MASTER OF COMPUTER APPLICATIONS

SYLLABUS

(Under Choice Based Credit System)
Applicable for the students admitted
from 2017 – 2018 onwards

PG DEPARTMENT OF COMPUTER APPLICATIONS

Bishop Heber College (Autonomous)
(Nationally Reaccredited at the A+ Level by NAAC)
(Recognized by UGC as "College with Potential for Excellence")
Tiruchirappalli-620 017

Sem	Subject Code	Course	Subject Title	Hrs/ Week	Credit	Int. Mark	Ext. Mark	Mark
MCA COURSE STRUCTURE FOR 2017 – BATCH ONWARDS								
I	P14CA101	Core I	Problem Solving and Programming in C	4	3	25	75	100
	P14CA102	Core II	Mathematical Foundations of Computer Science	4	4	25	75	100
	P14CA103	Core III	Internet Programming	4	3	25	75	100
	P14CA104	Core IV	Computer Graphics	4	3	25	75	100
	P14CA105	Core V	Digital Computer Fundamentals and Computer Architecture	4	4	25	75	100
	P14CA1P1	Core Prac.I	C Programming Lab	4	3	40	60	100
	P14CA1P2	Core Prac.II	Internet Programming Lab	4	3	40	60	100
	P14CA2S1	SBC I*	Communication and Life Skills	2	-	-	-	-
			Total	**30**	**23**	**205**	**495**	**700**
II	P14CA206	Core VI	Object Oriented Programming in C ++	4	3	25	75	100
	P14CA207	Core VII	Probability and Statistics	4	3	25	75	100
	P14CA208	Core VIII	Open Source Technologies	4	4	25	75	100
	P14CA209	Core IX	Data Structures and Algorithms	4	4	25	75	100
	P14CA2P3	Core Prac.III	C++ Programming Lab	3	3	40	60	100
	P14CA2P4	Core Prac.IV	Open Source Programming Lab	3	3	40	60	100
	P14CA2S1	SBC I*	Communication and Life Skills	2	2	25	75	100
	P14CA2B1	Summer Internship I**	Summer Project – I (May / June)	--	2	-	--	100
		NMEC		4	2	25	75	100
	P08VL2:1/ P08VL2:2	VLO	RI / MI	2	2	25	75	100
			Total	**30**	**28**	**255**	**645**	**1000**
III	P14CA310	Core X	Programming in Java	4	3	25	75	100
	P14CA311	Core XI	Resource Management Techniques	4	3	25	75	100
	P14CA312	Core XII	Database Systems	4	4	25	75	100
	P14CA313	Core XIII	Operating Systems	4	4	25	75	100
	P14CA3P5	Core Prac.V	Java Programming Lab	4	3	40	60	100
	P14CA3P6	Core Prac.VI	RDBMS Lab	4	3	40	60	100
	P14CA3:1		Accounting and Financial Management					
	P14CA3:2	Elective I	Marketing Management	4	4	25	75	100
	P14CA3:3		Management Information Systems					
	P14CA4S2	SBC II*	Numerical Aptitude	2	-	-	-	-
			Total	**30**	**24**	**205**	**495**	**700**
IV	P14CA414	Core XIV	Programming in .NET Technologies	4	4	25	75	100
	P14CA415	Core XV	Computer Communication Networks	4	4	25	75	100
	P14CA416	Core XVI	Software Engineering	4	4	25	75	100
	P14CA417	Core XVII	Microprocessors and Microcontroller	4	4	25	75	100
	P14CA4P7	Core Prac. VII	.NET Programming Lab	4	3	40	60	100
	P14CA4P8	Core Prac. VIII	Multimedia Lab (Photoshop & Flash)	4	3	40	60	100
	P14CA4:1		Compiler Design					
	P14CA4:2	Elective II	Principles of E-commerce	4	4	25	75	100
	P14CA4:3		System Analysis and Design					
	P14CA4S2	SBC II*	Numerical Aptitude	2	2	25	75	100
	P14CA4B2	Summer Internship II **	Summer Project – II (May / June)	-	2	-	-	100
			Total	**30**	**30**	**230**	**570**	**900**

	Code	Category	Title	Hours	Credit	CIA	ESE	Total
V	P14CA518	Core XVIII	Programming in J2EE and J2ME Technologies	4	4	25	75	100
	P14CA519	Core XIX	Organizational Behaviour	4	4	25	75	100
	P16CA520	Core XX	Mobile Computing	4	4	25	75	100
	P14CA5P9	Core Prac. IX	J2EE and J2ME Programming Lab	4	3	40	60	100
	P16CA5:1	Elective III	Data Ware Housing and Data Mining	4	4	25	75	100
	P16CA5:2		Human Computer Interaction					
	P16CA5:3		Parallel Processing					
	P16CA5:4		Grid Computing					
	P16CA5:5	Elective IV	Cloud Computing & Big Data Analytics	4	4	25	75	100
	P16CA5:6		Internet of Things					
	P16CA5:7		Artificial Intelligence					
	P16CA5:8		Genetic Algorithms					
	P14CA5PJ	Core Project-I	Mini Project	4	3	-	-	100
	P14CA5S3	SBC III*	Comprehensive Study	2	2	25	75	100
			Total	**30**	**28**	**190**	**510**	**800**
VI	P14CA6PJ/ /P17CA6PJ	Core Project-II	Project (Regular / Lateral Entry)	30	7/8	50	150	200
		Total		**180**	**140**	**1135**	**2865**	**4300**

S.No.	Courses	No. of Courses
1	Core Courses	20
2	Core Practicals	9
3	Elective	4
4	Summer Internship	2
5	ED Course	1
6	Skill Based Courses	3
7	Value Education	1
8	Core Project	2
	Total	**42**

Extra Disciplinary Courses offered by the Department:

    (a). Web Design   – P16CA2E1
    (b). Cyber Crime   – P16CA2E2
    (c). Principles of Information Technology – P16CA2E3

Core I : PROBLEM SOLVING AND PROGRAMMING IN C

Objectives:

1. To understand the basic concepts of problem solving approaches.
2. To develop programming skills using C Language.

UNIT – I   **9 Hours**

Introduction to Computer Problem Solving:
1.1 The Problem Solving Aspects –
1.2 Top Down Design –
1.3 Implementation of Algorithm
1.4 Program Verification
1.5 The Efficiency of Algorithm
1.6 The Analysis of Algorithms.
Fundamental Algorithms:
1.7 Introduction
1.8 Exchanging the values of Two Variables
1.8 Counting
1.9 Summation of a set of Numbers
1.10 Factorial Computation
1.11 Generation of the Fibonacci sequence
1.12 Reversing the Digits of an Integer.

UNIT – II   **10 Hours**

Introduction to Algorithms and Programming:
2.1 Introduction
2.2 Algorithms
Computer Programs:
2.3 Purpose and Planning
2.4 Compiler, Interpreter, Loader, and Linker
2.5 Program Execution
2.6 Introduction to C
2.7 The C Declarations
2.8 Operators and Expressions
2.9 Input and Output in C.

UNIT – III   **12 Hours**

3.1 Decision Statements
3.2 Loop Control Statements
3.3 Arrays.

UNIT – IV   **9 Hours**

4.1 Working with Strings and Standard Functions Pointers
4.2 Functions
4.3 Storage Class.

UNIT – V   **9 Hours**

5.1 Preprocessor Primitives
5.2 Structure and Union
5.3 Files
5.4 Dynamic Memory Allocation.

Text Books
1. R.G.Dromey, *How to Solve it by Computer*, Pearson Education, Fifth Edition, 2008.
2. Pradip Dey, Manas Ghosh, *Fundamentals of Computing and Programming in C*, First Edition, Oxford University Press, 2009.
3. Ashok N. Kamthane, *Programming with ANSI and Turbo C*, Pearson Education,

Sixth Impression, 2009.

Reference Books

1. Venugopal K.R, Prasad and Sudeep R, ***Programming with C,*** McGraw Hill Education, *2005*.
2. Deitel and Deitel, ***C How to Program***, Pearson Education, Sixth Edition, 2010.
3. Yashavant Kanetkar, ***Understanding Pointers in C***, Fourth Edition, BPB Publications, 2008.
4. Cormen, Leiserson, Rivest, Stein, ***Introduction to Algorithms***, McGraw Hill Publishers, 2002.

Core II : MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Objectives:

1. To impart basic knowledge on formal languages and grammars.
2. To study boolean algebra and graphs.

UNIT – I   **9 Hours**

    Boolean Algebra:
    1.1 Lattices and Algebraic Systems
    1.2 Principle of Duality
    1.3 Basic Properties of Algebraic Systems Defined by Lattices
    1.4 Distributive and Complemented Lattices
    1.5 Boolean Lattices and Boolean Algebras
    1.6 Uniqueness of Finite Algebras
    1.7 Boolean Functions and Boolean Expressions
    1.8 Propositional Calculus
    1.9 Design and Implementation of Digital Networks
    1.10 Switching Circuits.

UNIT – II   **9 Hours**

    Graphs and Planar Graphs:
    2.1 Introduction
    2.2 Basic Terminology
    2.3 Multigraphs and Weighted Graphs
    2.4 Paths and Circuits
    2.5 Shortest Paths in Weighted Graphs
    2.6 Eulerian Paths and Circuits
    2.7 Hamiltonian Paths and Circuits.
    Trees and Cut-Sets:
    2.8 Trees
    2.9 Rooted Trees
    2.10 Prefix Codes
    2.11 Binary Search Trees
    2.12 Spanning Trees and Cut-Sets
    2.13 Minimum Spanning Trees.

UNIT – III   **10 Hours**

    Computability and Formal Languages:
    3.1 Introduction
    3.2 Russell's Paradox and Noncomputability
    3.3 Ordered Sets
    3.4 Languages
    3.5 Phrase Structure Grammars
    3.6 Types of Grammars and Languages.

UNIT – IV   **10 Hours**

    Finite State Machines:
    4.1 Introduction
    4.2 Finite State Machines
    4.3 Finite State Machines as Models as Physical System
    4.4 Equivalent Machines
    4.5 Finite State Machines as Language Recognizers.

UNIT – V   **9 Hours**

    Recurrence Relations and Recursive Algorithms:
    5.1 Introduction
    5.2 Recurrence Relations

5.3 Linear Recurrence Relations with Constant Coefficients
5.4 Homogeneous Solutions
5.5 Particular Solutions
5.6 Total Solutions
5.7 Solutions by the Method of Generating Functions
5.8 Sorting Algorithms.

Text Book

1. C. L. Liu, *Elements of Discrete Mathematics,* McGraw Hill, Second Edition, 1985.

Reference Books

1. J. P. Tremblay, R. Manohar, *Discrete Mathematical Structures with Application to Computer Science*, McGraw Hill, 2001.
2. Narasingh Deo, *Graph Theory,* Prentice Hall of India, 2004.

Core III : INTERNET PROGRAMMING

Objectives:

1. To develop the knowledge for designing web sites using HTML 5.
2. To imbibe the knowledge in scripting languages and XML.

UNIT – I   10 Hours

1.1 Getting Started with HTML
1.2 Formatting Text by using Tags
1.3 using Lists and Backgrounds
1.4 Creating Hyperlinks and Anchors
1.5 Introduction to Style Sheets
1.6 Formatting Text by using Style Sheets
1.7 Formatting Paragraphs by using Style Sheets.

UNIT – II   10 Hours

2.1 Displaying Graphics
2.2 Creating Division Based Layouts
2.3 Creating Tables – Formatting Tables
2.4 Creating User Forms
2.5 Incorporating Sound and Video
2.6 Canvas.
The Basics of Java Script:
2.7 Overview of Java Script
2.8 Object Oriented and Java Script
2.9 General Syntactic Characteristics
2.10 Primitives, Operations, and Expressions
2.11 Screen Output and Keyboard Input
2.12 Control Statements
2.13 Object Creation and Modification.

UNIT – III   10 Hours

3.1 Arrays
3.2 Functions
3.3 An Example
3.4 Constructors
3.5 Pattern Matching Using Regular Expressions
3.6 Another Example
3.7 Errors in Scripts.
Java Script and XHTML Documents:
3.8 The Java Script Execution Environment
3.9 The Document Object Model
3.10 Element Access in Java Script.
Events and Event Handling:
3.11 Handling Events from Body Elements
3.12 Handling Events from Button Elements
3.13 Handling 3.14 Events from Text Box and Password Elements
3.14 The DOM 2 Event Model
3.15 The Navigator Object
3.16 DOM Tree Traversal and Modificaion.

UNIT – IV   10 Hours

 Dynamic Documents with Java Script:
4.1 Introduction
4.2 Positioning Elements
4.3 Moving Elements
4.4 Element Visibility
4.5 Changing Colors and Fonts
4.6 Dynamic Content

4.7 Stacking Elements
4.8 Locating the Mouse Cursor
4.9 Reacting to a Mouse Click
4.10 Slow Movement of Elements
4.11 Dragging and Dropping Elements.

UNIT – V   **10 Hours**
Introduction To XML:
5.1 Introduction
5.2 The Syntax of XML
5.3 XML Document Structure
5.4 Document Type Definitions
5.5 Namespaces
5.6 XML Schemas
5.7 Displaying Raw XML Documents
5.8 Displaying XML Documents With CSS
5.9 XSLT Style Sheets
5.10 XML Processors.

Text Books
1. Faithe Wempen, *HTML5 Step by Step*, Microsoft Press, 2011.
2. Robert W. Sebesta, *Programming the World Wide Web*, Pearson Education, Fourth Edition, 2009.

Reference Book
1. Joel Sklar, *Principles of Web Design: The Web Technologies Series*, Fifth Edition, 2011.

Core IV : COMPUTER GRAPHICS

Objectives:

1. To understand the computational development of graphics with mathematics.
2. To introduce the fundamental concepts about display devices, input devices and graphics system.
3. To provide in–depth knowledge of display systems, image synthesis, shape modeling of 2D and 3D applications.

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UNIT – I   **10 Hours**

Overview of Graphics Systems:
1.1 Video Display Devices
1.2 Input Devices
1.3 Hard Copy Devices
1.4 Graphics Software
1.5 Introduction to OpenGL.
Graphics Output Primitives:
1.6 Line
1.7 Drawing Algorithms
1.8 Line Equations
1.9 DDA Algorithm
1.10 Bresenham's Algorithm
1.11 Circle
1.12 Generating Algorithms.

UNIT – II   **10 Hours**

Attributes of Graphics Primitives:
2.1 Color and Gray Scale
2.2 Line Attributes
2.3 Fill–Area Attributes
2.4 Character Attributes
2.5 Antialiasing.
2.6 OpenGL Color Functions.
Geometric Transformations:
2.7 Basic Two Dimensional Geometric Transformations
2.8 Matrix Representations and Homogeneous Coordinates.

UNIT – III   **10 Hours**

Two–Dimensional Viewing:
3.1 The Clipping Window
3.2 Clipping Algorithms – Two Dimensional Line Clipping
3.3 Polygon Fill
3.4 Area Clipping
3.5 Curve Clipping
3.6 Text Clipping.
Interactive Input Methods and Graphical User Interfaces:
3.7 Logical Classification of Input Devices
3.8 Interactive Picture Construction Techniques.

UNIT – IV   **10 Hours**

Three Dimensional Viewing:
4.1 The Three
4.2 Dimensional Viewing Pipeline
4.3 Three
4.4 Dimensional Viewing
4.5 Coordinate Parameters Transformation from World to Viewing Coordinates
4.6 Projection Transformations
4.7 Perspective Projections

4.8 OpenGL Three Dimensional Viewing Functions.

UNIT – V   **10 Hours**

Visible–Surface Detection Methods:
5.1 Classification of Visible
5.2 Surface Detection Algorithms
5.3 Comparison of visibility
5.4 Detection Methods
5.5 Curved Surfaces
5.6 Wire–Frame Visibility Methods.
Computer Animation:
5.7 Design of Animation Sequences
5.8 Traditional Animation Techniques
5.9 General Computer
5.10 Animation Functions
5.11 Computer Animation Languages
5.12 Key
5.13 Frame Systems
5.14 Motion Specifications.

Text Book
1. Donald Hearn, M. Pauline Baker, *Computer Graphics with Open GL,* Pearson Education, Third Edition, 2009.

Reference Book
1. Newman William M., Sproull Robert F., *Principles of Interactive Computer Graphics,* McGraw Hill, 2010.

Core V : DIGITAL COMPUTER FUNDAMENTALS AND COMPUTER ARCHITECTURE

Objectives:

1. To understand the principles of digital computer logic circuits and their design.
2. To understand the working principles of central processing unit.

UNIT – I   12 Hours
    1.1 Number Systems
    1.2 Binary Arithmetic
    1.3 Binary codes.

UNIT – II   10 Hours
    2.1 Logic Gates and Logic Circuits
    2.2 Boolean Algebra
    2.3 Karnaugh Map.

UNIT – III   10 Hours
    Arithmetic Building Blocks:
    3.1 Half Adder
    3.2 Full Adder
    3.3 Controlled Inverter
    3.4 The Adder
    3.5 Subtracter.
    Data Processing Circuits:
    3.6 Multiplexer
    3.7 Demultiplexer
    3.8 Decoder
    3.9 Encoder.

UNIT – IV   9 Hours
    Flip–Flops:
    4.1 RS Flip Flop
    4.2 Edge Triggered RS Flip Flop
    4.3 Edge Triggered D Flip Flop
    4.4 JK Flip Flop
    4.5 JK Master Slave Flip Flop.
    Registers:
    4.6 Types of Registers
    Counters:
    4.7 Asynchronous Counters
    4.8 Synchronous Counters
    4.9 MOD Counters
    4.10 Decade Counters
    4.11 Pre–Settable Counters.

UNIT – V   9 Hours
    Central Processing Unit:
    5.1 General Register Organization
    5.2 Stack Organization
    5.3 Instruction Formats
    5.4 Addressing Modes
    5.5 Data Transfer And Manipulation
    5.6 Program Control
    5.7 Reduced Instruction Set Computer
    5.8 CISC characteristics
    5.9 RISC Characteristics.

Text Books

1. V.Vijayendran, *Digital Fundamentals*, S.Viswanathan Pvt.,Ltd., 2008.
2. Donald P Leach., Albert Paul Malvino, *Digital Principles and Applications*, TMH, Fifth Edition 2005.
3. Morris Mano M, *Computer System Architecture,* Prentice Hall of India, Third Edition, 2008.

Reference Book

1. Thomas C Bartee, *Digital Computer Fundamentals*, TMH, Sixth Edition, 1985.

Core Practical I : C PROGRAMMING LAB

Objectives:

1. To give an experience of programming in C Language.
2. To apply the concept of pointers and sorting techniques in C Programs.

List of Exercises

1. Operators.
2. Control statements.
3. Arrays, multidimensional arrays.
4. Functions (recursive functions, types of functions).
5. String handling functions.
6. Structures, unions.
7. Storage classes.
8. Pointers.
9. File handling.
10. Searching.
11. Sorting.

Core Practical II : INTERNET PROGRAMMING LAB

Objectives:

1. To provide working experience with tags, command and hyper links.
2. To develop web pages using HTML5, XML, Java and Visual Basic scripts.

List of Exercises

1. Text and Hyperlinks.
2. Image Mapping.
3. Style Sheets.
4. List with Hyperlinks.
5. Table Handling.
6. Canvas.
7. Video, Audio.
8. Input Types.
9. Semantic Elements.
10. Forms and Validation using Java Script.
11. Calculator using Java script.
12. Event Handling using Vbscript.
13. Application Form using Vbscript.
14. XML Validation.
15. Database Application using XML.

SBC I* - COMMUNICATION AND LIFE SKILLS

Objectives:

1. To inculcate the significance of soft–skills both for personal and professional success.
2. To enable the students to muster effective verbal and non verbal communication.

UNIT – I   **10 Hours**
Basic Grammar – Reading Comprehension:
1.1 Purpose and Strategies of Reading
1.2 Skimming for Details
1.3 Identifying Main Ideas.

UNIT – II   **10 Hours**
Reading Comprehension:
2.1 Scanning for Information
2.2 Drawing Inferences
2.3 Vocabulary.
Writing Paragraphs:
2.4 Features of Good Writing
2.5 Gathering Ideas
2.6 Purposes of Writing
2.7 Writing for a Specific Audience
2.8 Organizing Ideas.

UNIT – III   **10 Hours**
Writing Essays:
3.1 Writing an Introduction
3.2 Developing Supporting Ideas
3.3 Writing a Conclusion
3.4 using Linkers
3.5 Choosing the Right Words
3.6 Common Errors in Writing
3.8 Editing and Proof Reading.

UNIT – IV   **10 Hours**
Group Discussion:
4.1 Group Discussion as a Tool for Selection
4.2 Skills for Group Discussion
4.3 Leadership and Problem
4.4 Solving Skills
4.5 Types of Group Discussions
4.6 Group Dynamics
4.7 Roles and Functions.

UNIT – V   **10 Hours**
Interview Skills:
5.1 Purpose of Interviews
5.2 Preparing a Resume
5.3 Writing Cover Letter
5.4 Before and at the Interview
5.5 Etiquette, Body Language and Time Management.

Text Book
1. Lina, B Sai Lakshmi et.al *Polyskills*, Cambridge University Press India Pvt. Ltd., 2012.

Reference Books

1. John Seely, ***The Oxford Guide to Writing and Speaking***, Oxford University Press, New Delhi, 2004.
2. Thorpe E, and Thorpe S, ***Objective English***, Pearson Education, Second Edition, New Delhi, 2007.
3. Turton N.D and Heaton J.B, ***Dictionary of Common Errors***, Addison Wesley Longman Ltd., Indian reprint 1998.

Core VI : OBJECT ORIENTED PROGRAMMING IN C ++

Objectives:

1. To learn the basic concepts of object oriented programming.
2. To enhance the knowledge in programming through C++.

UNIT – I   10 Hours

An Overview of C++:
1.1 What is Object Oriented Programming?
1.2 C++ Console I/O Commands
1.3 Classes
1.4 Some Difference Between C and C++
1.5 Introduction Function Overloading
Introducing Classes :
1.6 Constructor and Destructor Functions
1.7 Constructors that Take Parameters
1.8 Introducing Inheritance
1.9 Object Pointers
1.10 In–Line Functions
1.11Automatic In–Lining.

UNIT – II   10 Hours

A Closer Look at Classes:
2.1 Assigning Objects
2.2 Passing Object to Functions
2.3 Returning Object from Functions
2.4 An Introduction to Friend Functions.
Arrays, Pointers and References:
2.5 Arrays of Object
2.6 Using Pointers to Objects
2.7 The this Pointer
2.8 Using new & delete
2.9 More –about new & delete
2.10 Reference
2.11 Passing reference to the Objects
2.12 Returning reference
2.13 Independent References and Restrictions.

UNIT – III   10 Hours

Function Overloading:
3.1 Overloading Constructor Functions
3.2 Creating and Using a Copy Constructor
3.3 Using Default Arguments
3.4 Overloading and Ambiguity
3.4 Finding the Address of an Overloaded Function.
Introducing Operator Overloading:
3.5 The Basics of Operator Overloading
3.6 Overloading Binary Operators
3.7 Overloading the Relational and Logical Operators
3.8 Overloading a Unary Operator
3.9 Using Friend Operator Functions
3.10 A closer look at the Assignment Operator Overloading
3.11 The Subscript [] Operator Overloading.

UNIT – IV   **9 Hours**

    Inheritance:
    4.1 Base Class Access Control
    4.2 Using Protected Members
    4.3 Constructors, Destructors and Inheritance
    4.4 Multiple Inheritance
    4.5 Virtual Base Classes.
    Introducing the C++ I/O System:
    4.6 Some C++ I/O Basics
    4.7 Formatted I/O using width ( ), precision( ), fill( )
    4.8 Using I/O Manipulators
    4.9 Creating your own Inserters
    4.10 Creating Extractors.

UNIT – V   **9 Hours**

    Advanced C++ I/O:
    5.1 Creating your own Manipulators
    5.2 File I/O Basics
    5.3 Unformatted, Binary I/O
    5.4 More Unformatted   I/O Functions
    5.5 Random Access
    5.6 5.7 Checking the I/O Status
    5.8 Customized I/O and Files.
    Virtual Functions:
    5.9 Pointers and Derived Classes
    5.10 Introduction to Virtual Functions
    5.11 More about Virtual Functions
    5.12 Applying Polymorphism
    5.13 **Templates and Exception Handling:**
    5.14 Exception Handling
    5.15 Handling Exceptions Thrown.

Text Book
1. Herbert Schildt, *Teach Yourself C++,* McGraw Hill, Third Edition, 2000.

Reference Book
1. Robert Lafore, *Object Oriented Programming in Turbo C++,* Galgotia Publications, 2001.

Core VII : PROBABILITY AND STATISTICS

Objectives:

1. To impart knowledge on probability and distribution functions.
2. To learn discrete distributions and basics of statistics.

UNIT – I   **10 Hours**

1.1 Probability
1.2 Random Events
1.3 Sample Spaces
1.4 Axiomatic Approach to Probability
1.5 Conditional Probability
1.6 Addition and Multiplication
1.7 Baye's Theorem.

UNIT – II   **10 Hours**

2.1 Random Variables
2.2 Discrete and Continuous Random Variables
2.3 Probability Density Functions
2.4 Distribution Functions
2.5 Marginal and Conditional probability Distribution Functions.

UNIT – III   **10 Hours**

3.1 Mathematical Expectations
3.2 Variance
3.3 Moment Generating Functions
3.4 Correlation Coefficients
3.5 Regression.

UNIT – IV   **10 Hours**

4.1 Discrete Distributions
4.2 Binomial, Poisson Distributions
4.3 Continuous Distribution
4.4 Normal and Properties of Normal Distribution.

UNIT – V   **10 Hours**

5.1 Concept of Sampling
5.2 Types of Sampling
5.3 Sampling Distribution and Standard Error
5.4 Testing of Hypothesis
5.5 Tests for Means and Variances for Large and Small Samples
5.6 Chi–Square Test and its Applications
5.7 Tests of Goodness of Fit
5.8 Test of Independence of Attributes.

Text Book

1. Irwin Miller., Marylees Miller., *John E. Freund's Mathematical Statistics with Applications*, Seventh Edition, Pearson Education, 2004.

Reference Books

1. Madin A, *Statistical Methods - An Introductory Text*, Wiley Basterr Ltd., New Delhi, 2010.
2. Guptha S.V, Kapoor V.K, *Fundamental of Mathematical Statistics*, Sultan Chand and Sons, 2011.

Core VIII : OPEN SOURCE TECHNOLOGIES

Objectives:

1. To create awareness about free and open source software.
2. To motivate the students to use open source operating system and develop applications using them.

UNIT – I   **9 Hours**

Open Source Software and Linux(LAMP):
1.1 Introduction
1.2 Open Source Software Vs Commercial Software
1.3 The Web Explained.
The Linux Command Line:
1.4 Starting with Linux Shells:
1.5 Introduction
1.6 Linux Distributions
1.7 Types of Shells: Starting the Shell
1.8 The Shell Prompt
1.9 The Bash Manual
1.10 File System Navigation
1.11 File and Directory Listing
1.12 File Handling
1.13 Directory Handling
1.14 Viewing File Contents.

UNIT – II   **10 Hours**

Linux: **Working with Editors**:
2.1 The Vim Editor
2.2 The emacs Editor
2.3 The KDE Family of Editors
2.4 The GNOME Editor.
Shell Scripting Basics: **Basic Script Building:**
2.5 Using Multiple Commands
2.6 Creating Script File
2.7 Displaying Messages
2.8 Using Variables
2.9 Redirecting Input and Output
2.10 Pipes
2.11 Performing Math
2.12 Exiting the Script.
Using Structured Commands:
2.13 Working with the if–then Statement
2.14 The if–then–else Statement
2.15 Nesting ifs
2.16 The Test Command
2.17 Compound Condition Testing
2.18 The Case Command.

UNIT – III   **9 Hours**

PHP Language Structure:
3.1 The Building Blocks of PHP
3.2 Flow Control Functions in PHP
3.3 Working with Functions
3.4 Working with Arrays
3.5 Working with Objects.

UNIT– IV   **10 Hours**

Getting Involved with the Code:

4.1 Working with Strings, Dates, and Time
4.2 Working with Forms
4.3 Working with Cookies and User Sessions
4.4 Working with Files and Directories
4.5 Working with Images.

UNIT – V   **10 Hours**

    PHP and MySQL Integration:
    5.1 Understanding the Database Design Process
    5.2 Learning Basic SQL Commands
    5.3 Using Transactions and Stored Procedures in MySQL
    5.4 Interacting with MySQL Using PHP.

Text Books
1. James Lee and Brent Ware, *Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP*, Dorling Kindersley (India) Pvt. Ltd and Pearson Education, 2009.
2. Richard Blum, *Linux Command Line and Shell Scripting Bible*, Wiley Publishing, Inc., 2008.
3. Julie C. Meloni, *Sams Teach Yourself PHP, MySQL and Apache All in One*, Pearson Education, Fifth Edition, 2012.

Reference Books
1. Eric Rosebrock, Eric Filson, *Setting Up LAMP: Getting Linux, Apache, MySQL, and PHP and Working Together*", John Wiley and Sons Publications, 2004.
2. Richard Petersen, *The complete Reference Linux*, Sixth Edition, McGraw Hill, 2008.

Core IX : DATA STRUCTURES AND ALGORITHMS

Objectives:

1. To understand the linear and non linear data structures available in problem solving.
2. To know about the sorting and searching techniques and its efficiencies.
3. To get a clear idea about the various algorithm design techniques.
4. To apply the data structures and algorithms in real time applications.

UNIT – I   9 Hours

Introduction and Overview:
1.1 Definitions
1.2 Concept of Data Structures
1.3 Overview of Data Structures
1.4 Implementation of Data Structures.
Linked Lists:
1.5 Definition
1.6 Single Linked List
1.7 Circular Linked List
1.8 Double Linked List
1.9 Circular Double Linked List
1.10 Application of Linked Lists.
Stacks:
1.11 Introduction – Definition
1.12 Representation of Stack
1.13 Operations on Stacks
1.14 Application of Stacks.
Queues:
1.15 Introduction
1.16 Definition
1.17 Representation of Queues
1.18 Various Queue Structures
1.19 Application of Queues.

UNIT – II   10 Hours

Trees :
2.1 Basic Terminologies
2.2 Definition and Concepts
2.3 Representation of Binary Tree
2.4 Operations on Binary Tree
2.5 Types of Binary Trees
2.6 Trees and Forests –2.7 B Trees .

UNIT – III   10 Hours

Graphs:
3.1 Introduction
3.2 Graph Terminologies
3.3 Representation of Graphs
3.4 Operations on Graphs
3.5 Applications of Graph Structures
3.6 BDD and its Applications.
Introduction:
3.7 What is an Algorithm?
3.8 Algorithm Specification
3.9 Performance Analysis**.**

UNIT – IV   11 Hours

Divide–and–Conquer:
4.1 General Method
4.2 Binary Search
4.3 Finding the Maximum and Minimum
4.4 Merge Sort
4.5 Quick Sort
4.6 Selection.
The Greedy Method:
4.7 The General Method
4.8 Minimum Cost Spanning Trees
4.9 Single
4.10 Source Shortest Paths.

UNIT – V   **10 Hours**
Dynamic Programming:
5.1 The General Method
5.2 Multistage Graphs
5.3 All Pairs Shortest Paths
5.4 Single Source Shortest Paths.
Backtracking:
5.5 The General Method
5.6 The 8-Queens Problem
5.7 Sum of Subsets
5.8 Graph Coloring.

Text Books
1. Samanta D**, *Classic Data Structures,* ** Prentice Hall of India, 2006.
2. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, ***Fundamentals of Computer Algorithms***, Galgotia Publications, Second Edition, 1998.

Reference Books
1. V. Aho, J. E. Hopcroft, and J. D. Ullman, ***Data Structures and Algorithms***, Pearson Education, 2008.
2. Anany Levitin, ***Introduction to the Design and Analysis of Algorithms,*** Pearson Education 2003.

Core Practical III : C++ PROGRAMMING LAB

Objectives:

1. To give practical experiences in object oriented programming.
2. To develop C++ programs to illustrate Object Oriented Concepts.

List of Exercises:

1. Class and Objects.
2. Functions
   a) Friend functions.
   b) Inline Functions.
3. Constructor and Destructor
   a) Copy Constructor.
   b) Constructor Overloading.
4. Inheritance Types.
5. Polymorphism
   a) Function Overloading.
   b) Operator overloading (unary and binary).
   c) Virtual functions.
6. I/O Formatting and I/O Manipulators.
7. Files (Read, Write and Update).
8. Stack Operations.
9. Queue Operations.
10. Single Linked List (creation, insertion, deletion, searching).
11. Sorting
    a) Quick Sort.
    b) Merge Sort.
12. Searching
    a) Linear search.
    b) Binary search.
       1. Tree Traversals.

Core Practical IV : OPEN SOURCE PROGRAMMING LAB

Objectives:

1. To have a practical knowledge in Linux.
2. To understand and work with PHP and MySQL.

List of Exercises:

1. Simple shell commands.
2. Directories commands.
3. Navigating file system.
4. Simple filters.
5. Regular expressions.
6. System processes commands
    a. Write a menu driven program to create, sort and display a file.
    b. Write a menu driven program to copy, edit, rename and delete a file.
    c. Prepare the mark list of a student.
    d. Write a shell program to sort the names and numbers in ascending and descending order.
7. 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.
8. Write a PHP program that adds products that are selected from a web page to a shopping cart.
9. Write a PHP program Interface to create a database and to insert a table into it.
10. Write a PHP program using classes to create a table.
11. Write a PHP program to upload a file to the server.
    a. Write a shell program to find the details of an user session.
    b. Create a MySQL table and execute queries to read, add, remove and modify a record from that table.

Summer Internship I**: SUMMER PROJECT - I

Objective:

To develop software using the concepts and techniques studied during the first and second semesters.

NMEC (a) : WEB DESIGN

Objectives:

1. To learn the basics of internet, email and search engines.
2. To develop the knowledge for creating web pages using HTML and scripting.

UNIT – I   **10 Hours**

    1.1 Internet
    1.2 Definition of Internet
    1.3 Basics of Internet
    1.4 Internet and WWW
    1.5 Internet Application
    1.6 Web Browsers
    1.7 Web Pages
    1.8 Internet Chat
    1.9 Web Sites
    1.10 E–Mail
    1.11 Search Engines
    1.12 URLs
    1.13 Domain Names
    1.14 Portals.

UNIT – II   **10 Hours**

    2.1 HTML
    2.2 Basics of HTML
    2.3 Document Body Text
    2.4 Hyperlink
    2.5 Adding more Formatting
    2.6 Lists
    2.7 Using Color & images.

UNIT – III   **9 Hours**

    3.1 Tables
    3.2 Multimedia Objects
    3.3 Frames
    3.4 Forms
    3.5 Marquee.

UNIT – IV   **9 Hours**

    4.1 DHTML
    4.2 Cascading Style Sheets
    4.3 Introduction using Styles
    4.4 Working Simple Examples
    4.5 Defining Your Own Styles
    4.6 Properties & Values in Styles
    4.7 Style Sheets
    4.8 A Worked Example
    4.9 Formatting Blocks of Information.

UNIT – V   **9 Hours**

    5.1 Java Script
    5.2 Introduction to Java script
    5.3 Basics
    5.4 Variables
    5.5 String Manipulation
    5.6 Mathematical Functions
    5.7 Operations
    5.8 Built– in Objects

5.9 Data Validation
5.10 Messages & Confirmation
5.11 Status Bar
5.12 Writing to a Different Frame.

Text Books
1. Raj Kamal, *Internet & Web Technologies*, McGraw Hill, 2009.
2. Chris Bates, *Web Programming*, John Wiley & Sons, Third Edition, 2010.

Reference Book
1. Steven Holzner, *HTML Black Book*, Dreamtech Publishers, 2008.

NMEC (b) : CYBER CRIME

Objectives:

1. To give a clear picture on the nature and effects of cyber crimes.
2. To help the students to face such challenges with technical skills.

UNIT – I   **9 Hours**
   1.1 Sale of Illegal Articles
   1.2 Online gambling
   1.3 Intellectual Property Crimes
   1.4 Email Spoofing
   1.5 Forgery
   1.6 Cyber Stalking
   1.7 Web Defacement.

UNIT – II   **9 Hours**
   2.1 Email Bombing
   2.2 Data Diddling
   2.3 Virus / Worm Attacks
   2.4 Trojans and Keyloggers
   2.5 Email Frauds
   2.6 Computer Crime Technology
   2.7 White Collar Computer Crime
   2.8 Crime Victim.

UNIT – III   **9Hours**
   3.1 Fake Websites
   3.2 Bank Fraud
   3.3 Advance Fee Fraud
   3.4 Identity Theft
   3.5 Digital Privacy Cyber Security
   3.6 Protecting Information Resources.

UNIT – IV   **9 Hours**
   Corporate Reputation:
   4.1 Determinants and Effects
   4.2 Rebuilding Corporate Reputation
   4.3 Social Responsibility.

UNIT – V   **9 Hours**
   5.1 Knowledge Resources
   5.2 Entrepreneurship Capabilities
   5.3 Information Sources
   5.4 knowledge Categories
   5.5 Crime Investigations

Text Books
   1. Rohas Nagpal, *Evolution of Cyber Crimes*, Asian School of Cyber Laws, 2008.
   2. Petter Gottschalk, *Policing Cyber Crime*, Petter Gottschalk and Ventus Publishing Aps, 2010.

Reference Book
   1. Farooq Ahmad, *Cyber Law in India Law on Internet*, Fourth Edition, 2011.

NMEC (c) : PRINCIPLES OF INFORMATION TECHNOLOGY

Objectives:

1. To impart basic knowledge about computer systems.
2. To enable the students to know the importance of internet and applications of internet technologies.

UNIT – I   10 Hours

Introduction to Computer Systems :
1.1 Introduction to Computer
1.2 Classification of Digital Computer System
1.3 Anatomy of Digital Computer
1.4 Architecture
1.5 Number System
1.6 Memory Units
1.7 Auxiliary Storage Devices.

UNIT – II   10   Hours

2.1 Input Devices
2.2 Output Devices
2.3 **Computer software and software Development**:
2.4 Introduction to Computer Software
2.5 Operating systems
2.7 Programming Languages
2.8 Software Features and Trends.

UNIT – III   9 Hours

Tele Communications:
3.1 Introduction to Tele communication
3.2 Computer Networks
3.3 Communication System
3.4 Distributed system.

UNIT – IV   9 Hours

Internet and Intranet:
4.1 Internet and World Wide Web
4.2 email
4.3 Intranets.

UNIT – V   9 Hours

Applications of IT:
5.1 Computer in Business and Industry
5.2 Computers in Home
5.3 Computer in Education and Training
5.4 Computer in Entertainment, Science, Medicine and Engineering.

Text Book
1. Alexis Leon and Mathews Leon, *Fundamentals of Information Technology*, VIKAS Publishing House Pvt. Ltd., 2009.

Reference Books
1. Stacey C. Sawyer, Brain K. Williams Sarah E. Hutchinson, *Using Information Technology – A practical introduction to computers and communications*, Third Edition, McGraw Hill, 2005.
2. A. Kumar, *Internet and IT*, Anmol Publications Pvt. Ltd., First Edition, 2002.

Core X : PROGRAMMING IN JAVA

Objectives:

1. To impart knowledge in the basic concepts of Java programming.
2. To develop programs in GUI using AWT and swing.
3. To introduce the Remote Method Invocation and JDBC.

UNIT – I   **10 Hours**

The History and Evolution of Java :
1.1 The Creation of Java
1.2 The Byte Code
1.3 The Java Buzzwords.
An Overview of Java –
1.4 **Introducing Classes**
1.5 **A Closer Look at Methods and Classes**
1.6 **Inheritance.**

UNIT – II   **10   Hours**

2.1 Packages and Interfaces
2.2 Exception Handling
2.3 MultiThreaded Programming
2.4 Enumerations, Autoboxing and Annotations(Metadata)
2.5 String Handling
2.6 Exploring java.lang:
2.7 Primitive Type Wrappers
2.8 Process
2.9 Runtime – Math.

UNIT – III   **15 Hours**

The Collections Framework:
3.1 Collections Overview
3.2 The Collection Interfaces
3.3 The Collection Classes (ArrayList, LinkedList)
3.4 Accessing a Collection via an Iterator
3.5 StringTokenizer, Date, Scanner. **Input/Output Classes and Interfaces.**
3.6 Networking..

UNIT – IV   **10 Hours**

Java Applets – Java AWT:
4.1 Working with User Interfaces
4.2 Event-Driven Programming
4.3 Swing Part–I.

UNIT – V   **10 Hours**

Swing Part – II
5.1 Java Database Connectivity
5.2 Java Remote Method Invocation (RMI)
5.3 Java Servlets: JSDK
5.4 The Servlet API
5.5 Life Cycle of a Java Servlet
5.6 Creating Servlets.

Text Books
1. Herbert Schildt, *The JAVA 2*, *Complete Reference* McGraw Hill, Fifth Edition 2009.
2. Ivan Bayross, *JAVA 2.0 Web Enabled Commercial Application Development*, BPB Publications, 2000.

Reference Books
1. Ken Arnold, James Gosling, David Holmes, *Java™ Programming Language*, Addison Wesley Profession, Fourth Edition, 2005.

2. Paul J. Deitel, Harvey M. Deitel, *Java™ for Programmers, 2/E,* PHI Publications, 2011.

Core XI : RESOURCE MANAGEMENT TECHNIQUES

Objectives:

1. To impart basic knowledge in resource management techniques.
2. To enable the students to learn problem solving techniques.

UNIT – I   **10 Hours**

    1.1 The Linear Programming Problem
    1.2 Mathematical Formulation of the Problem
    1.3 Graphical Solution Method
    1.4 The Simplex Method
    1.5 Artificial Variable Techniques
    1.6 Dual Simplex method.

UNIT – II   **10 Hours**

    2.1 The Transportation Problem
    2.2 Matrix Form
    2.3 The Transportation Table
    2.4 The Initial Basic Feasible Solution
    2.5 Degeneracy in Transportation Problems
    2.6 Optimum Solution
    2.7 The Assignment and Routing Problems.

UNIT – III   **10 Hours**

    3.1 Queueing Theory
    3.2 Queueing System
    3.3 Characteristics of Queueing System
    3.4 Poisson Process and Exponential Distribution
    3.5 Classification of Queues
    3.6 Transient and Steady States
    3.7 Poisson Queues
    3.8 Non – Poisson Queueing Systems
    3.9 Non – Markovian Queues
    3.10 Probabilistic models.

UNIT– IV   **10 Hours**

    4.1 Inventory Control
    4.2 ABC Analysis
    4.3 Economic Lot Size Problems
    4.4 EOQ with Shortage
    4.5 Multi–Item Deterministic Problem
    4.6 Uncertain Demand
    4.7 Inventory Control with Price Breaks. Replacement Problem
    4.8 Replacement of Items that Deteriorate with time
    4.9 Replacement of Items that Fail Completely
    4.10 other Replacement Problems.

UNIT – V   **10 Hours**

    5.1 Network Scheduling by PERT/CPM
    5.2 Basic Concepts
    5.3 Constraints in Network
    5.4 Construction of the Network
    5.5 Time Calculations in Networks
    5.6 Critical Path Method (CPM)
    5.7 PERT – PERT Calculations.

Note: Derivations of results are not expected.

Text Book

1. Kanti Swarup, P.K. Gupta and Man Mohan, *Operations Research*, Sultan Chand and Sons, 1992.

Reference Books

1. Hamdy A Taha, *Operations Research – An Introduction,* Macmillan Publishing Company, 1982.
2. Don. T. Phillips, A. Ravindran, James. J. Solberg, *Operations Research – Principles and Practice*, John Wiley & Sons, 1976.

Core XII: DATABASE SYSTEMS

Objectives:

1. To understand the database applications, structure, languages and models.
2. To have a clear idea about the relational model, integrity, security, transaction management, storage and file structure.
3. To learn about SQL & PL /SQL statements.

UNIT – I   12 Hours

Introduction:
1.1 Database System Applications
1.2 Database Systems vs File Systems
1.3 View of data
1.4 Data Models
1.5 Database Languages
1.6 Database Users and Administrators
1.7 Transaction Management
1.8 Database System Structure
1.9 Application Architectures.
Entity – Relationship model:
1.10 Basic Concepts
1.11 Constraints
1.12 Keys
1.13 Entity
1.14 Relationship Diagram
1.15 Weak entity Sets
1.16 Extended E–R Features.
Relational Model:
1.15 Structure of Relational Database
1.16 Relational Algebra
1.17 Extended Relational Algebra Operations.

UNIT – II   10 Hours

Integrity and security:
2.1 Domain Constraints Referential Integrity –
2.2 Assertions
2.3 Security and Authorization
2.4 Authorization in SQL
2.5 Encryption and Authentication.
Relational Database Design:
2.6 First Normal Form
2.7 Pitfalls in Relational Database Design
2.8 Functional Dependencies
2.9 Decomposition
2.10 Desirable Properties of Decomposition
2.11 Boyce Codd Normal Form
2.12 Third Normal Form
2.13 Fourth Normal Form
2.14 More normal Forms .

UNIT – III   9 Hours

Storage and File Structure:
3.1 RAID
3.2 File Organization
3.3 Organization of Records in Files
3.4 Dictionary Storage.
Indexing and Hashing:
3.5 Basic Concepts
3.6 Ordered Indices
3.7 B+ – Tree Index Files
3.8 Static Hashing
3.9 Dynamic Hashing.

UNIT–IV   9 Hours

Transaction Management:

4.1 Transactions Concept
4.2 Transaction state
4.3 Implementation of Atomicity and Durability
4.4 Concurrent Executions
4.5 Serializability
Concurrency control:
4.6 Lock Based Protocols
4.7 Timestamp Based Protocols
4.8 Validation Based Protocols
Recovery system:
4.9 Failure classification
4.10 Storage Structure
4.11Recovery and Atomicity
4.12 Log Based Recovery
4.13 Shadow Paging.

UNIT – V   **10 Hours**
Introduction to Oracle:
5.1 Classification of SQL Commands
5.2 Data Types
5.3 Operators
5.4 Built in functions
5.5 Sorting
5.6 Joins
5.7 Special Operators: Set Operators.
Indexing:
5.8 Removing Index
5.9 Creating Index on Multiple Columns.
Views:
5.10 Creating and Accessing
5.11 Classification of Views.
PL/SQL:
5.12 Introduction
5.13 Advantages of PL/SQL
5.14 Structure of PL/SQL Block
5.15 Conditional Statement
5.16 Stored Functions: Structure of Function
5.17 Compiling a Function
5.18 Calling a Function.
Stored Procedures:
5.19 Advantages of Procedures
5.20 Why Called "Stored Procedures"?
5.21 Differences between Procedures and Functions
5.22 Compiling a Procedure
5.23 Executing a Procedure.
Cursors:
5.24 What is Cursor?
5.25 Purpose of Cursors
5.26 Classification of Cursors.
Database Triggers:
5.27Components of Trigger
5.28Types of Triggers.

Text Books
1. Abraham Silberchatz, Henry F. Korth and S. Sudharshan, *Data Base System concepts* Mc Graw Hill, Fourth Edition, 2006.
2. Satish Asnani, *Oracle Database 11g –Hands–on SQL and PL/SQL,* PHI Learning, 2010.

Reference Books
1. C.J. Date, A. Kannan, S.Swamynathan, *Introduction to Database Systems*, Pearson Education, Eighth Edition 2006.
2. Ramez Elmasri, *Fundamentals of Database Systems*, Pearson Education, 2008.

SEMESTER : III   **HOURS/WEEK : 4**
CODE   : P14CA313   **CREDITS   : 4**

Core XIII: OPERATING SYSTEMS

Objectives:

1. To enable the students to learn the basic concepts of operating systems.
2. To impart knowledge about operating system functionalities like memory, processor, and scheduler.

UNIT – I   **10 Hours**
    Operating System Overview:
    1.1 Operating System Objectives and Functions
    1.2 The Evolution of Operating Systems
    1.3 Major Achievements
    1.4 Developments Leading to Modern Operating Systems
    1.5 Virtual Machines
    1.6 OS Design Considerations for Multiprocessor and Multicore
    1.7 Microsoft Windows Overview
    1.8 Traditional UNIX Systems
    1.9 Modern UNIX Systems.

UNIT – II   **10 Hours**
    Process: Process Descriptions & Control:
    2.1 What is a Process? Process States
    2.2 Process Description
    2.3 Process Control
    2.4 Execution of the Operating System.
    Threads:
    2.5 Processes and Threads
    2.6 Types of Threads
    2.7 Multicore and Multithreading.
    Concurrency:
    2.8 Mutual Exclusion and Synchronization
    2.9 Concurrency:
    2.10 Deadlock and Starvation.

UNIT – III   **9 Hours**
    Memory: Memory Management:
    3.1 Memory Management Requirements
    3.2 Memory Partitioning
    3.3 Paging
    3.4 Segmentation
    3.5 Security Issues.
    Virtual Memory:
    3.6 Hardware and Control Structures
    3.7 Operating System Software.

UNIT – IV   **9 Hours**
    Scheduling: Uniprocessor Scheduling:
    4.1 Types of Scheduling
    4.2 Scheduling Algorithms.
    Multiprocessor and Real Time Scheduling:
    4.3 Multiprocessor Scheduling
    4.4 Real time scheduling
    4.5 Linux Scheduling
    4.6 UNIX FreeBSD Scheduling Windows 7 Scheduling.

UNIT – V   **10 Hours**
    Input/Output and Files: I/O Management and Disk Scheduling:
    5.1 I/O Devices
    5.2 Organization of the I/O Function
    5.3 Operating System Design Issues
    5.4 I/O Buffering
    5.5 Disk Scheduling

5.6 RAID

5.7 Disk Cache

5.8 UNIX FreeBSD I/O

5.9 Windows 7 I/O.

File Management:

5.10 Overview

5.11 File Organization and Access

5.12 File Directories

5.13 File Sharing

5.14 Record Blocking

5.15 Secondary Storage Management

5.16 File System Security

5.17 UNIX File Management

5.18 Linux File Management

5.19 Windows 7 File System.

Text Book

1. Willam Stallings, *Operating Systems*, Pearson Education, Seventh Edition, 2003.

Reference Books

1. Deital H.M, *An Introduction to Operating Systems,* Addison Wesley Publishing Co., 1984.
2. Silberschartz A, Peterson J.L., Galvin P, *Operating System Concepts*, Addison Wesley publishing co., 1998.

Core Practical V : JAVA PROGRAMMING LAB

Objectives:

1. To get experience with java programming concepts.
2. To develop GUI application using awt and swing.
3. To develop JDBC programs.

List of Exercises:

1. Classes and Objects.
2. Inheritance.
3. Interfaces.
4. Packages.
5. Exceptions handling.
6. Multithreading.
7. Collection Interfaces.
8. I/O Streams.
9. Applet programming.
10. Applying AWT concepts.
11. Applying swing concepts.
12. JDBC.

Core Practical VI : RDBMS LAB

Objectives:

1. To get hands–on experience with SQL.
2. To work with PL/SQL commands, functions, procedures, cursors and triggers.
3. To get experience on exception handling.

List of Exercises:

1. DDL statements and simple queries.
2. DML statements and simple queries.
3. Queries using
   1. WHERE clause, HAVING clause, LIKE operator, BETWEEN clause.
   2. logical operators.
   3. Set operators.
   4. Sorting and grouping.
4. Nested queries using SOL
   i. Sub queries.
   ii. Join operators .
5. Built – in functions (string functions, character functions, date functions, conversion functions, and aggregate functions).
6. Use of indexes, creating views and querying in views.
7. Functions.
8. Procedures.
9. Cursors.
10. Triggers.
11. Exceptions.
12. Case studies in PL/SQL:
    i. Splitting of tables.
    ii. Joining of tables.
    iii. Pay bill preparation

Elective I (a) : ACCOUNTING AND FINANCIAL MANAGEMENT

Objectives:

1. To learn book keeping and accountancy for financial management.
2. To impart knowledge in cost analysis, decision making and operational planning.

UNIT – I   **10 Hours**
   Financial Statements:
   1.1 Accounting Concepts and Conventions
   1.2 System of Book Keeping
   1.3 Journal
   1.4 Ledger
   1.5 Trail Balance
   1.6 Preparation of Trading A/c, Profit and Loss A/c and Balance Sheet without Adjustments.

UNIT – II   **10 Hours**
   Financial Statement Analysis:
   2.1 Financial ratios
   2.2 Classification According to Statement
   2.3Classification According to Function.

UNIT – III   **10 Hours**
   Cost Analysis for Decision Making:
   3.1 Understanding Costs
   3.2 Cost Volume Profit   Analysis
   3.3 Absorption and Marginal Costing.

UNIT – IV   **10 Hours**
   Financial Decisions:
   4.1 Cost of capital
   4.2 Capital Structure Planning
   4.3 Investment Decisions.

UNIT – V   **10 Hours**
   Operational Planning and control:
   5.1 Working Capital Planning and Financing.

Text Books
   1. T.P.Ghosh , *Accounting and Finance for Managers*, Taxmann Publication ., 2007.
   2. R.K.Sharma and Shashi K.Gupta, *Accounting for Financial Management*, Kalyani Publishers.

Reference Book
   1. Dr. M. Sheik Mohamed, Dr.E. Mubarak Ali, Dr. M. Abdul HAkkeem, *Management Accounting,* Raja Publications, 2012.

Elective I (b) : MARKETING MANAGEMENT

Objectives:

1. To make the students to know the importance of marketing a developed product.
2. To enrich the knowledge of marketing with development, advertising, selling and management of a new product.

UNIT – I   **10 Hours**
Marketing Management:
1.1 Meaning of Market,
1.2 Marketing and Marketing Management
1.3 Marketing Functions
1.4 Marketing Concepts
1.5 Marketing Environment
1.6 Approaches to Study of Marketing
1.7 Market Segmentation
1.8 Brand Positioning
1.9 Factors Influencing Buyer's Behaviour.

UNIT – II   **10 Hours**
New Product Development:
2.1 Meaning of Product, Idea Screening
2.2 Concept Development and Testing
2.3 Strategy Development
2.4 Market Testing
2.5 Commercialization
2.6 Consumer Adoption Process
2.7 Product Life Cycle
2.8 Product Mix Decisions
2.9 Product Line Decisions
2.10 Individual Product Decision
2.11Product Positioning.

UNIT – III   **10 Hours**
Managing Marketing Channels:
3.1 Nature of Marketing channels
3.2 Channel Design Decisions
3.3 Channel Management Decisions
3.4 Channel Dynamics
3.5 Retailing
3.6 Types
3.7 Decisions
3.8 Trends
3.9 Wholesaling
3.10 Types
3.11 Decision Trends
3.12 Physical Distribution
3.13 Objective
3.14 Order Processing – Warehousing
3.15 Inventory
3.16 Transportation
3.17 Distribution Cost Analysis
3.18 Packing.

UNIT – IV   **10 Hours**
Advertising and Sales Promotion:

4.1 Advertising
4.2 Setting and Objectives
4.3 Deciding on the Message
4.4 Deciding on the Media
4.5 Evaluating the Effectiveness
4.6 Sales Promotion
4.7 Purpose of Sales Promotion
4.8 Decision in Sales Promotion
4.9 Objectives of Sales Promotion
4.10 Developing Sales Promotion Programme
4.11 Pretesting Sales Promotion Programme
4.12 Implementing Sales Promotion Programme
4.13 Evaluating Sales Promotion Programme
4.14 Management of Sales Force.

UNIT – V   **10 Hours**

Pricing of Product / Service:
5.1 Setting the Price
5.2 Adopting the Price
5.3 Methods of Pricing.

Text Book
1. Philip Kotler, ***Marketing Management*** , Dorling Kindersley Pvt Ltd.,2009.

Reference Books
1. Gordon B. Davis Margrethene H. Olson, ***Management Information Systems***, McGraw Hill, 2000.
2. Edward W. Cundiff, Richard Ralph Still, Norman A. P. Govoni, ***Fundamentals of Modern Marketing,*** Prentice Hall of India,1980.

Elective I (c) : MANAGEMENT INFORMATION SYSTEMS

Objectives:

1. To impart the business knowledge in terms of information management and decision making.
2. To develop the knowledge in business applications for managerial decision supports.

UNIT – I   **10 Hours**

Introduction to Information Systems:
1.1 Why study Information System?
1.2 Why Business need Information Technology?
1.3 Fundamentals of Information Systems
1.4 Overview of Information Systems.

UNIT – II   **10 Hours**

Solving Business Problems with Information Systems:
2.1 System Approach to Problem Solving
2.2 Developing Information System Solution.
Database Management:
2.3 Managing Data Resources
2.4 Technical Foundation of Database Management.

UNIT – III   **10 Hours**

Information Systems for Strategic Advantage:
3.1 Fundamentals
3.2 Strategic Advantage
3.3 Strategic Applications and Issues in IT.
Managing:
3.4 Enterprise and Global Management.

UNIT – IV   **10 Hours**

Business Applications of Information Technology:
4.1 The Internet Electronic Commerce
4.2 Fundamentals of Electronic Commerce
4.3 Information System for Business Operations
4.4 Business Information System
4.5 Transaction Processing Systems.

UNIT – V   **10 Hours**

Information Systems for Managerial Decision Support:
5.1 Decision Support Systems
5.2 Artificial Intelligence Technology in Business
5.3 Management IT
5.4 Planning for Business Change with IT
5.5 Implementing Business Changes with IT
5.6 Security and Control Issues in I/S
5.7 Ethical and Societal Challenge of Information Technology.

Text Book

1. James A. O'Brien, *Management Information Systems,* Galgotia Publications, Fourth Edition, 1999.

Reference Book

1. Gordon B. Davis, Margrethe H. Olson, *Management Information Systems*, McGraw Hill, 2000.

SBC II*: NUMERICAL APTITUDE

Objectives:

1. To improve the students' numerical ability.
2. To empower their professional capacity.

UNIT – I   **10 Hours**

    1.1 Numbers
    1.2 HCF
    1.3 LCM
    1.4 Decimal Fractions
    1.5 Simplification
    1.6 Square Roots
    1.7 Cube Roots
    1.8 averages
    1.9 Problems in numbers and ages.

UNIT – II   **10 Hours**

    2.1 Surds
    2.2 Indices
    2.3 Percentages
    2.4 Profit and Loss
    2.5 Ratio and Proportion
    2.6 Partnership
    2.7 Chain Rule
    2.8 Time and Work
    2.9 Pipes and Distances.

UNIT– III   **10 Hours**

    3.1 Time and distance
    3.2 Problems on Trains, Boats and Streams
    3.3 Alligation – Simple Interest
    3.4 Compound Interest
    3.5 Logarithms
    3.6 Area.

UNIT– IV   **10 Hours**

    4.1 Volume and Surface Area
    4.2 Races and Games of Skill
    4.3 Calendar
    4.4 Clocks
    4.5 Stocks and Shares Permutation and Combination
    4.6 Probability.

UNIT – V   **10 Hours**

    5.1 True Discount
    5.2 Banker's Discount
    5.3 Height and Distances
    5.4 Odd man out and Series
    5.5 Tabulation
    5.6 Bar graphs
    5.7 Pie charts
    5.8 Line Graphs.

Text Book

1. R. S. Aggarwal, *Quantitative Aptitude for Competitive Examinations*, S.Chand and Co. Ltd, Seventh Revised Edition, 2005.

Reference Book
1. Barron's, *Guide for GMAT*, Galgotia Publications, 2006.

Core XIV : PROGRAMMING IN .NET TECHNOLOGIES

Objective:
1. To build web applications using server controls and ADO.NET concepts.
2. To expose the students to work with C# Sharp.

UNIT – I   **10 Hours**
    1.1 The .NET Framework
    1.2 The Evolution of Web Development
    1.3 The .NET Framework.
    1.4 The .NET Languages
    1.5 C# Language Basics
    1.6 Variables and Data Types.
    1.7 Variable Operations
    1.8 Object–Based Manipulation
    1.9 Conditional Logic
    1.10 Loops
    1.11 Methods
    1.12 The Basics About Classes
    1.13 Building a Basic Class
    1.14 Value Types and Reference Types
    1.15 Understanding Namespaces and Assemblies
    1.16 Advanced Class Programming.

UNIT – II   **10 Hours**
    2.1 The Anatomy of an ASP.NET Application
    2.2 Introducing Server Controls
    2.3 Improving the Currency Converter
    2.4 A Deeper Look at HTML Control Classes
    2.5 The Page Class – 2.6 Application Events
    2.7 Application Events
    2.8 ASP.NET Configuration
    2.9 Stepping Up to Web Controls
    2.10 Web Control Classes
    2.11 List Controls
    2.12 Table Controls
    2.13 Web Control Events and AutoPostBack
    2.14 A Simple Web Page.

UNIT – III   **9 Hours**
    3.1 Understanding Validation
    3.2 The Validation Controls
    3.3 The Calendar
    3.4 The AdRotator
    3.5 Pages with Multiple Views
    3.6 User Controls
    3.7 Master page Basics.
    Website Navigation:
    3.8 The Problem of State
    3.9 View State
    3.10 Transferring Information Between Pages
    3.11 Cookies
    3.12 Session State
    3.13 Session State Configuration.

UNIT – IV   **9 Hours**
    4.1 Understanding Data Management

4.2 Configuring Your Database
4.3 SQL Basics
4.4 ADO.NET Basics
4.5 Direct Data Access
4.6 Disconnected Data Access
4.7 Introducing Data Binding
4.8 Single
4.9 Value Data Binding
4.10 Repeated
4.11 Value Data Binding
4.12 Data Source Controls.

UNIT – V   **10 Hours**

5.1 The GridView
5.2 Formatting the GridView
5.3 Selecting a GridView Row
5.4 Editing with the GridView
5.5 Sorting and Paging the GridView
5.6 Using GridView Templates
5.7 The DetailsView and FormView
5.8 Files and Web Applications
5.9 File System Information
5.10 Reading and Writing with Streams
5.11 Allowing File Uploads
5.12 Deploy a Web Application in WWW.

Text Book

1. Mathew MacDonald, ***Beginning ASP.NET 4 in C# 2010: From Novice to Professional***, Apress Publications, Second Edition, 2007.

Reference Book

1. Mirudula Parihar, ***ASP.NET Bible***, DreamTech Publications, 2007.

Core XV : COMPUTER COMMUNICATION NETWORKS

Objectives:

1. To study the concepts on the uses of network, network hardware, software, protocols, and their performance.
2. To learn the different types of network layers and network security.

UNIT – I   **10 Hours**

1.1 Introduction – **Uses of Computer Networks:**
1.2 Business Application
1.3 Home Application
1.4 Mobiles users
1.5 Social Issues
1.6 Network Hardware
1.7 Network Software.
Reference Models:
1.8 OSI Reference model
1.9 TCP\IP Reference model.
The physical Layer:
1.10 The Theoretical Basis for Data Communication
1.11 Guided Transmission Media
1.12 Wireless Transmission.

UNIT – II   **10 Hours**

The Data Link Layer:
2.1 Design Issues
2.2 Error Detection and Correction
2.3 Elementary Data Link Protocols
2.4 Sliding Window Protocols
2.5 The Medium Access Sublayer.
Ethernet:
2.6 Ethernet Cabling
2.7 Manchester Encoding
2.8 Ethernet MAC Sublayer Protocol.
Bluetooth:
2.9 Bluetooth Architecture
2.10 Bluetooth Applications
2.11 The Bluetooth Protocol Stack
2.12 Bluetooth Frame Structure.

UNIT – III   **10 Hours**

The Network Layer:
3.1 Design Issues
3.2 Routing Algorithms.
Congestion Control:
3.3 General Principles of Congestion Control
3.4 Congestion Control Prevention Policies
3.5 Congestion Control in Virtual Circuit Subnets
3.6 Congestion Control in Datagram Subnets.
3.7 Quality of Service – 3.8 Internetworking
3.9 The Network Layer in the Internet:
3.10 The IP Protocol – IP Address.

UNIT – IV   **10 Hours**

The Transport Layer:

4.1 The Transport Service
4.2 The Internet Transport Protocol (UDP) .
The Internet Transport Protocol (TCP):
4.3 Introduction to TCP
4.4 TCP Service Model
4.5 The TCP Protocol
4.6 The TCP Segment Header
4.7 TCP Connection Establishment
4.8 TCP Connection Release .
The Application Layer:
4.9 Domain Name System
4.10 Electronic Mail.

UNIT – V   **10 Hours**

Network Security: Cryptography:
5.1 Introduction to Cryptography
5.2 Substitution Ciphers
5.3 Transposition Ciphers
5.4 One Time pads
5.5 Two Fundamental Cryptographic Principles.
Symmetric Key Algorithms:
5.6 Data Encryption Standard. **Public Key algorithms:**
5.7 RSA
5.8 Other Public Key Cryptography.
5.9 Email Security
5.10 Web Security.

Text Book
1. Andrew S. Tannenbaum, *Computer Networks*, Prentice Hall of India, Fourth Edition, 2005.

Reference Books
1. Behrouz A Forouzan, *Data Communications and Networking*, McGraw Hill, Fourth Edition, 2006.
2. William Stallings, *Data and Computer Communications*, Prentice Hall of India, Sixth Edition, 2000.

SEMESTER : IV   **HOURS/WEEK : 4**
CODE   : P14CA416   **CREDITS   : 4**

Core XVI: SOFTWARE ENGINEERING

Objectives:

1. To enable the students to learn the various software development models.
2. To understand the concepts of data flow in software development.

UNIT – I   10 Hours

Software and Software Engineering:
1.1 The Nature of Software
1.2 The Unique Nature of WebApps
1.3 Software Engineering
1.4 The Software Process
1.5 Software Engineering Practice
1.6 Software Myths.
The Software Process: Process Models:
1.7 A Generic Process Model
1.8 Process Assessment and Improvement
1.9 Prescriptive Process Models
1.10 Specialized Process Models
1.11 The Unified Process.

UNIT – II   10 Hours

Modeling: Principles that Guide Practice:
2.1 Software Engineering Knowledge
2.2 Core Principles
2.3 Principles That Guide Each Framework Activity.
Understanding Requirements:
2.4 Requirements Engineering
2.5 Establishing the Groundwork
2.6 Eliciting Requirements
2.7 Developing UseCases
2.8 Building the Requirements Model
2.9 Negotiating Requirements
2.10 Validating Requirements.
Requirements Modeling: Scenarios, Information and Analysis Classes:
2.11 Requirements Analysis
2.12 Scenario–Based Modeling
2.13 UML Models That Supplement the Use Case
2.14 Data Modeling Concepts
2.15 Class–Based Modeling.

UNIT – III   10 Hours

Design Concepts:
3.1 Design within the Context of Software Engineering
3.2 The Design Process
3.3 Design Concepts
3.4 The Design Model.
Architectural Design:
3.5 Software Architecture
3.6 Architectural Genres
3.7 Architectural Styles
3.8 Architectural Design.
User Interface Design:
3.9 The Golden Rules
3.10 Interface Design Steps.
Quality Management: Quality Concepts:
3.11 Software Quality
3.12 The Software Quality Dilemma
3.13 Achieving Software Quality.

UNIT – IV   10 Hours

Software Quality Assurance:
4.1 Background Issues
4.2 Elements of Software Quality Assurance
4.3 SQA Tasks, Goals and Metrics

4.4 Formal Approaches to SQA
4.5 Statistical Software Quality Assurance
4.6 Software Reliability
4.7 The ISO 9000 Quality Standards
4.8 The SQA Plan.
Software Testing Strategies:
4.9 A Strategic Approach to Software Testing
4.10 Strategic Issues
4.11 Test Strategies for Conventional Software
4.12 Test strategies for Object
4.13 Oriented Software
4.14 Test Strategies for WebApps
4.15 Validation Testing
4.16 System Testing
4.17 The Art of Debugging.
Testing Conventional Applications:
4.18 Software Testing Fundamentals
4.19 Internal and External Views of Testing
4.20 White Box Testing
4.21 Basis Path Testing
4.22 Control Structure Testing
4.23 Black Box Testing
4.24 Model Based Testing.

UNIT – V   **10 Hours**
Managing Software Projects: Project Management Concepts:
5.1 The Management Spectrum
5.2 People
5.3 The Product
5.4 The Process
5.5 The Project.
Process and Project Metrics:
5.6 Metrics in the Process and Project Domains
5.7 Software Measurement
5.8 Metrics for Software Quality
5.9 Integrating Metrics within the Software Process
5.10 Metrics for Small Organizations
5.11 Establishing a Software Metrics Program.
Estimation For Software Projects:
5.12 Software Project Estimation
5.13 Decomposition Techniques
5.14 Empirical Estimation Models.
Project Scheduling:
5.15 Basic Concepts
5.16 Project Scheduling
5.17 Scheduling**.**
Risk Management:
5.18 Software Risks
5.19 Risk Identification
5.20 Risk Projection
5.21 Risk Refinement
5.22 Risk Mitigation, Monitoring and Management.

Text Book
1. Roger S. Pressman, *Software Engineering - A Practitioner's Approach*, McGraw Hill, seventh Edition, 2010.

Reference Books
1. Ian Sommerville, *Software Engineering*, Pearson Education Asia, Sixth edition, 2000.
2. James F Peters and Witold Pedryez, *Software Engineering – An Engineering Approach*, John Wiley and Sons, New Delhi, 2000.

SEMESTER : IV	HOURS/WEEK : 4
CODE : P14CA417	CREDITS : 4

Core XVII: MICROPROCESSORS AND MICROCONTROLLER

Objectives:

1. To learn the assembly language programming.
2. To understand the concepts of microprocessors and microcontrollers.

UNIT – I   10 Hours
   Introduction:
   1.1 Evolution of Microprocessor
   1.2 Intel 8085 Architecture
   1.3 Instruction Set
   1.4 Instruction and Data Formats
   1.5 Addressing Modes
   1.6 Status Flags
   1.7 Intel 8085 Instructions
   1.8 Simple 8085 Programs.

UNIT – II   10 Hours
   8086 Microprocessor:
   2.1 Architecture of Intel 8086 Microprocessor
   2.2 Addressing Modes
   2.3 Instruction Set
   2.4 Assembly Language Programming.

UNIT – III   10 Hours
   3.1 Salient Features of 80286
   3.2 Internal Architecture of 80286
   3.3 Signal Description of 80286
   3.4 Salient Feature of 80386 DX Architecture and Signal Description of 80386
   3.5 Register Organization of 80386
   3.6 Addressing Modes
   3.7 Data Types of 80386
   3.8 Salient Feature of 80586 (Pentium)
   3.9 Few Relevant Concepts of Computer Architecture
   3.10 System Architecture.

UNIT – IV   10 Hours
   Interfacing Concepts:
   4.1 Programmable Peripherals Interface (PPI)
   4.2 Programmable Communication Interface (PCI)
   4.3 DMA Controller – Interrupt Controller.

UNIT – V   10 Hours
   5.1 Architecture of 8051
   5.2 Signal Descriptions of 8051
   5.3 Register Set of 8051
   5.4 Important Operational Features of 8051
   5.5 Memory and I/O Addressing by 8051
   5.6 Interrupts of 8051
   5.7 Instruction Set of 8051
   5.8 Design of a Micro Controller 8051 Based Length Measurement System for
   Continuously Rolling Cloth or Paper.

Text Books
   1. Badriram, *Fundamentals of Microprocessor and Microcomputers*, DhanpatRai and
      Sons, Fourth Edition 1993.
   2. Liu and Gibson, *Microcomputer System The 8086/8088 Family*, Prentice Hall of India
      Pvt. Ltd, 1991.
   3. A.K.Ray and K.M.Bhurchandi, *Advanced Microprocessors and Peripherals* TMH
      2000.

Reference Books
   1. Douglas.V.Hall *Microprocessor and Interfacing – Programming and Hardware*
      McGraw Hill, 1986.

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2. R.S.Goankar, *Microprocessor Architecture, Programming and Applications 8080/8085 A*, Wiley Eastern Ltd, New Delhi, 1991.

Core Practical VII : .NET PROGRAMMING LAB

Objectives:

1. To develop practical knowledge in .Net technologies.
2. To get hands–on experience on web services.

List of Exercises

1. Job portal (SqlServer database –Connected data access).

2. Job portal (MS Access database –Connected data access).

3. Job portal (SqlServer database –Disconnected data access).

4. College portal (SqlServer database –Connected data access).

5. College portal (MS Access database –Connected data access).

6. College portal (SqlServer database –Disconnected data access).

7. Company portal (SqlServer database –Connected data access).

8. Company portal (MS Access database –Connected data access).

9. Company portal (SqlServer database –Disconnected data access).

Core Practical VIII : MULTIMEDIA LAB (PHOTOSHOP & FLASH)

Objectives:

1. To develop practical knowledge in multimedia tools.
2. To get hands–on experience in designing multimedia.

List of Exercises

1. Draw an image using various basic tools (paintbrush tool, eye dropper & color picker, crop tool, lasso tool, paint bucket tool etc).
2. Use the following options to edit the image:
   - i. Scale.
   - ii. Rotate.
   - iii. Distort.
   - iv. Transformation.
   - v. Fill & stroke.
   - vi. Sharpen.
3. Re–touch the photo with the following options:
   - i. Black & white photo re–touching.
   - ii. Converting color to black & white.
   - iii. Picture Restoration.
   - iv. Dodging.
   - v. Burning with photo.
4. Select different portions from two (or) three images and merge them into a single image.
5. Apply the following color manipulation techniques :
   - i. Invert.
   - ii. Equalize.
   - iii. Threshold.
   - iv. Replace color options.
6. Implement the image masking concepts.
7. Apply special visual effects to an image using filters.
8. Make a poster for an advertisement of a product using Adobe Photoshop.
9. Create an animation with special effects.
10. Create a new RGB Color file that is 5 inches wide, 7 ½ inches high with 200 pixels per inch and change the background through the File/New pull–down menu.
11. Create an e–Invitation for sport's day.
12. Create a 30 second multi–media profile about Bishop Heber College.

Elective II (a) : COMPILER DESIGN

Objectives:

1. To impart the basic knowledge of compilers.
2. To understand and develop compilers with analyzer and code generators.

UNIT – I   **10 Hours**

1.1 Introduction to Compiling
1.2 Compilers
1.3 Analysis of the Source Program
1.4 The Phases of a Compiler
1.5 Cousins of the Compiler
1.6 Grouping of Phases
1.7 Compiler Constructions Tools – **Lexical Analysis :**
1.8 Role of the Lexical Analyzer
1.9 Input Buffering
1.10 Specifications of Tokens
1.11 Recognitions of Tokens
1.12 Language for Specifying Lexical Analyzers
1.13 Finite Automata
1.14 Regular Expression to NFA
1.15 Design of a Lexical Analyzer Generator.

UNIT – II   **9 Hours**

2.1 Syntax Analyzer
2.2 Role of The Parser
2.3 Context
2.4 Free Grammars
2.5 Top Down Parsing
2.6 Bottom Up Parsing
2.7 Operator
2.8 Precedence Parsing
2.9 LR Parsers
2.10 Using Ambiguous Grammars
2.11 Parser Generators

UNIT – III   **9 Hours**

3.1 Runtime Environments
3.2 Source Language Issues
3.3 Storage Organization
3.4 Storage Allocations
3.5 Strategies
3.6 Access to Non Local Names
3.7 Parameter Parsing
3.8 Symbol Tables
3.9 Language Facilities for Dynamic Storage Allocation
3.10 Dynamic Storage Allocation Techniques.

UNIT – IV   **9 Hours**

4.1 Intermediate Code Generation
4.2 Intermediate Languages
4.3 Declarations Assignment Statements
4.4 Boolean Expressions
4.5 Case Statements
4.6 Back Patching
4.7 Procedure Calls.

UNIT – V   **9 Hours**

5.1 Code Generation

5.2 Issues in the Design of a Code Generator
5.3 The Target Machine
5.4 Runtime Storage Management
5.5 Basic Blocks and Flow Graphs
5.6 Next Use Information
5.7 A Simple Code Generation
5.8 Code Optimization
5.9 Principal Sources of Optimization
5.10 Optimization of Basic Blocks
5.11 Loops in Flow Graphs.

Text Book

1. Alfred V. Aho, Ravi Sethi and Jeffrey D.Ullman, ***Compilers, Principles, Techniques and Tools***, Pearson Education, Second Edition, 2007.

Reference Book

1. Reinhard Wilhelm, Helmut Seidl, ***Compiler Design Virtual Machines***, Springer Verlag Berlin Heidelberg, 2010.

Elective II (b) : PRINCIPLES OF E–COMMERCE

Objectives:

1. To introduce the basics of electronic commerce.
2. To learn the network infrastructure, network security and firewalls.
3. To learn about the electronic payment system, advertising and marketing over the internet.

UNIT – I   **10 Hours**

1.1 Introduction
1.2 Electronic Commerce Frame Work
1.3 The Anatomy of E
1.4 Commerce Applications
1.5 Electronic Commerce Consumer Applications
1.6 Electronic Commerce Organization Application Applications
1.7 The Network Infrastructure for Electronic Commerce
1.8 Components of the Highway
1.9 Network Access Equipment – 1.10 Global Information Distribution Networks.

UNIT – II   **10 Hours**

2.1 The Internet as a Network Infrastructure
2.2 The Internet Terminology
2.3 Chronological History of the Internet
2.4 NSFNET
2.5 Architecture and Components
2.6 National Research and Education Network
2.7 Globalization of the Academic Internet
2.8 The Business of Internet Commercialization
2.9 Telco/Cable/Online Companies National Independent ISPS
2.10 Regional Level ISPS
2.11 Local Level ISPS
2.12 Service Provided Connectivity
2.13 Internet Connectivity Options .

UNIT – III   **10 Hours**

Network Security and Firewalls:
3.1 Client Server Network Security
3.2 Firewalls and Network Security
3.3 Data and Message Security
3.4 Challenge Response System
3.5 Encrypted Documents and Electronic Mail
3.6 Electronic Commerce and World Wide Web
3.7 Architecture Framework for Electronic Commerce
3.8 Technology Behind the Web
3.9 Security and the Web
3.10 Consumer Oriented Applications
3.11 Mercandile Models from the Consumers Perspective.

UNIT – IV   **9 Hours**

Electronic Payment System:
4.1 Types of Electronic Payment Systems
4.2 Digital Token Based Electronic Payment Systems
4.3 Smart Card and Electronic Payment Systems
4.4 Credit Card Based Electronic Payment Systems
4.5 Risk and Electronic Payment Systems
4.6 Designing Electronic Payment Systems
4.7 Inter Organizational Commerce and EDI
4.8 Implementation
4.9 Mime and Value Added Networks
4.10 EDI Software Implementation
4.11 EDI Envelope for Message Transport
4.12 Value Added Networks (VANS)

4.13 Internet

4.14 Based EDI.

UNIT – V   **9 Hours**

Advertising and Marketing on the Internet:

5.1 The New Age of Information

5.2 Based Marketing

5.3 Advertising on the Internet

5.4 Charting the Online Marketing Process

5.5 Consumer Search and Resource Discovery

5.6 Information Search and Retrieval

5.7 Electronic Commerce Catalogues or Directories

5.8 Information Filtering

5.9 On Demand Education and Digital Copy Rights

5.10 Computer

5.11 Based Education and Training

5.12 Technological Components of Education

5.13 On Demand Software Agents

5.14 Characteristics and Properties of Agents

5.15 The Technology Behind Software Agents.

Text Book

1. Ravi Kalakota and Andrew Whinston, *Frontiers of Electronic Commerce,* Pearson Education, 2009.

Reference Book

1. Pete Loshin and Paul A.Murphy, *Electronic Commerce*, Jaico Publishing House, 2001.

Elective II (c) : SYSTEM ANALYSIS AND DESIGN

Objectives:

1. To learn the basics of system development and business case scenarios.
2. To impart knowledge about system development through analysis and design.

UNIT – I   10 Hours
  Foundations for Systems Development:
  1.1 The Systems Development Environment
  1.2 Succeeding as a Systems Analyst
  1.3 Managing the Information Systems Project
  1.4 Automated Tools for Systems Development.

UNIT – II   10 Hours
  Making for Business Case:
  2.1 Identifying and Selecting Systems Development Projects
  2.2 Initiating and Planning Systems Development Projects.

UNIT – III   10 Hours
  Analysis:
  3.1 Determining System Requirements
  3.2 Structuring Systems Requirements
  3.3 Process Modeling
  3.4 Logic Modeling
  3.5 Conceptual Data Modeling
  3.6 Selecting the best alternative design strategy.

UNIT – IV   10 Hours
  Design:
  4.1 Designing Databases
  4.2 Designing Forms and Reports
  4.3 Designing Interfaces and Dialogues.

UNIT – V   10 Hours
  Design, Implementation and Maintenance:
  5.1 Finalizing Design specifications
  5.2 Designing Distributed and Internet Systems
  5.3 System Implementation
  5.4 Maintaining Information Systems.

Text Book
  1. Jeffrey A. Hoffer, Joey F.George, Joseph S. Valacich, *Modern Systems Analysis and Design*, Pearson Education, Third Edition, 2004.

Summer Internship II** : SUMMER PROJECT - II

Objective:

1. To develop software using the concepts and techniques studied during the third and fourth semesters.

Core XVIII : PROGRAMMING IN J2EE AND J2ME TECHNOLOGIES

Objectives:

1. To understand the concepts of enterprise applications.
2. To get a clear knowledge on mobile applications.

UNIT – I   10Hours
   J2EE and J2SE–J2EE Multi–Tier Architecture:
   1.1 Distributive Systems
   1. 2The Tier
   1.3 J2EE Multi
   1.4 Tier Architecture
   1.5 Client Tier Implementation
   1.6 Web Tier Implementation
   1.7 Enterprise JavaBeans Tier Implementation
   1.8 Enterprise Information Systems Tier Implementation
   1.9 Challenges. **J2EE Best Practices:**
   1.10 Enterprise Application Strategy
   1.11The Enterprise Application
   1.12 Clients
   1.13Sessions Management
   1.14 Web Tier and Java Server Pages.

UNIT – II   10 Hours
   Java Servlets:
   2.1 Java Servlets and Common Gateway Interface Programming
   2.2 A Simple Java Servlet
   2.3 Anatomy of a Java Servlet.
   Java Server Pages:
   2.4 JSP–JSP Tags
   2.5 Tomcat
   2.6 Request String
   2.7 User Sessions
   2.8 Cookies
   2.9 Session Objects.

UNIT – III   10 Hours
   J2EE Database Concepts:
   3.1 Data–Database
   3.2 Database Schema
   3.3 The Art of Indexing.
   JDBC Objects:
   3.4 The Concept of JDBC
   3.5 JDBC Driver Types
   3.6 JDBC Packages
   3.7 A Brief Overview of the JDBC Process
   3.8 Database Connection
   3.9 Associating the JDBC/ODBC Bridge with the Database
   3.10 Statement Objects
   3.11ResultSet
   3.12 Transaction Processing
   3.13 Metadata.

UNIT – IV   10 Hours
   Enterprise JavaBeans:

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4. 1Enterprise JavaBeans
4.2 Deployment Descriptors
4.3 Session Java Bean
4.4 Entity Java Bean
4.5 Message Driven Bean
4.6 The JAR File.

UNIT – V   **9 Hours**
J2ME Architecture and Development Environment:
5.1 J2ME Architecture
5.2 Runtime Environment
5.3 MIDlets Programming
5.4 J2ME SDKS
5.5 Hello World J2ME Style
5.6 Multiple MIDlets in a MIDlet Suite
5.7 J2ME Wireless Toolkit.
Commands, Items and Event Processing:
5.8 J2ME User Interfaces
5.9 Display Class
5.10 The palm OS Emulator
5.11 Command Class
5.12 Item Class
5.13 Exception Handling.

Text Books
1. Jim Keogh, *J2EE: The Complete Reference*, McGraw Hill, 2010.
2. James Keogh, *The Complete Reference J2ME*, McGraw Hill, 2010.

Reference Books
1. Justin Couch and Daniel H. Steinberg, *J2EE Bible*, Willey India Pvt. Ltd, New Delhi, 2002.
2. Paul Tremblett, *Instant Enterprise Java Beans*, McGraw Hill, 2001.
3. C.S.R Prabhu, A.Prathap Reddi, *Bluetooth Technology and its Applications with Java and J2ME*, PHI Learning Private Limited, 2009.

Core XIX : ORGANIZATIONAL BEHAVIOUR

Objectives:

1. To understand personality, perception, attitudes and motivation.
2. To learn about stress management, communication, leadership and organization.

UNIT – I   10 Hours

Introduction:
1.1 Elements of OB
1.2 Nature and Scope of OB
1.3 Contributing Disciplines to OB.
1.4 Organisational Behaviour in Historical Perspective
Foundations of Individual Behaviour:
1.5 Introduction
1.6 The Individual and Individual Differences
1.7 Human Behaviour and its Causation.

UNIT – II   9 Hours

Personality – Perception – Attitudes:
2.1 Concept of Attitudes
2.2 Formation of Attitudes
2.3 Types of Attitudes
2.4 Measurement of Attitude
2.5 Change of Attitude.
Values:
2.6 Concept of Value
2.7 Types of Values
2.8 Formation of Values
2.9 Values and Behaviour.
2.10 **Job Satisfaction.**

UNIT – III   10 Hours

Learning:
3.1 Meaning and Definition
3.2 Determinants of Learning
3.3 Learning Theories
3.4 Learning Principles
3.5 Reinforcement
3.6 Punishment
3.7 Learning and Behaviour.
Motivation:
3.8 Concepts
3.9 Meaning of Motivation
3.10 Nature of Motivation
3.11 Motivation Cycle or Process
3.12 Need for Motivation
3.13 Theories of Motivation
3.14 Motivation and morale.

UNIT – IV   10 Hours

Organisational Conflicts:
4.1 Definition of Conflict
4.2 Sources of Conflict
4.3 Types of Conflicts
4.4 Aspects of Conflicts
4.5 Functional Conflict
4.6 Dysfunctional Conflict
4.7 Conflict Process

4.8 Conflict Management.
4.9 **Job Frustration**
4.10 **Stress Management.**

UNIT – V   **10 Hours**

Communication:
5.1 Nature and Need for Communication
5.2 Communication Process
5.3 Communication Channel
5.4 Communication Networks
5.5 Communication Barriers
5.6 Effective Communication.
5.7 **Leadership**
5.8 Organisational Structure
5.9 Organisational Culture.

Text Book
1. S.S Khanka, *Organizational Behaviour,* S.Chand and Company Ltd, 2002.

Reference Books
1. John W Newstorm and Keith Davis,*Organizational Behaviour,* TMH, 2001.
2. Hugh J Arnold and Daniel C Fieldman, *Organizational Behaviour ,* Mc Graw Hill, 1996.

Core XX: MOBILE COMPUTING

Objectives:

1. To know about the technologies, services and issues in mobile computing.
2. To impart knowledge on application development for mobile computing systems.

UNIT – I   **10 Hours**

Introduction:
    1.1 Applications
    1.2 A Simplified reference model.
    Wireless transmission:
    1.3 Frequencies for radio transmission
    1.4 Signals
    1.5 Antennas
    1.6 Signal propagation
    1.7 Multiplexing
    1.8 Modulation
    1.9 Spread spectrum
    1.10 Cellular systems.

UNIT – II   **10 Hours**

    Telecommunications Systems: GSM:
    2.1 Mobile services
    2.2 System architecture
    2.3 Radio interface
    2.4 Protocols
    2.5 Security.
    UMTS:
    2.6 UMTS system architecture
    2.7 UMTS radio interface
    2.8 **Satellite Systems:**
    2.9 Applications
    2.10 Basic Types of Satellite Orbits
    2.11 GEO
    2.12 LEO
    2.13 MEO
    2.14 Routing
    2.15 Localization
    2.16 Handover.

UNIT – III   **10 Hours**

    Wireless LAN:
    3.1 IEEE
    3.2 System architecture
    3.3 Protocol architecture.
    Bluetooth:
    3.4 User scenarios
    3.5 Architecture
    3.6 Radio layer
    3.7 Baseband layer
    3.8 Link manager protocol
    3.9 L2CAP
    3.10 Security
    3.11SDP
    3.12Profiles.

UNIT – IV   **10 Hours**

Mobile Network Layer:
Mobile IP
4.1 Goals, assumptions and requirements
4.2 Entities and terminology
4.3 IP packet delivery
4.4 Agent discovery
4.5 Registration
4.6 Tunneling and encapsulation
4.7 Optimizations
4.8 Reverse tunneling
4.9 IPv6.
Mobile ad-hoc networks:
4.10 Routing
4.11 Destination sequence distance vector
4.12 Dynamic source routing
4.13 Overview ad-hoc routing protocols
Wireless Application Protocol:
4.14 Architecture.

UNIT – V   **10 Hours**

   Android:
5.1 Android Components
5.2 Android Development Tools
5.3 Android Application Architecture
5.4 Installation
5.5 Android Virtual Devices
5.6 Emulator
5.7 Create and Run Android Virtual Device
5.8 Your First Android Project
5.9 Starting an Installed Application.

Text Book:
   1. Jochen Schiller, *"Mobile communications"*, Pearson Education, Second Edition 2008.
   2. Lars Vogel, *Android Development Tutorial Based on Android 4.0*, tutorial. 2012(http://www.vogella.com/articles/Android/article.html).

Reference Books
   1. Asoke K. Talukder , Hasan Ahmed and Roopa R Yavagal, *Mobile Computing*, McGraw Hill, Second Edition, 2011.
   2. Wei–Meng Lee, *Beginning Android Application Development*, John Wiley and Sons, Inc, 2012.

Core Practical IX : J2EE AND J2ME PROGRAMMING LAB

Objectives:

    1. To develop web applications using JSP.
    2. To gain knowledge on Servlets.

List of Exercises:

1.   (i) Create a simple servlet program to display "Welcome Servlet".

      (ii) Create a servlet program to read data from a client.(without using IDE)

2. Write session tracking code in servlets

        i. using cookies.

        ii. using Http Session.

        iii. URL rewriting.

3. (i) Write a simple JSP program to display "Welcome User".

    (ii) Write a program using JSP: declarations, expressions and scriptlets.

    (iii) Write a JSP code to read data from a client.

4. Develop a web application for online quiz using JSP. (Questions and options must be retrieved from database, Timer control).

5. Create a simple online shopping JSP application using JDBC and session management. (Shopping cart feature).

6. Create a JSP application to transfer data from one component to another using JDBC.

7. Create a session bean to generate business process.

8. Develop an entity bean to persist business objects.

9. Create a message driven bean to pass asynchronous messages among components.

10. Create a MIDlet source code to Welcome User.

11. Design an Online Help MIDlet application using command objects.

12. Design a MIDlet application or selecting an Option from a Choice Group object.

Elective III (a): DATA WAREHOUSING AND DATA MINING

Objectives:

1. To learn how to extract knowledge from information repositories.
2. To know the techniques of mining and warehousing.

UNIT – I   **10 Hours**

Introduction:
1.1 Why Data Mining?
1.2 What is Data Mining?
1.3 What Kinds of Patterns can be Mined?
1. 4Which Technologies Are Used?
1.5 Which Kinds of Applications Are Targeted?
1.6 Major issues in Data Mining.
Data Preprocessing:
1.7 **Data Preprocessing:**
1.8 An Overview
1.9 Data Clearing
1.10 Data Integration
1.11 Data Reduction
1.12 Data Transformation and Data Discretization.

UNIT – II   **10 Hours**

Data Warehousing and Online Analytical Processing:
2.1 Data Warehouse:
2.2 Basic Concepts
2.3 Data Warehouse Modeling:
2. 4 Data Cube and OLAP
2.5 Data Warehouse Design and Usage
2.6 Data Warehouse Implementation
2.7 Data Generalization by Attribute
2.8 Oriented Induction.

UNIT – III   **9 Hours**

Mining Frequent Patterns, Associations, and Correlations:
Basics Concepts and Methods:
3.1 Basic Concepts
3.2 Frequent Itemset Mining Methods.
Classification: Basic Concepts:
3.3 Basic Concepts
3.4 Decision Tree Induction
3.5 Rule Based Classification
3.6 Lazy Learners.

UNIT – IV   **9 Hours**

Cluster Analysis:
Basic Concepts and Methods:
4.1 Cluster Analysis
4.2 Partitioning Methods
4.3 Hierarchical Methods
4.4 Density Based Methods
4.5 Grid Based Methods.

UNIT – V   **10 Hours**

Outlier Detection:
5.1 Outliers and Outlier Analysis
5.2 Outlier Detection Methods
5.3 Statistical Approaches
5.4 Proximity based Approaches
5.5 Clustering based Approaches
5.6 Classification based Approaches.
Data Mining Trends and Research Frontiers:
5.7 Data Mining Applications.

Text Book
1. Jiawei Han and Micheline Kamber, *Data Mining Concepts and Techniques*, Morgan Kaufmann, Third Edition, 2012.

Reference Books
1. Margaret H.Dunham, *Data Mining: Introductory and Advanced Topics*, Pearson Education, 2003.
2. Arun K.Pujari, *Data Mining Techniques*, University Press, 2001.

Elective III (b): HUMAN COMPUTER INTERACTION

Objectives:
To understand the concepts and techniques for effective interaction between Human and Computers.

Unit I: Hrs 12

1.1 Cognitive Psychology and Computer Science
1.2 Capabilities of Human–Computer Interaction (HCI)
1.3 Goals of Human–Computer Interaction (HCI)
1.4 Roles of Human, Computer and Interaction in HCI
1.5 Basic User Interfaces
1.6 Advanced User Interfaces
1.7 Justification of Interdisciplinary Nature
1.8 Standard Framework of HCI
1.9 HCI Design Principles
1.10 Interface Levels in HCI
1.11 Steps in Designing HCI Applications
1.12 Graphical User Interface Design
1.13 Popular HCI Tools
1.14 Architecture of HCI Systems
1.15 Advances in HCI
1.16 Overview
1.17 HCI Sample Exercises Usability Engineering
1.18 Introduction
1.19 HCI and Usability Engineering
1.20 Usability Engineering Attributes
1.21 Process of Usability-Need for Prototyping.

Unit II Hrs 11

2.1 Modelling of Understanding Process
2.2 Introduction
2.3 Goals, Operators, Methods and Selection Rules (GOMS)
2.4 Cognitve Complexity Theory (CCT)
2.5 Adaptive Control of Thought-Rational (ACT-R)
2.6 State, Operator, and Result (SOAR)
2.7 Belief-Desire-Intention (BDI)
2.8 ICARUS
2.9 Connectionist Learning with Adaptive Rule Induction On
2.10 line (CLARION)
2.11 Subsumption Architecture
2.12 Spoken Dialogue System
2.13 Introduction
2.14 Factors Defining Dialogue System
2.15 General Architecture of a Spoken Dialogue System
2.16 Dialogue Management (DM) Strategies
2.17 Computational Models for Dialogue Management
2.18 Statistical Approaches to Dialogue Management
2.19 Learning Automata as Reinforcement Learners
2.20 Case Study: Learning Dialogue Strategy Using Interconnected Learning Automata
2.21 Software and Toolkits for Spoken Dialogue Systems Development.

Unit III Hrs 10

3.1 Recommender Systems
3.2 Introduction
3.3 HCI Study Based on Personalisation
3.4 Personalisation in Recommender Systems
3.5 Relation between Information Filtering and Recommender Systems
3.6 Application Areas of Recommender Systems-Recommender System Field as an Interdisciplinary Area of Research
3.7 Phases of Recommender Systems
3.8 User Profiling Approaches
3.9 Classification of Recommendation Techniques
3.10 Advantages and Disadvantages of Recommender System Approaches
3.11 Need of Software Agent
3.12 based Approach in Recommender Systems

3.13 Evaluating Recommender Systems

3.14 Integrated Framework for Recommender Systems

3.15 Case Study: Music Recommender System .

Unit IV   **Hrs 10**

4.1 Advanced Visualisation Methods

4.2 Ontology Definition

4.3 Ontology Visualisation Method

4.4 Space Dimensions of Ontology Visualisation

4.5 Ontology Languages

4.6 Ontology Visualisation Tools

4.7 Ontology Reasoning

4.8 Reasoner

Case Study 1:

4.9 Teaching Ontology with C Programming Language

Case Study 2:

4.10 Activity for Ontology Creation with a Case of a Software Company Scenario

Case Study 3:

4.11Activity for History Ontology Creation.

Unit V   **Hrs 10**

5.1 Ambient Intelligence:

The New Dimension of Human

5.2 Computer Interaction

5.3 Introduction

5.4 Ambient Intelligence Definition

5.5 Context-aware Systems and Human

5.6 Computer Interaction

5.7 Middleware

5.8 Modelling Data for AmI Environment

5.9 Development of Context

5.10 awareness Feature in Smart Class Room

5.11 A Case Study

5.12 Context-aware Agents for Developing AmI Applications

5.13 A Case Study.

Text book:
1. K. Meena, R. Sivakumar, "Human–Computer Interaction", PHP Learning Private limited Delhi-110092, 2015.

Reference Book:
1. "Alan Dix, Janet Finlay, Gregory D.Abowd, Russell Beale", "Human-Computer Interaction", 3rd Edition, Pearson publications, 2008.

Elective III (c) : PARALLEL PROCESSING

Objectives:

1. To give the basic understanding of parallel processing.
2. To acquire knowledge in parallel algorithms.

UNIT – I   10 Hours

1.1 Introduction to Parallel Computing
1.2 Motivating Parallelism
1.3 Scope of Parallel Computing
1.4 Parallel Programming Platforms
1.5 Implicit Parallelism
1.6 Limitations of Memory System Performance
1.7 Dichotomy of Parallel Computing Platforms
1.8 Physical Organisation of Parallel Platforms
1.9 Communication Costs in Parallel Machines
1.10 Routing Mechanisms for Inter Connection Networks
1.11 Impact of Process Mapping and Mapping Techniques.

UNIT – II   10 Hours

2.1 Principles of Parallel Algorithm Design
2.2 Preliminaries
2.3 Decomposition Techniques
2.4 Characteristics of Tasks and Interactions
2.5 Mapping Techniques for Load Balancing
2.6 Methods for Containing Interaction Over Heads
2.7 Parallel Algorithm Models.

UNIT – III   10 Hours

3.1 Dense Matrix Algorithms
3.2 Matrix Vector Multiplication
3.3 Matrix _ Matrix Multiplication
3.4 Solving a system of Linear Equations.

UNIT – IV   10 Hours

Sorting:
4.1 Issues in Sorting on Parallel Computers
4.2 Sorting Networks
4.3 Bubble Sort and its Variants
4.4 Quick Sort
4.5 Bucket and Sample Sort
4.6 Other sorting Algorithms.

UNIT – V   10 Hours

5.1 Graph Algorithms
5.2 Definitions and Representation Preim's Algorithm
5.3 Disk Stars Algorithm
5.4 All Pairs Shortest Paths
5.5 Transitive Closure
5.6 Connected Components
5.7 Algorithm for Space Graphs.

Text Book

1. Ananth Grama, Anshul Guptha, George Karypis and Vipin Kumar, *Introduction to Parallel Computing*, Pearson Education, 1994.

Reference Book

2. Harry F. Jordan, Gita Alaghband, *Fundamentals of Parallel Processing*, Prentice Hall, 2003.

Elective III (d) : GRID COMPUTING

Objectives:

1. To introduce grid computing paradigm.
2. To understand the mechanisms needed to harness grid computing.

UNIT– I 10 Hours

Introduction:
1.1 Early Grid Computing
1.2 Current Grid Activities
1.3 An Overview of Grid Business Areas
1.4 Grid Applications
1.5 Grid Infrastructure.
Grid Computing Organizations and Their Roles:
1.6 Organizations Developing Grid Standards and Best Practice Guidelines
1.7 Organizations Developing Grid Computing Toolkits and the
1.8 Framework
1.9 Organizations Building and Using Grid
1.10 Based Solutions to Solve Computing, Data and Network Requirements.
The Grid Computing Anatomy:
1.11 The Grid problem.

UNIT – II 10 Hours

The Grid Computing Road Map:
2.1 Autonomic Computing
2.2 Business On Demand and Infrastructure Virtualization
2.3 Service–Oriented Architecture and Grid
2.4 Semantic Grids.
Merging the Grid Services Architecture with the Web Services Architecture:
2.5 Service
2.6 Oriented Architecture
2.7 XML
2.8 Related Technologies and their Relevance to Web Services
2.9 XML Messages and Enveloping
2.10 Service Message Description Mechanisms
2.11 Relationship between Web Service and Grid Service.

UNIT – III 10 Hours

Open Grid Services Architecture (OGSA):
3.1 OGSA Architecture and Goal. **Some Sample Use Cases that Drive the OGSA:**
3.2 Commercial Data Center (CDC)
3.3 National Fusion Collaboratory(NFS)
3.4 Online Media and Entertainment
3.5 The OGSA Platform Components.
Open Grid Services Infrastructure (OGSI):
3.6 Introduction
3.7 Grid Services
3.8 A High
3.9 Level Introduction to OGSI
3.10 Technical Details of OGSI Specification
3.11 Introduction to Service Data Concepts.

UNIT – IV 10 Hours

OGSA Basic Service:
4.1 Common Management Model (CMM)
4.2 Service Domains
4.3 Policy Architecture
4.4 Security Architecture

4.5 Metering and Accounting

4.6 Common Distributed Logging

4.7 Distributed Data Access and Replication.

GLOBUS GT3 Toolkit: Architecure:

4.8 GT3 Software Architecture Model.

UNIT – V 10 Hours

GLOBUS GT3 Toolkit:

Programming Model:

5.1 Introduction

5.2 Service Programming Model:Grid Service Behaviour Implementation

5.3 Operation Providers

5.4 Grid Service Lifecycle Callbacks and Lifecycle Management

5.5 Client Programming Model

GLOBUS GT3 Toolkit:

High Level Services:

5.6 Introduction

5.7 Resource Discovery and Monitoring

5.8 Resource Allocation

5.9 Data Management

5.10 Information Services

5.11 Index Services.

Text Book

1. Joshy Joseph, Craig Fellenstein, *Grid Computing,* Pearson Education, 2004.

Reference Book

2. D. Janikiram, *Grid Computing,* McGraw Hill, 2005.

Elective IV (a): CLOUD COMPUTING AND BIG DATA ANALYTICS

Objectives:
1. To learn big data technology and tools, including MapReduce and Hadoop.
2. To understand the basic concepts of cloud computing, cloud components, cloud architecture and services.

UNIT-I   **10 Hours**

    Cloud Computing Basics
    1.1 Cloud Computing Overview
    1.2 Applications
    1.3 Intranets and the Cloud
    1.4 First Movers in the Cloud
    Organization and Cloud Computing:
    1.5 When You Can Use Cloud Computing:
    1.6 Benefits
    1.7 Limitations -Security Concerns
    1.8 Regulatory Issues
    Cloud Computing Titans:
    1.9 Google, EMC, NetApp, Microsoft, Amazon, Salesforce.com, IBM.

UNIT-II   **10 Hours**

    The Business Case for Going to the Cloud :
    2.1 Cloud Computing Services
    2.2 How Those Applications Help Your Business
    Cloud Computing Technology:
    2.3 Hardware and Infrastructure:
    2.4 Clients
    2.5 Network
    2.6 Security
    2.7 Services
    Accessing the Cloud :
    2.8 Platforms
    2.9 Web Applications
    2.10 Web APIs
    2.11 Web Browsers.

UNIT – III   **10 Hours**

    Developing Applications :
    3.1 Google
    3.2 Microsoft
    Migrating to the Cloud:
    3.3 Cloud Services for individuals
    3.4 Cloud Services aimed at the Mid-Market
    3.5 Enterprise
    3.6 Class Cloud Offerings
    3.7 Migration.

UNIT – IV   **10 Hours**

    Introduction to Big Data:
    4.1 Definition
    4.2 Characteristics
    4.3 Importance of Big Data
    4.4 Understanding the waves of managing data
    4.5 Architecture of Big Data
    4.6 Examining Big Data types
    4.7 Integrating data types into a big data environment
    Distributed Computing:
    4.8 Understanding Distributed Technologies foundation of computing
    4.9 Need of Distributed Computing in Big Data.

Big Data Management:
Operational Databases:

5.1 RDBMS

5.2 Non Relational Databases

5.3 Key-value pair Databases

5.4 Riak-key Value Database

5.5 Document Databases

5.6 MongoDB

5.7 CouchDB

Hadoop:

5.8 A brief history of Hadoop

5.9 Apache Hadoop and the Hadoop Eco system

The Hadoop Distributed File System (HDFS):

5.10 The design of HDFS

5.11 HDFS concepts

5.12 Hadoop file systems

Map Reduce:

5.13 Introduction to Map Reduce Programming model

5.14 Pig

5.15 HIVE

5.16 Hbase

5.17 Zookeeper

5.18 Sqoop.

Text Books:

1. Anthony T. Velte Toby J. Velte, Robert Elsenpeter, *"Cloud Computing : A Practical Approach"*, The McGraw Hill, 2010.
2. "Big Data for Dummies" by Judith Hurwitz, Alan Nugent, Dr.Fern Halper, Marcia Kaufman, Wiley Publications, 2013.

References:

1. Barrie Sosinsky, *"Cloud Computing Bible"*,Wiley Publishing, 2011.
2. Vignesh Prajapati, *"Big Data Analytics with R and Haoop"*, Packet Publishing 2013.
3. Chris Eaton, Dirk deroos et al. , *"Understanding Big data "*, McGraw Hill, 2012.

Elective IV (b): INTERNET OF THINGS

Objectives:
1.To understand the underlying concepts in Internet of Things (IoT)
2. To provide in-depth knowledge on state of the art in the IoT, challenges and future directions.

UNIT- I
INTRODUCTION TO IoT-Requirements of IoT:
1.1 The definition of the Internet of Things, main assumptions and perspectives
1.2 Platform for IoT devices. Economics and Technology of the IoT
1.3 Issues in IoT and solutions-Architecture of IoT.
Anatomy of IoT:
1.4 Traditional Internet Protocol Vs Chirps
1.5 Applying network intelligence at propagator nodes
1.6 Transport and functional architectures.

UNIT- II
IoT Devices
2.1 Temporary and Ad
2.2 hoc devices
2.3 Addressing issues
2.3 End devices in dedicated networks
2.4 Converting states to chirps
2.5 RFID integration in the IoT
2.6 End devices with higher demands
2.7 Small data-Building a web of things
2.8 Autonomy and co-ordination
2.9 Structuring a tree
2.10 Housekeeping message
2.11 Role of integrator function
2.12 Degrees of functionality
2.13Aggregating end points
2.14 Packaging options.

UNIT- III
Data and Human Interaction:
3.1 Functions of IoT
3.2 Analysis and control
3.3 Neighborhood and affinities
3.4 Public private and other kinds of data
3.5 Publishing agent
3.6 Searching for and managing agents
3.7 High and low level loops
3.8 Human interface and control points
3.9 Collaborative scheduling tools
3.10 Packaging and provisioning
3.11 Distributed integrator functions
3.1 2Filtering the streams
3.13 IP Alternative-Protocol based on category classification
3.14 Skeletal architecture of chirp packets
3.15 Pattern driven
3.16 Propagator node networks and operation
3.17 Power of local agents and integrator functions
3.18 High level interchange.

UNIT- IV
IoT APPLICATIONS:

4.1 Moore's Law
4.2 Intelligence near the edge
4.3 Incorporating legacy devices
4. 4 Staying in the loop
4.5 Social machines
4.6 Applications of IoT
4.7 Agriculture
4.8 Home healthcare
4.9 Efficient process control
4.10 Factory application
4.11 Home automation
4.12 Natural sciences
4.13 Living applications
4.14 Origin of IoT
4.15 Open source networking solutions
4.16 Shared software and business process vocabularies.

UNIT- V

Creating the IoT projects:
5.1 Sensor project-Actuator project
5.2 Controller-Camera. Using an IoT service platform-
5.3 Selecting an IoT. **Platform**
5.4 The claysterplatform
5.5 Interfacing ourdevices using XMPP
5.6 Creating control application.

Text Books:

1. Francis DaCosta*, "Rethinking the Internet of Things-A scalable approach to connecting everything",* Apress open publication, 2013.
2. Peter Waher*, "Learning Internet of Things"*, PACKT Publishing-Birmingham-mumbai-2015.

Reference Books:

1. Arhdeep Bahga and Vijay Madisetti , *"Internet of Things: A Hands on Approach*" (http://www.internet-of-things-book.com/).
2. Cuno Pfister*, "Getting started with the internet of things",* O'Rielly Publication.

Elective IV (c): ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS

Objectives:

1. To provide the knowledge of problem solving using AI techniques.
2. To enable the students to acquire basic knowledge on knowledge representations, expert system development process and tools.

UNIT – I   **10 Hours**

      1.1 The AI problems
      1.2 AI techniques
      1.3 Problems
      1.4 Problems Space and Search
      1.5 Defining the Problem as a State Search
      1.6 Production Systems
      1.7 Problem Characteristics
      1.8 Heuristic Search Techniques
      1.9 Generate and Test
      1.10 Hill climbing
      1.11 Best First Search. Problem Reduction
      1.12 Constraint Satisfaction
      1.13 Means-ends Analysis.

UNIT – II   **10 Hours**

      Game Playing:
      2.1 Mini_Max procedure
      2.2 Adding Alpha
      2.3 Beta Cutoffs
      2.4 Additional Refinements
      2.5 Searching AND/OR Graphs
      2.6 Iterative Deepening. Using Predicate Logic
      2.7 Representing Simple Facts and Logic
      2.8 Representing Instance and ISA Relationships
      2.9 Computable Functions and Predicates
      2.10 Use of the Predicate Calculus in AI
      2.11 Resolution
      2.12 Natural Deduction.

UNIT – III   **10 Hours**

      3.1 Representing Knowledge using Rules
      3.2 Procedural verses Declarative Knowledge Logic Programming
      3.3 Forward versus Backward Reasoning
      3.4 Resolving within AND/OR Graphs Matching
      3.5 Control Knowledge
      3.6 Symbolic Reasoning under Uncertainty
      3.7 Nonmonotonic Reasoning
      3.8 Implementation Issues
      3.9 Augmenting a Problem Solver
      3.10 Implementation of Depth First and Breadth First Search. Statistical Reasoning
      3.11 Bayer's Theorem
      3.12 Certainity Factors and Rule based Systems
      3.13 Bayesian Networks
      3.14 Dempston
      3.15 Shafer Theory
      3.16 Fuzzy logic.

UNIT – IV   **10 Hours**

      4.1 Expert Systems
      4.2 Architectural Components

4.3 Explanation Facilities
4.4 Knowledge Acquisition.

UNIT – V   **10 Hours**
     5.1 Expert System Development Process
     5.2 Nonformal Representation of Knowledge
     5.3 Semantic Networks
     5.4 Frames
     5.5 Scripts
     5.6 Production Systems
     5.7 Expert Systems tools.

Text Books
1. Elain Rich & Kevin Kaight, *Artificial Intelligence*, McGraw Hill, Second Edition, 1991.
2. David W. Roltson, *Principles of Artificial Intelligence & Expert Systems Development,* McGraw Hill, 1988.

SEMESTER : V   **HOURS/WEEK : 4**
CODE   : P16CA5:8   **CREDITS   : 4**

Elective IV (d): GENETIC ALGORITHMS

Objectives:

1. To understand the importance of genetic algorithms.
2. To enable the students to know the various applications of genetic algorithms.

UNIT – I   **10 Hours**
     Introduction:
     1.1 A Brief History of Evolutionary Computation
     1.2 Elements of Genetic Algorithms
     1.3 A simple Genetic Algorithm
     1.4 Applications of Genetic Algorithms.
     Genetic Algorithms in Scientific Models:
     1.5 Evolving Computer Programs
     1.6 Data Analysis and Prediction
     1.7 Evolving Neural Networks
     1.8 Modeling Interaction between Learning and Evolution
     1.9 Modeling Sexual Selection
     1.10 Measuring Evolutionary Activity.

UNIT – II   **10 Hours**
     Theoretical Foundation of Genetic Algorithm:
     2.1 Schemas and Two_Armed and k_Armed Problem
     2.2 Royal Roads
     2.3 Exact Mathematical models of simple Genetic Algorithms
     2.4 Statistical Mechanics Approaches.

UNIT – III   10 Hours

Computer Implementation of Genetic Algorithm:

3.1 Data structures
3.2 Reproduction
3.3 Crossover and Mutation
3.4 Mapping objective functions to fitness form
3.5 Fitness Scaling
3.6 Coding
3.7 A multi parameter
3.8 Mapped
3.9 Fixed Point Coding
3.10 Discretization and Constraints.

UNIT – IV   9 Hours

Some applications of Genetic Algorithms:

4.1 The Risk of Genetic Algorithms
4.2 De Jong and Function Optimization
4.3 Improvement in Basic Techniques
4.5 Current Applications of Genetic Algorithms.

UNIT – V   9 Hours

Advanced Operators and Techniques in Genetic Search:

5.1 Dominance
5.2 Duplicity and Abeyance
5.3 Inversion and other Reordering Operators. Micro operators
5.4 Niche and Speciation
5.5 Multi-Objective optimization
5.6 Knowledge based Techniques
5.7 Genetic Algorithms and Parallel Processors.

Text Book

1. David E. Goldberg, *Genetic Algorithms in Search, Optimization & Machine Learning*, Pearson Education, 2006.

Reference Book

1. Melane Mitchell, *An Introduction to Genetic Algorithms*, Prentice Hall of India, 2002.

Core Project – I : MINI PROJECT

Objectives:

1. To enhance the knowledge of the students in technical domain and application domain.
2. To develop a software project.

SBC III* : COMPREHENSIVE STUDY

Objectives:

1. To consolidate the understanding of the basics through frequent tests and interaction.
2. Emphasis is on the concepts and fundamentals and the orientation is towards placement.

UNIT – I: Programming in C, C++, Java, .NET Technologies.

UNIT – II: Digital Computer Fundamentals, Operating Systems, Data Structures.

UNIT – III: Database Systems, Networks, Web Technologies.

UNIT – IV: Computer Graphics, Microprocessor, Software Engineering, Compiler Design

UNIT – V: Big Data Analytics, Internet of Things, Cloud Computing Human Computer Interaction, Mobile Computing.

Core Project-II : PROJECT

Objectives:

1. To explore the knowledge of students in technical domain and application domain.
2. To get an experience to develop software in the corporate domain.