Operating System - Issues in Designing a Distributed Operating System - Distributed Computing Environment (DCE). Computer Networks: Networks Types - LAN Technologies - WAN Technologies - Internetworking - ATM Technology.

UNIT II

18 Hours

Message Passing: Desirable Features of a Good Message - Passing System - Issues in IPC by Message Passing - Synchronization - Buffering - Multi datagram Messages - Encoding and Decoding of Message Data - Process Addressing - Failure Handling - Group Communication.

UNIT III

18 Hours

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 - Heterogeneous DSM - Advantages of DSM. Synchronization: Clock Synchronization - Event Ordering - Mutual Exclusion - Deadlock - Election Algorithms.

UNIT IV

18 Hours

Distributed File Systems: Desirable Features of a Good Distributed File System - File Models - File Accessing Models - File Caching Schemes- File Replication - Fault Tolerance - Atomic Transactions - Design Principles.

UNIT V

18 Hours

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 Books

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

Reference Book

Doreen L. Galli, *Distributed Operating Systems: Concepts and Practice*, Prentice Hall, 2000

SEMESTER –III: CORE– XII A: .NET TECHNOLOGIES LAB

Subject Code : 17PCS3C12P1

Hours/Week : 3

Credit : 2

Maximum Marks : 50

Internal Marks : 10

External Marks : 40

1. Write a VB.NET program to create dynamic text box control.
2. Write a VB.NET program to make text box control that accepts numbers only as input.
3. Design a simple VB.NET application that displays roll number of students in Checked List Box and allows user to fill attendance of students. After filling the attendance it should display the present number of students in List Box and also count how many students are present in a label.
4. Write a VB.NET program to change the background color of a form using track bar and scrollbar controls.
5. Write a VB.NET program to add and remove the nodes in Tree View control.
6. Write a VB.NET program to add a node to a tree view using context menu.
7. Write a VB.NET program to search and high light text in Rich Text Box.
8. Write a VB.NET program to perform insert, update, delete and retrieve operations using MS Access.
9. Write a VB.NET program to perform insert, update, delete and retrieve operations using SQL Server.
10. Write a VB.NET program to perform login authentication using SQL Server.
11. Create a web service for performing simple arithmetic operations.
12. Create a web service that performs insert, delete, update and select operations of SQL server.

SEMESTER –III: CORE – XII B: MICROPROCESSOR LAB

Subject Code : 17PCS3C12P2

Hours/Week : 3

Credit : 2

Maximum Marks : 50

Internal Marks : 10

External Marks : 40

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

SEMESTER – III: ELECTIVE – III: MICROPROCESSORS AND MICROCONTROLLERS

Subject Code : 17PCS3CE3A

Hours/Week : 6

Credit : 4

Maximum Marks : 100

Internal Marks : 25

External Marks : 75

Objective

To realize the 8086 Microprocessor Architecture, Operations, Programming, and to understand the basics of advanced Microprocessors and 8051 with 80196 Microcontroller.

UNIT I

18 Hours

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 Architecture – #Pin configuration# - Comparison of 8086 and 8088.

UNIT II

18 Hours

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 Hours

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 Hours

80286 Architecture – Salient features of 80286 – Signal description of 80286 – 80286 bus interface – basic bus operations of 80286 – 80386 architecture – salient features of 80386 – addressing modes of 80386 – register organization of 80386 – data types of 80386 – Protected and virtual mode of 80386 - Pentium Microprocessor – Architecture – Instruction set of Pentium – Intel MMX – MMX architecture – MMX instruction set - Pentium Pro and Pentium II features.

UNIT V

18 Hours

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 – Intel 16-bit Microcontroller - 80196 – 80196 architecture – Register set of 80196 – General features of 80196.

Self-study portion

Text Book

A.K. Ray, K.M. Bhurchandi, *Advanced Microprocessors and Peripherals*, TMH Publications, Third Edition, 2013.

- UNIT I** : Chapter-1 Section (1.1-1.3, 1.8-1.10)
- UNIT II** : Chapter-2 Section (2.1-2.4) Chapter-3 Section (3.3), Chapter-4 Section (4.3)
- UNIT III** : Chapter-3 Section (3.4)
- UNIT IV** : Chapter – 9 Section (9.1 - 9.3, 10), Chapter (10.2 – 10.5, 10.7.10.10), Chapter (11.1-11.3, 11.5 – 11.7, 11.10, 11.12)
- UNIT V** : Chapter-17 Section (17.2-17.8, 17.11)

Reference Book

Badri Ram, *Fundamentals of Microprocessors and Microcomputers*, Fifth Revised and Enlarged Edition, Dhanpat Rai Publications, 2003.

SEMESTER – III: ELECTIVE - III: CLOUD COMPUTING

Subject Code : 17PCS3CE3B

Hours/Week : 6

Credit : 4

Maximum Marks : 100

Internal Marks : 25

External Marks : 75

Objective To understand the concepts of Cloud Computing

UNIT I

18 Hours

PRINCIPLES OF PARALLEL AND DISTRIBUTED COMPUTING: Eras of Computing - Parallel vs. Distributed Computing - Elements of Parallel Computing - What is Parallel Processing?- Hardware Architectures for Parallel Processing - Approaches to Parallel Programming - Levels of Parallelism - Laws of Caution - Elements of Distributed Computing - General Concepts and Definitions - Components of a Distributed System - Architectural Styles for Distributed Computing - Technologies for Distributed Computing - Remote Procedure Call - Distributed Object Frameworks - Service Oriented Computing

UNIT II

18 Hours

INTRODUCTION -Cloud Computing at a Glance -The Vision of Cloud Computing - Defining a Cloud - A Closer Look - Cloud Computing Reference Model - Characteristics and Benefits - Challenges Ahead - Historical Developments - Distributed Systems - Virtualization - Web 2.0 -Service-Oriented Computing - Utility-Oriented Computing - Building Cloud Computing Environments- Application Development - Infrastructure and System Development

UNIT III

18 Hours

CLOUD COMPUTING ARCHITECTURE: Introduction - Cloud Reference Model - Architecture-Infrastructure / Hardware as a Service - Platform as a Service - Software as a Service - Types of Clouds - Public Clouds - Private Clouds - Hybrid Clouds - Community Clouds - Economics of the Cloud - Open Challenge - Cloud Definition Cloud Interoperability and Standards - Scalability and Fault Tolerance – Contents - Security, Trust, and Privacy - Organizational Aspects

UNIT IV

18 Hours

INFRASTRUCTURE AS A SERVICE: Virtual Machines provisioning and Migration Services – Virtual Machine Provisioning and manageability – Virtual Machine Migration Services -Secure Distributed Data Storage in Cloud Computing – Cloud Storage from LANs to WANs - Technologies for Data Security in cloud Computing. PLATFORM AND SOFTWARE AS A SERVICE: Dynamic ICT services – Importance of quality and Security in clouds – Dynamic Data center – Producing Business-ready, Dynamic ICT Services

UNIT V

18 Hours

MONITORING AND MANAGEMENT: An Architecture for Federated Cloud Computing - Introduction- A Typical Use Case – The Basic Principles of Cloud Computing – A Model for Federated Cloud Computing. SLA Management in Cloud Computing: Traditional Approaches to SLO Management - Types of SLA – Life Cycle of SLA. GOVERNANCE AND CASE STUDIES: Data Security in the Cloud – The current state of data security in the cloud – Cloud Computing and Data Security Risk

Text Books

1. RajkumarBuyya, Christian Vecchiola, S. ThamaraiSelvi, “Mastering Cloud Computing”, McGraw Hill Education (India) Private Limited Publications, First Reprint, 2013
UNIT I - Chapter 2.1 to 2.5
UNIT II- Chapter 1.1 to 1.3
UNIT III- Chapter 4.1 to 4.5
2. RajkumarBuyya, James Broberg and Andrzej Goscinski, “Cloud Computing Principles and Paradigms”, Wiley Publications, 2013
UNIT IV - Chapter 5.3 & 5.4, Chapter 8.2&8.3 & Chapter 11.3, 11.4, 11.5
UNIT V- Chapter – 15.1 to 15. 4, 16.2 to 16.4, 23.2, 23.4

Reference Book

Michael Miller, “Cloud Computing Web Based Applications that change the way youwork and collaborate online”, Pearson Education, 2009

SEMESTER – III: EXTRA CREDIT I: J2EE TECHNOLOGY

Subject Code : 17PCS3EC1

Hours/Week : -

Credit : 5

Maximum Marks : 100

Internal Marks : -

External Marks : 100

Objective To understand the concepts of J2EE technologies.

UNIT I

J2EE Multi-Tier Architecture: Distributed Systems – The Tier – J2EE Multi-Tier Architecture – Client Tier Architecture – Client Tier Implementation - Web Tier Implementation. J2EE Design Patterns and Frameworks: The Pattern Concept – Pattern catalog.

UNIT II

Java Server Pages: JSP – JSP Tags – Tomcat – Request String – User Sessions – Cookies – Session Objects.

UNIT III

Enterprise JavaBeans: Enterprise JavaBeans – Session Java Bean – Entity Java Bean – Message-Driven Bean.

UNIT IV

Java Remote Method Invocation: Remote Method Invocation concept – Server Side – Client side. JavaMail API: Java Mail – Protocols – Exceptions – Send Email message – Retrieving Email Messages – Deleting Email Messages.

UNIT V

JDBC Objects: The concept of JDBC – JDBC Driver Types – A brief overview of the JDBC Process – Database Connection – Statement Objects – ResultSet – Transaction Processing – Meta data.

Text Book

Jim Keogh, The Complete Reference J2EE, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2002.

UNIT I : Chapter 2& 4

UNIT III : Chapter 12

UNIT V : Chapter 6

UNIT II : Chapter 11

UNIT IV : Chapter 15

Reference Book

B.V. Kumar, S.Sangeetha, S.V. Subrahmanya, J2EE Architecture, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2008.

SEMESTER- IV: CORE – XIII: MIDDLEWARE TECHNOLOGY

Subject Code : 17PCS4C13

Hours/Week : 6

Credit : 5

Maximum Marks : 100

Internal Marks : 25

External Marks : 75

Objective To learn the various concepts of middleware technologies.

UNIT I

18 Hours

Introduction – Advantages of Servlets over CGI – The Servlet Life Cycle – Server API – A Simple Servlet – Handling HTTP GET Requests – Handling HTTP POST Requests – Cookies – Session Tracking – Multi-tier Applications using Database. Remote Method Invocation.

UNIT II

18 Hours

JSP: Elements of JSP – Components of JSP Page – Request Dispatching – Anatomy of Request Processing – The include Directive – The jsp:include Action – Forwarding requests – The RequestDispatcher Object. Session Tracking – The Session API.

UNIT III

18 Hours

Database Access with JDBC: Overview of JDBC – JDBC Drivers – Connecting to a Database with DriverManager – The Statement Interfaces – ResultSets – Using Metadata.

UNIT IV

18 Hours

Web Control: Stepping Up to Web Controls – Web Control Classes – AutoPostBack and Web Control Events – A Simple Web Page Applet – Accessing Web Controls. Validation and Rich Controls: Validation – A Simple Validation Example – Understanding Regular Expression – Other Rich Controls.

UNIT V

18 Hours

Overview of ADO.NET: Introducing ADO.NET and Data Management – Characteristics of ADO.NET – The ADO.NET Object Model. ADO.NET Data Access: SQL Basics – The SQL Select, Update, Insert, Delete Statement – Creating a Connection – Defining a Select command – Using Command with Data Reader – Updating Data – Accessing Disconnected Data – Selecting Multiple Tables – Modifying and Updating Disconnected Data.

Text Books

1. Web Technology A Developer Perspective, N.P. Gopalan & J.Akilandeswary, PHI Learning Private Limited, 2009.
UNIT I : Chapter 10
2. Programming with Java, C.Muthu, Vijay Nicole Imprints Private Limited, 2004.
UNIT I : Chapter 20
3. The Complete Reference JSP 2.0, Phil Hanna, Tata McGraw-Hill Company, 2003
UNIT II : Chapter 5, 7, 8. **UNIT III** : Chapter 15
4. The Complete Reference ASP.NET”, Matthew MacDonald, Tata McGraw-Hill Publishing Company Limited, New Delhi.
UNIT IV : Chapter 7, 9 **UNIT V** : Chapter 12, 13

Reference 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.

SEMESTER- IV: CORE – XIV: MIDDLEWARE TECHNOLOGY LAB

Subject Code : 17PCS4C14P
Hours/Week : 6
Credit : 5

Maximum Marks : 100
Internal Marks : 20
External Marks : 80

1. Develop a servlet application to display a welcome message on the browser by using servlets.
2. Develop a servlet program for calculating factorial of given number.
3. Develop a servlet program for authenticating and personal details form filling.
4. Write a program to display the multiples of two using JSP.
5. Write a JSP program to connect the database and extract data from the tables and display them.
6. Develop the JSP Program which does the following job.
 - a. Insert the details of the 3 or 4 users who register with the web site by using registration form. Authenticate the user when he submits the login form using the user name and password from the database
7. Program for finding whether a given number is palindrome or not using JSP.
8. Write a program to display the session ID, creation time, and the last accessed time of the Web page.
9. 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.
 - c) Send restart and shutdown commands.
10. Design a web page that makes uses of Ad Rotator Control
11. Design a web page involving Multi View or Wizard Control.
12. Create a table and insert a few records using Disconnected Access.
13. Develop a program to update and delete few records using Disconnected Access.
14. Develop a program to view the records using GridView, DetailsView, FormView Controls.
15. Develop a program to display the data using grid view control.

SEMESTER IV: Project

Subject Code : 17PCS4PW
Hours/Week : 18
Credit : 14

Maximum Marks : 300
Internal Marks : -
External Marks : 300

Objective

Students carry out a project in software development companies

**SEMESTER – IV: EXTRA CREDIT II:
SOFTWARE TESTING AND QUALITY ASSURANCE**

Subject Code : 17PCS4EC2
Hours/Week : -
Credits : 5

Maximum Marks : 100
Internal Marks : -
External Marks : 100

Objective To understand the various concepts of software testing and quality assurance

UNIT I

Introduction – Representation Theory Management – Measurement and Models – Measurement Scales and Scales Types – Classification of Software Types – Determining What to Measure – Applying Framework – Software Measurement Validation – What is good data – How to define the data – How to collect data – How to store and extract data.

UNIT II

Aspects of software size – Length – reuse – functionality – Complexity – Structure – Object Oriented Metrics - What is Metrics Plan – GQM Model – Measurement Tools – Measurement in the small – Measurement in the large – Defects

UNIT III

White box testing – Structured Testing – Code Complexity Testing – Mutating Testing - Block Box Testing.

UNIT IV

Test Planning – Test Plan components – GUI Testing - Validation Testing – Integration Testing – System and Accepting Testing – Scenario-Based Testing – Regression Testing - Specification Testing – Performance Testing – Usability and Accessibility Testing

UNIT V

Quality Concepts – Software Quality Assurance – Six Sigma – Total quality Management – Product Quality Metrics – In-Process Quality Metrics – Metrics for software Maintenance – Histogram

Text Book

Bharati S.Ainapure, *Software Testing and Quality Assurance*, Technical Publications, Pune, Second Revised Edition, 2009.

| | | | |
|-----------------|-------------|----------------|-----------------|
| UNIT I | : Chapter 1 | UNIT II | : Chapter 2 & 3 |
| UNIT III | : Chapter 3 | UNIT IV | : Chapter 4 |
| UNIT V | : Chapter 5 | | |

Reference Book

Andreas Spillner, Tilo Linz, Hans Schaefer, *Software Testing Foundations*, 4th Edition, Rockynook, 2010