

GURU NANAK COLLEGE (AUTONOMOUS)

(Affiliated to University of Madras and Re-Accredited at 'A' Grade by NAAC)

Guru Nanak Salai, Velachery, Chennai – 600042.



Bachelor of Computer Applications - BCA

(SEMESTER PATTERN WITH CHOICE BASED CREDIT SYSTEM)

Syllabus

(For the candidates admitted in the Academic year 2019-20 and thereafter)

Vision

To impart essential knowledge in Information technology to the student community, enhance their ability to apply the knowledge gained and be successful in their professional and social life and thrive for the upliftment of the society.

Mission

- Inculcate students and equip them with global technological skills in Information Technology, that enhance them to be innovative, have lateral thinking and be good at problem-solving.
- Increase Industry - Institute Interaction to enlighten the students about the required skills to be successful in their career.
- Train and develop the students as IT professionals with confidence, competence, commitment and character

Programme Outcomes

PO1: Understand the concepts of key areas in computer Applications.

PO2: Analyze and apply latest technologies to solve problems in the areas of computer applications.

PO3: Analyze and synthesis computing systems through quantitative and qualitative techniques.

PO4: Apply technical and professional skills to excel in business.

PO5: Communicate effectively in both verbal and written form.

PO6: Develop practical skills to provide solutions to industry, society and business.

Programme Specific Outcomes

PSO 1 : Analyze customer requirements, apply knowledge of computing fundamentals, computing specialization and domain knowledge for the abstraction and conceptualization of computing models.

PSO 2 : Create high level design and develop reliable software systems.

PSO 3 : Able to use the techniques, skills and modern hardware and software tools necessary for innovative software solutions.

PSO 4 : Possess leadership and managerial skills with best professional ethical practices and social concern.

PSO 5 : Able to work collaboratively as a member or leader in multidisciplinary teams.

COURSE STRUCTURE
BACHELOR OF COMPUTER APPLICATION (B.C.A)
2019-20 Batch onwards

Semester	Part	Course Component	Subject Code	Subject Name	Credits	Hours	Internal	External	Total
Semester - I	I	Language	19UTAM121	Tamil - I	3	6	50	50	100
	II	English	19UENG221	English - I	3	4	50	50	100
	III	Core Paper-I	19UBCA301	Programming in C & C++	4	6	50	50	100
	III	Core Paper-II	19UBCA302P	Practical – C & C++ Programming	4	4	50	50	100
	III	Allied-I	19UMAT333	Mathematics I	5	6	50	50	100
	IV	Non Major Elective-II / Basic/ Advance Tamil	19UNME401L	Practical - Computing Skills	2	2	-	100	100
	IV	Soft Skills-I	19UGSL401	Introduction to study skill	3	2	-	100	100
Total Credits: 24 / Total Hours per week: 30									
Semester - II	I	Language	19UTAM122	Tamil - II	3	6	50	50	100
	II	English	19UENG222	English - II	3	4	50	50	100
	III	Core Paper-III	19UBCA303	Programming in JAVA	4	5	50	50	100
	III	Core Paper-IV	19UBCA304P	Practical – JAVA	4	5	50	50	100
	III	Allied-II	19UMAT334	Mathematics II	5	6	50	50	100
	IV	Non Major Elective-II / Basic/ Advance Tamil	19UNME402L	Practical – HTML	2	2	-	100	100
	IV	Soft Skills-II	19UGSL402	Life skills	3	2	-	100	100
Total Credits: 24 / Total Hours per week: 30									
Semester - III	III	Core Paper-V	19UBCA305	Software Testing	4	5	50	50	100
	III	Core Paper-VI	19UBCA306	Web Technology	4	6	50	50	100
	III	Core Paper-VII	19UBCA307P	Practical – Web Applications	4	5	50	50	100
	III	Core Paper-VIII	19UBCA308	Data Structures and Algorithms	4	6	50	50	100
	III	Allied-III	19UCOM333	Financial Accounting	5	6	50	50	100
	IV	Soft Skills-III	19UGSL403	Job Oriented Skills	3	2	-	100	100
Total Credits: 24 / Total Hours per week: 30									
Semester - IV	III	Core Paper-IX	19UBCA309	Mobile Application Development	4	6	50	50	100
	III	Core Paper-X	19UBCA311	Operations Research with Big Data	4	8	50	50	100
	III	Core Paper-XI	19UBCA310P	Practical – Mobile Application Development	4	6	50	50	100
	III	Allied-IV	19UCOM334	Cost and Management Accounting	5	6	50	50	100
	IV	Soft Skills-IV	19UGSL405	Practical - PHP	3	2	-	100	100
	IV	EVS	19UEVS401	Environmental Studies	2	2	-	100	100
Total Credits: 22 / Total Hours per week: 30									
Semester - V	III	Core Paper XII	19UBCA312	Programming in Python	4	6	50	50	100
	III	Core Paper XIII	19UBCA313	Relational Database Management System	4	6	50	50	100
	III	Core Paper XIV	19UBCA314P	Practical -Python	4	6	50	50	100
	III	Elective-I	19UBCA315	Refer Annexure – I (operating system)	5	6	50	50	100
	III	Elective-II	19UIDE311	Refer Annexure – I-IDE – E-Commerce	5	5	50	50	100
	IV	Value Education	19UVED401	Value Education	2	1	-	100	100
	IV	Internship		Internship	2		-	100	100
Total Credits: 26/ Total Hours per week: 30									
Semester - VI	III	Core Paper-XV	19UBCA316	Information Security	4	6	50	50	100
	III	Core Paper-XVI	19UBCA317P	Practical - R-Programming	4	6	50	50	100
	III	Core Paper-XVII	19UBCA318	Data Communication and Networking	4	6	50	50	100
	III	Core Paper-XVIII	19UBCA319	Mini Project	4	6	50	50	100
	III	Elective-III	19UBCA320	Refer Annexure – I (R-Programming)	5	6	50	50	100
	V	Extension Activity	19UEXT501	Extension Activity	1	-	-	-	-
Total Credits: 22 / Total Hours per week: 30									
G rand Total Credits: 142 / Total Hours per week: 180									

ANNEXURE - I

Course Component	Subject Name
Elective - I	1. Operating System 2. Computer Architecture 3. Data Mining
Elective - II	1. IDE – Introduction to Web Designing(HTML & CSS) 2. E-Commerce 3. Client/Server Computing
Elective - III	1. Cloud Computing 2. Unix Programming 3. R - Programming

- Examination will be held in the even semester.

CORE - I PROGRAMMING IN C & C++

SUBJECT CODE : 19UBCA301	THEORY	MARKS : 100
SEMESTER : I	CREDITS : 4	NO. OF HOURS : 90

COURSE OBJECTIVES:

- This course introduces the basic concepts of C & C++ programming.
- This course is designed to expand the knowledge of C & C++ programs by teaching some of the more advanced features of both the languages.
- The course material includes many examples. Since an understanding of the topics of this course is a basic need of every student who wants to excel in C & C++ programming, the course includes many opportunities for hands-on experience.

UNIT I

(18hrs)

Introduction to Computer - Fundamental Character Set - Identifier and Keywords - Data Types - Constants - Variables - Declarations - Expressions - Statements - Arithmetic, Unary, Relational and Logical, Assignment and Conditional Operators - Library Functions- Storage Classes.

UNIT II

(18hrs)

Data Input Output Functions - Simple C Programs - Flow of Control – If, If-Else, While, Do-While, For Loop - Nested Control Structures – Switch - Break and Continue - GOTO Statements - Comma Operator - Arrays - Defining and Processing - Passing Arrays to Functions – Multi-Dimensional Arrays - Arrays and String.

UNIT III

(18hrs)

Principles of Object Oriented Programming-Classes and Objects- Declaring Objects – The Public Keyword – The Private Keyword – The Protected Keyword – Defining Member Functions – Inline Function-Static Member Variables and Functions – Friend Functions.

UNIT IV

(18hrs)

Constructors and Destructors: Characteristics – Calling Constructor and Destructor – Function Overloading - Operator Overloading: Overloading Unary - Binary Operators - Overloading with Friend Function.

UNIT V

(18hrs)

Inheritance: Types of Inheritances – Single Inheritance – Multilevel Inheritance – Multiple Inheritance – Hierarchical Inheritance – Hybrid Inheritance – Multipath Inheritance – Virtual Base Classes - Polymorphism – Abstract Classes - Pointers: Pointer Declaration – Pointer to Class - Object – This Pointer – Pointer to Derived Classes- Virtual Functions.

1. PRESCRIBED BOOKS:

- i. E. Balagurusamy, 1995, Programming in ANSI C, TMH Publishing Company Ltd.
- ii. E. Balagurusamy, 1995, Object Oriented Programming with C++, Tata McGraw-Hill Publishing Company Ltd.

2. REFERENCE BOOKS:

- i. H. Schildt, 2004, The Complete Reference, 4th Edition, TMH Gottfried, B.S, 1996, Programming with C, Second Edition, TMH Pub. Co. Ltd., New Delhi.
- ii. Robert Lafore, Object Oriented Programming in Microsoft C++, Galgotia publication.
- iii. H. Schildt, C++, 1998, The Complete Reference-1998-TMH Edition, 1998.

QUESTION PAPER PATTERN:

Section	Question Component	Numbers	Marks	Total
A	Definition/Principle Answer any 10 out of 12 questions (each in 50 words)	1-12	3	30
B	Short Answer Answer any 5 out of 7 questions (each in 300 words)	13-19	6	30
C	Essay Answer any 4 out of 6 questions (each in 600 words)	20-25	10	40
TOTAL MARKS				100

DISTRIBUTION OF QUESTIONS:

Section	Units	No. of Questions	
		Theory	Problems
A	Unit – 1	3	
	Unit – 2	3	
	Unit – 3	2	
	Unit – 4	2	
	Unit – 5	2	
B	Unit – 1	2	
	Unit – 2	1	
	Unit – 3	2	
	Unit – 4	1	
	Unit – 5	1	
C	Unit – 1	1	
	Unit – 2	2	
	Unit – 3	1	
	Unit – 4	1	
	Unit – 5	1	

CORE – II PRACTICAL – C & C++ PROGRAMMING LAB

SUBJECT CODE : 19UBCA302P	PRACTICAL	MARKS : 100
SEMESTER : I	CREDITS : 4	NO. OF HOURS : 60

COURSE OBJECTIVES

- This course gives exposure to hands on training in C & C++ programming
- To familiarize the student with basic concepts of computer programming and developer tools.
- To present the syntax and semantics of the “C” & “C++” language as well as data types offered by the language
- To allow the student to write their own programs using standard language infrastructure regardless of the hardware or software platform

Matrix Manipulation:

1. Addition & Subtraction
2. Multiplication
3. Transpose of a Matrix

String Manipulation:

4. Counting the number of Vowels, Consonants, Words, White Spaces in a line of text and Array of lines
5. Reverse a String and check for Palindrome

Sorting and Searching:

6. Bubble Sort
7. Linear Search
8. Binary Search

Recursion:

9. Fibonacci Sequence
10. Towers of Hanoi

Classes and Object

11. Simple Program using Class
12. Constructor and Destructor
13. Function Overloading
14. Operator Overloading
15. Friend Function

Inheritance

16. Single Inheritance
17. Multiple Inheritance
18. Pointer to Object
19. Polymorphism
20. Command line argument

ALLIED I - MATHEMATICS – I

SUBJECT CODE : 19UMAT333	THEORY	MARKS : 100
SEMESTER : I	CREDITS : 5	NO. OF HOURS : 90

COURSE OBJECTIVES:

- To improve basics in Mathematics and Analytical Skills

UNIT I (18hrs)

Algebra: Summation of Series - Binomial, Exponential and Logarithmic Series (Without proof) and Simple Problems.

Chapter 2, Section 2.1.3, 2.2, 2.2.1, 2.3, 2.3.3

UNIT II (18hrs)

Matrices: Eigen Values – Eigen Vectors - Cayley - Hamilton Theorem (without proof)

Chapter 4 Section 4.5, 4.5.2, 4.5.3

UNIT III (18hrs)

Theory of Equations: Polynomial equations, irrational roots, complex roots, increasing and decreasing of roots, Reciprocal equations - Approximation of roots of a polynomial equation by Newton's Method.

Chapter 3, Section 3.1 to 3.4.1

UNIT IV (18hrs)

Differential Calculus: n^{th} derivatives - Leibnitz Theorem - Jacobians - Radius of Curvature (Cartesian Coordinates only) – Maxima and Minima of functions of two variables.

Chapter 1, Section 1.1.1 to 1.3.1 and Section 1.4.3

UNIT V (18hrs)

Trigonometry: Expansions of $\text{Sinn}\theta$, $\text{Cosn}\theta$, $\text{tann}\theta$ - Expansions of $\text{Sin}^n\theta$, $\text{Cos}^n\theta$ - Hyperbolic and Inverse hyperbolic functions.

Chapter 6, Section 6.1 to 6.3.

Content and treatment as in

Allied Mathematics Volume I and II by P. Duraipandian and S. Udayabaskaran, S. Chand Publications, 2016 Edition.

1. PRESCRIBED BOOKS:

- Allied Mathematics, A. Singaravelu.
- Ancillary Mathematics, A. Manickavasagam Pillai and Narayanan.

2. REFERENCE BOOKS:

- Allied Mathematics, S.G. Venkatachalapathy
- P. Kandasamy and K. Thilagavathi, Allied Mathematics Volume I and Volume II -- 2004, S. Chand and Co, New Delhi.
- Ancillary Mathematics Volume 1 and 2 by P. Balasubramanian & K.G. Subramanian.

WEBSITES:

www.freetechbooks.com/mathematics-f38.html

www.e-booksdirectory.com

www.freebookcentre.net/SpecialCat/Free-Mathematics-Books-Download.html

QUESTION PAPER PATTERN:

Section	Question Component	Numbers	Marks	Total
Section A	Definition/Principle Answer any 10 out of 12 questions	1 – 12	3	30
Section B	Short Answer Answer any 5 out of 7 questions	13–19	6	30
Section C	Essay Answer any 4 out of 6 questions	20– 25	10	40
TOTAL				100

DISTRIBUTION OF QUESTIONS:

Sections	Units	No. of Questions	
		Theory	Problems
Section A	Unit – 1		2
	Unit – 2	1	2
	Unit – 3	1	1
	Unit – 4		2
	Unit – 5	1	2
Section B	Unit – 1		2
	Unit – 2		2
	Unit – 3		1
	Unit – 4		1
	Unit – 5		1
Section C	Unit – 1		1
	Unit – 2		2
	Unit – 3		1
	Unit – 4		1
	Unit - 5		1

NME – PRACTICAL - COMPUTING SKILLS

SUBJECT CODE : 19UNME401L	PRACTICAL	MARKS : 100
SEMESTER : I	CREDITS : 2	NO. OF HOURS : 30

COURSE OBJECTIVES

- The major objective in introducing the Computing Skills course is to impart training for students in Microsoft Office which has different components like Ms word, MS Excel, Ms Access, Power point etc., at two levels based on their knowledge and exposure.
- It provides essential skills for the user to get adapted to any work environment, as most of the systems in any workplace have Ms Office installed for their day to day activities. The course is highly practice oriented rather than regular class room teaching.

UNIT I

(6hrs)

Introduction to Computers – Classification of Computers; Role of Computers in Society; Inside Computers – Hardware (Processing, Memory, I/O, Storage), Software (Systems, Application), CPU, OS (DOS, Windows, UNIX, Linux), Storage Devices - Programming – Overview - Need for Languages - Skills - Networking Basics – Virus – Hacking.

UNIT II

(6hrs)

Word Processing – Open, Save and Close Word Document - Editing Text - Tools, Formatting, Bullets - Spell Checker - Navigating in Word – Keyboard, Mouse - Document Formatting - Paragraph Alignment, Indentation, Headers and Footers, Numbering – Printing - Preview Options.

UNIT III

(6hrs)

File Management - Understanding the Importance of File Management, Backup of Files, Navigating through MyComputer and Windows Explorer - Files and Folders – Editing, Retrieving, Deleting, Renaming, Subfolders – Manipulate Windows – Maximize, Minimize - Power Point Basics – Terminology, Templates, Viewing.

UNIT IV:

(6hrs)

Spreadsheets – MS Excel – Opening, Entering Text and Data, Formatting, Navigating- Formulas – Entering, Handling and Copying- Charts –Creating, Formatting and Printing, Header and Footer, Data Alignment, Printing.

UNIT V:

(6hrs)

Networks – Internet Explorer- Components - WWW – Working, Browsing, Searching, Saving – Bookmark – Favorite, Create, Delete – Printing a Web Page – E-mail - Creating, Receiving, Reading and Sending Messages

Note: Unit II to Unit V needs exposure through practical

REFERENCES BOOKS:

- i. Introduction to Computers – Peter Norton, Tata McGraw Hill
- ii. Microsoft 2003 – Jennifer Ackerman Kettell, Guy Hat-Davis, Curt Simmons, Tata McGraw Hill

CORE - III PROGRAMMING IN JAVA

SUBJECT CODE : 19UBCA303	THEORY	MARKS : 100
SEMESTER : II	CREDITS : 4	NO. OF HOURS : 75

COURSE OBJECTIVES

- This course introduces the concepts of Programming in JAVA.
- To understand Object Oriented Programming concepts like data abstraction, encapsulation, etc.
- To solve the real world scenarios using top down approach.
- To understand various JAVA programming concepts.

UNIT I

(15hrs)

Introduction to Java - Features of Java - Basic Concepts of Object Oriented Programming - Java Tokens - Java Statements – Constants – Variables - Data Types - Type Casting – Operators – Expressions - Control Statements: Branching and Looping Statements.

UNIT II

(20hrs)

Classes, Objects and Methods - Constructors - Methods Overloading – Inheritance - Overriding Methods - Finalizer and Abstract Methods - Visibility Control – Arrays - Strings and Vectors - String Buffer Class.

UNIT III

(15hrs)

Interfaces – Packages - Creating Packages - Accessing a Package - Multithreaded Programming - Creating Threads - Stopping and Blocking a Thread - Life Cycle of a Thread - Using Thread Methods - Thread Priority – Synchronization - Implementing the Runnable Interface.

UNIT IV

(10hrs)

Managing Errors and Exceptions - Syntax of Exception Handling Code - Using Finally Statement - Throwing Our Own Exceptions - Applet Programming - Applet Life Cycle- Graphics Programming.

UNIT V

(15hrs)

Introducing the AWT: Working with Windows, Graphics and Text- AWT Classes- Working with Frames-Working with Graphics-Working with Color-Working with Fonts- Using AWT Controls, Layout Managers and Menus.

1. PRESCRIBED BOOKS:

- i. E. Balagurusamy 2004, Programming with JAVA - 2nd Edition, Tata McGraw - Hill Publishing Co. Ltd, New Delhi.
- ii. Herbert Schildt, The Complete Reference Java™ 2- 5th Edition, Tata McGraw-Hill Publishing Co. Ltd, New Delhi.

2. REFERENCE BOOKS:

- i. Y. Daniel Liang, 2003, An Introduction to JAVA Programming, Prentice – Hall of India Pvt. Ltd.
- ii. Cay S. Horstmann and Gary Cornell, 2005, Core Java™2 Volume I, Fundamental 7th Edition, Pearson Education.

QUESTION PAPER PATTERN:

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TOTAL MARKS				100

DISTRIBUTION OF QUESTIONS:

Section	Units	No. of Questions	
		Theory	Problems
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	Unit – 2	3	
	Unit – 3	2	
	Unit – 4	2	
	Unit – 5	2	
B	Unit – 1	2	
	Unit – 2	1	
	Unit – 3	2	
	Unit – 4	1	
	Unit – 5	1	
C	Unit – 1	1	
	Unit – 2	2	
	Unit – 3	1	
	Unit – 4	1	
	Unit – 5	1	

CORE - IV PRACTICAL - JAVA LAB

SUBJECT CODE : 19UBCA304P	PRACTICAL	MARKS : 100
SEMESTER : II	CREDITS : 4	NO. OF HOURS : 75

COURSE OBJECTIVES

- This course gives hands on training in JAVA.

Application

1. To read student marks for five subjects and print the total and average.
2. Finding the largest among three numbers.
3. To implement the concept of method overloading.
4. To convert the given temperature in Fahrenheit to Celsius using the formula,
 $C = F - 32/1.8$.
5. To find the factorial of the given number.
6. To compute Simple and Compound Interest.
7. To check whether the given number is Prime or not.
8. To check whether the given number is Armstrong or not.
9. To print Fibonacci series.
10. To check whether the given string is Palindrome or not.
11. Substring Removal from a String. Use String Buffer Class.
12. Finding area and Perimeter of Triangle. Use Stream class.(Circle & Rectangle)
13. Determining the order of numbers generated randomly using Random class.
14. String Manipulation using Char Array.

Applets

15. Incorporating Graphics.
16. Working with Colors and Fonts.

ALLIED – II MATHEMATICS – II

SUBJECT CODE : 19UMAT334	THEORY	MARKS : 100
SEMESTER : II	CREDITS : 5	NO. OF HOURS : 90

COURSE OBJECTIVES:

- To improve basics in mathematics and analytical skills

UNIT I

(18hrs)

Integral Calculus: - Bernoulli's formula – Reduction formula for $\int \sin^n x \, dx$, $\int \cos^n x \, dx$ and $\int \sin^m x \cos^n x \, dx$.

Chapter 2, Sections 2.7 and 2.9

UNIT II

(18hrs)

Finite Differences: Operators E, differences tables, Newton's forward and backward interpolation formulae, Lagrange's Interpolation formulae.

Chapter 5, Section 5.1, 5.2

UNIT III

(18hrs)

Differential Equation: Second order Differential Equation with Constant Coefficients. Differential equation of the form $(aD^2+bD+C)y = e^{ax} \phi(x)$ where a, b, c are constants, $\phi(x) = \sin mx$ (or) $\cos mx$ (or) x^m . Partial Differential Equation: Eliminating Arbitrary constants and functions - Four Standard types. $f(p,q) = 0$; $f(x,p,q) = 0$, $f(y,p,q) = 0$, $f(z,p,q) = 0$.

Chapter 5, Section 5.2, 5.2.1

Chapter 6, Section 6.1 to 6.3

UNIT IV

(18hrs)

Laplace Transformation - Properties and Problems - $L[e^{at}f(t)]$, $L[t^n f(t)]$, $L[e^{at} t f(t)]$, $L[f(t)/t]$.

Chapter 7, Section 7.1.1 to 7.1.4

UNIT V

(18hrs)

Inverse Laplace Transformation: - Solving Differential Equation using Laplace Transformation (excluding simultaneous equations).

Chapter 7, Section 7.2 to 7.3

Content and treatment as in

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- ii. Ancillary Mathematics, A. Manickavasagam Pillai and Narayanan.
- iii. Allied Mathematics, S.G. Venkatachalapathy, Margham Publications, 2016 Edition
- iv. P. Kandasamy and K. Thilagavathi, Allied Mathematics Volume I and Volume II -- 2004, S. Chand and Co, New Delhi.
- v. Ancillary Mathematics Volume 1 and 2 by P. Balasubramanian & K.G. Subramanian, Tata McGraw Hill, New Delhi.

WEBSITES:

www.freetechbooks.com/mathematics-f38.html

www.e-booksdirectory.com

www.freebookcentre.net/SpecialCat/Free-Mathematics-Books-Download.html

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TOTAL				100

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	Unit – 3	1	1
	Unit – 4		2
	Unit – 5	1	2
Section B	Unit – 1		2
	Unit – 2		2
	Unit – 3		1
	Unit – 4		1
	Unit – 5		1
Section C	Unit – 1		1
	Unit – 2		2
	Unit – 3		1
	Unit – 4		1
	Unit - 5		1

NME – PRACTICAL – HTML LAB

SUBJECT CODE : 19UNME402L	PRACTICAL	MARKS : 100
SEMESTER : II	CREDITS : 2	NO. OF HOURS : 30

COURSE OBJECTIVES:

- This course introduces the basic concepts of HTML
1. Write a script to create an array of 10 elements and display its contents.
 2. Create a simple calculator using form fields. Have two fields for number entry and one field for the result. Allow the user to be able to use plus, minus, multiply and divide.
 3. Create a document and add a link to it. When the user moves the mouse over the link, it should load the linked document on its own. (user is not required to click on the link)
 4. Create a document which opens a new window without a toolbar, address bar or a status bar that unloads itself after one minute.
 5. Design an HTML page that includes document structure tags, title, line break, multiple headings and link to e-mail address.
 6. Create an HTML file which is the main page with an image and some text messages along with hyperlinks which is linked to various pages. The navigation should be such that the links take you to the appropriate page and then back to the main page.
 7. Create a HTML page to demonstrate the usage of Frames. Choose the content of the page on your own.
 8. Design an application for pay slip through HTML forms.
 9. Make a page with a heading. Make the heading large, bold, italic and center it across the top of the page.
 10. Design a Web Page for Student Information System.

CORE - V SOFTWARE TESTING

SUBJECT CODE : 19UBCA305	THEORY	MARKS : 100
SEMESTER : III	CREDITS : 4	NO. OF HOURS : 75

COURSE OBJECTIVES:

- To study the fundamentals and principles of software testing.
- To learn few techniques of testing.
- To understand the significance of testing.
- To learn the essentials of testing.

UNIT I

(15hrs)

INTRODUCTION TO SOFTWARE TESTING:

Testing as an Engineering Activity - Role of Process in Software Quality - Testing as a Process - Basic Definitions - Software Testing Principles – The Tester’s Role in a Software Development Organization - Origins of Defects - Defect Classes - The Defect Repository and Test Design – Defect.

UNIT II

(20hrs)

LEVELS OF TESTING:

The Need for Levels of Testing - Unit Testing - Unit Test Planning -Designing the Unit Tests- The Test Harness - Running the Unit tests and Recording results - Integration tests - Designing Integration Tests - Integration Test Planning - Scenario testing - Defect Bash Elimination - System Testing - Types of System Testing - Acceptance Testing - Performance testing - Regression Testing - Internationalization Testing - Ad-hoc Testing - Alpha - Beta Tests - Usability and Accessibility testing.

UNIT III

(15hrs)

TEST CASE DESIGN:

Test Case Design Strategies – Using Black Box Approach To Test Case Design – Random Testing – Requirements Based Testing – Boundary Value Analysis – Equivalence Class Partitioning – State based Testing – Cause and Effect Graphing – Compatibility Testing – User Documentation Testing – Domain Testing – Using White Box Approach To Test Design – Test Adequacy Criteria – Static Testing Vs. Structural Testing – Code Functional Testing – Coverage And Control Flow Graphs – Covering Code Logic – Paths – Code Complexity Testing.

UNIT IV

(10hrs)

TEST MANAGEMENT:

People and Organizational Issues in Testing - Organization Structures for Testing Teams - Testing Services - Test Planning - Test Plan Components - Test Plan Attachments - Locating Test Items - Test Management - Test Process - Reporting Test Results.

UNIT V

(15hrs)

CONTROLLING, MONITORING & REPORTING:

Software Test Automation - Skills Needed for Automation - Scope of Automation - Design and Architecture for Automation - Requirements for a Test Tool - Challenges in Automation -Test Metrics and Measurements - Project, Progress and Productivity Metrics
Case study: How to write Test Scenario? How to write Test Case?

1. PRESCRIBED BOOKS:

- i. Ilene Burnstein, “Practical Software Testing”, Springer International Edition, 2003.
- ii. Srinivasan Desikan and Gopalaswamy Ramesh, Software Testing ' Principles and Practices', Pearson education, 2007.
- iii. Ron Patton, “Software Testing”, Second Edition, Sams Publishing, Pearson Education, 2007

2. REFERENCE BOOKS:

- i. Edward Kit,” Software Testing In The Real World – Improving The Process”, Pearson Education, 1995.
- ii. Boris Beizer,” Software Testing Techniques” – 2nd Edition, Van Nostrand Reinhold, New York, 1990.
- iii. Aditya P. Mathur, “Foundations Of Software Testing _ Fundamental Algorithms And Techniques”, Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008.

QUESTION PAPER PATTERN:

Section	Question Component	Numbers	Marks	Total
A	Definition/Principle Answer any 10 out of 12 questions (each in 50 words)	1-12	3	30
B	Short Answer Answer any 5 out of 7 questions (each in 300 words)	13-19	6	30
C	Essay Answer any 4 out of 6 questions (each in 600 words)	20-25	10	40
TOTAL MARKS				100

DISTRIBUTION OF QUESTIONS:

Section	Units	No. of Questions	
		Theory	Problems
A	Unit – 1	3	
	Unit – 2	3	
	Unit – 3	2	
	Unit – 4	2	
	Unit – 5	2	
B	Unit – 1	2	
	Unit – 2	1	
	Unit – 3	2	
	Unit – 4	1	
	Unit – 5	1	
C	Unit – 1	1	
	Unit – 2	2	
	Unit – 3	1	
	Unit – 4	1	
	Unit – 5	1	

CORE - VI WEB TECHNOLOGY

SUBJECT CODE : 19UBCA306	THEORY	MARKS : 100
SEMESTER : III	CREDITS : 4	NO. OF HOURS : 90

COURSE OBJECTIVE

- This course introduces the concepts of ASP, VB Script, Java Script

UNIT I

(18hrs)

Introduction to VBScript - Adding VBScript Code to an HTML Page - VB Script Basics - VBScript Data Types - VBScript Variables - VBScript Constants -VBScript Operators: Mathematical - Comparison - Logical - Using Conditional Statements - Looping Through Code - VBScript Procedures – Type Casting Variables - Math Functions – Date Functions – String Functions – Other Functions - VBScript Coding Conventions - Dictionary Object in VBScript - Err Object.

UNIT II

(18hrs)

Introduction to Java Script – Advantages of Java Script – Java Script syntax - Data Type – Variable - Array – Operator & Expression – Looping – Control Structures - Constructor Function – User Defined Function Dialog Box .

UNIT III

(18hrs)

Java Script Document Object Model – Introduction – Object in HTML – Event Handling – Window Object – Document Object – Browser Object – Form Object – Navigator Object – Screen Object – Build in Object – User Defined Object – Cookies.

UNIT IV

(18hrs)

ASP.NET Language Structure – Page Structure – Page Event, Properties & Compiler Directives - HTML Server Controls – Anchor, Tables, Forms, Files. Basic Web server Controls – Label, Text Box, Button, Image Links, Check & Radio Button, Hyperlink, Data List Web Server Controls – Check Box List. Radio Button List, Drop Down List, List Box, Data Grid, Repeater.

UNIT V

(18hrs)

Request and Response Objects, Cookies, Working with Data – OLEDB Connection Class, Command Class, Transaction Class, Data Adaptor Class, Data Set Class. Advanced Issues – E-mail, Application Issues, Working with IIS and Page Directives, Error Handling. Security – Authentication, IP Address, Secure by SSL & Client Certificates.

1. PRESCRIBED BOOKS:

- i. I. Bayross, 2000, Web Enable Commercial Application Development Using HTML, DHTML, Javascript, Perl CGI, BPB Publications.
- ii. A. Russell Jones, Mastering Active Server Pages 3, BPB Publications.

2. REFERENCE BOOKS:

- i. Hathleen Kalata, Internet Programming with VBScript and JavaScript, Thomson Learning
- ii. Mike McGrath, XML Harness the Power of XML in easy steps, Dreamtech Publications
- iii. T.A. Powell, 2002, Complete Reference HTML, TMH.
- iv. J. Jaworski, 1999, Mastering Javascript, BPB Publications.
- v. Powell, Thomas; Schneider, Fritz, JavaScript: The Complete Reference, 2nd edition 2004, TMH

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C	Essay Answer any 4 out of 6 questions (each in 600 words)	20-25	10	40
TOTAL MARKS				100

DISTRIBUTION OF QUESTIONS:

Section	Units	No. of Questions	
		Theory	Problems
A	Unit – 1	3	
	Unit – 2	3	
	Unit – 3	2	
	Unit – 4	2	
	Unit – 5	2	
B	Unit – 1	2	
	Unit – 2	1	
	Unit – 3	2	
	Unit – 4	1	
	Unit – 5	1	
C	Unit – 1	1	
	Unit – 2	2	
	Unit – 3	1	
	Unit – 4	1	
	Unit – 5	1	

CORE - VII PRACTICAL - WEB APPLICATIONS LAB

SUBJECT CODE : 19UBCA307P	PRACTICAL	MARKS : 100
SEMESTER : III	CREDITS : 4	NO. OF HOURS : 75

COURSE OBJECTIVES

- This course gives training in Web Designing and Applications.

VB SCRIPT & JAVASCRIPT

1. Write a program outputs the squares, roots, cubes and complements of integers between 1 and 100.
2. Create a calculator.
3. Write a script to Sort numbers and strings.
4. Create a program to generate a hit counter.
5. Create a program to verify whether email address provided by user is valid or invalid.
6. Write a program to scroll the text on status bar.
7. The form consists of two multiple choice list and one single choice list
 - a. The first multiple choice list displays the major dishes available.
 - b. The second multiple choice list displays the stocks available.
 - c. The single choice list display the miscellaneous (Milkshakes, soft drinks, softy available etc.)
8. Write a script to create a digital clock.
9. Create a web page using two image file which switch black and white one another as the mouse pointer moves over the image. Use the OnMouseover and OnMouse event, onDbclick handler.
10. Build a WWW page with an image and 3 buttons, Pick three favorite graphics, Label the buttons and make each one swap in the graphic you have chosen.
11. Create a frameset that has two frames, side by side. Make the left-hand frame contain a form with 3 radio buttons. The buttons should be for three search engines:
 - Yahoo (<http://www.yahoo.com>)
 - Altavista (<http://www.altavista.com>)
 - Infoseek (<http://www.infoseek.com>)When the user clicks on of the option buttons, the frame on the right hand side should be loaded with the right search engine.
12. Write a program to implement Employee database with all validation

ASP

1. Create a login form, to expire, if the user does not type the password within 100 seconds.
2. Create an employee database and manipulate the records using command object in ASP.
3. Develop an application to illustrate the usage of Request and Response Objects in ASP.
4. Write an ASP program using Request Object to give the exact list of headers sent by the browser to the Web server.
5. Create an Active Server Page to display the records one by one from a student database. The student database should contain roll no, name, marks & total.
7. Design an ASP application that describes books in the Online Bookshop. (Use AD Rotator Component, Content Rotator Component, Content Linking Component)
8. Create a document and add a link to it. When the user moves the mouse over the link it should load the linked document on its own (User is not required to click on the link).
9. Create a document, which opens a new window without a toolbar, address bar, or a status bar that unloads itself after one minute.
10. Create a document that accepts the user's name in a text field form and displays the same the next time when the user visits the site informing him that he has accessed the site for the second time, and so on.

CORE - VIII DATA STRUCTURES AND ALGORITHMS

SUBJECT CODE : 19UBCA308	THEORY	MARKS : 100
SEMESTER : III	CREDITS : 4	NO. OF HOURS : 90

COURSE OBJECTIVES

- This course introduces fundamental data structures, algorithms, and abstract data types.
- Main topics includes arrays, linked lists, stacks, queues, graphs, and trees, and algorithms for list manipulation, graph, sorting, searching, and tree traversals.

UNIT I

(18hrs)

Definition of a Data structure – Basic Terms - primitive and composite Data Types, Asymptotic notations-Big Oh, Omega, Theta notations. Arrays: Operations on Arrays: Insertion, Deletion and Traversal with algorithms - Order list: Definition, Operations.

UNIT II

(18hrs)

Stacks – Operations on stack: PUSH, POP. Applications of Stack - Infix to Postfix Conversion, Recursion and Maze Problems - Queues - Operations on Queues: ENQUEUE AND DEQUEUE. Queue Applications, Circular Queue: Operations on Circular Queue.

UNIT III

(18hrs)

Singly Linked List – Operations: Insertion, Deletion and Traversal- Application - Representation of a Polynomial, Polynomial Addition; Doubly Linked List – Representation – Operations: Insertion, Deletion, Insert Last, Insert After, Delete Last and Display operation - Applications Ordering of Books in Library (Alphabetical Ordering).

UNIT IV

(18hrs)

Trees and Graphs: Binary Trees – Basic Terminologies in Trees - Representation - Conversion of Forest to Binary Tree, Operations - Tree Traversals; Graph - Definition, Basic Terms – Basic Operations - Types of Graphs, Hashing Tables and Hashing Functions, Traversal : BFS and DFS - Shortest Path: Dijkstra's Shortest Path Algorithm.

UNIT V

(18hrs)

Algorithm - Definition - Examples - Complexity: Time Complexity, Space Complexity - Divide and Conquer - Binary Search - Maximum and Minimum with example - Merge Sort with example.

1. PRESCRIBED BOOKS:

- i. E.Horowitz and S. Shani Fundamentals of Data Structures in C++, Galgotia Pub. 1999.
- ii. Horowitz, S. Sahni, and S. Rajasekaran, Computer Algorithms, Galgotia Pub. Pvt. Ltd.,1998.

2. REFERENCE BOOKS:

- i. R. Kruse C.L. Tondo and B. Leung, Data Structures and Program design in C, PHI, 1997.

QUESTION PAPER PATTERN:

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A	Definition/Principle Answer any 10 out of 12 questions (each in 50 words)	1-12	3	30
B	Short Answer Answer any 5 out of 7 questions (each in 300 words)	13-19	6	30
C	Essay Answer any 4 out of 6 questions (each in 600 words)	20-25	10	40
TOTAL MARKS				100

DISTRIBUTION OF QUESTIONS:

Section	Units	No. of Questions	
		Theory	Problems
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	Unit – 2	3	
	Unit – 3	2	
	Unit – 4	2	
	Unit – 5	2	
B	Unit – 1	2	
	Unit – 2	1	
	Unit – 3	2	
	Unit – 4	1	
	Unit – 5	1	
C	Unit – 1	1	
	Unit – 2	2	
	Unit – 3	1	
	Unit – 4	1	
	Unit – 5	1	

ALLIED- III FINANCIAL ACCOUNTING

SUBJECT CODE : 19UCOM333	THEORY	MARKS : 100
SEMESTER : III	CREDITS : 5	NO. OF HOURS : 90

COURSE OBJECTIVES

- This course introduces the concepts of Financial Accounting.

UNIT I (20 Hrs)

Meaning and scope of Accounting – Basic accounting concepts and conventions – Objectives of Accounting – Accounting transactions – Double entry book keeping – Journal –Ledger –Preparation of Trail Balance.

UNIT II (16Hrs)

Preparation of final accounts and Adjustments to final accounts. (Simple problems only)

UNIT III (18Hrs)

Depreciation – Meaning – causes – types- problems based on straight line and diminishing Balance methods only.

UNIT IV (18Hrs)

Single Entry Systems: Meaning – features – defects- statement of Affairs method and Introduction to conversion method. (Problems on statement of affairs method only)

UNIT V (18Hrs)

Introduction to Accounting Package: (Only Internal)

Accounting Package: Meaning – features – create a company – Alter – Display & Delete a company – Groups: Predefined groups – create new groups – display – Alter &Deleting a group.

Ledger: create a ledger – Display – Alter & Delete a ledger – Voucher: Meaning – Accounting vouchers - Create user defined voucher – Display – Alter & Deleting voucher. Accounting Ledgers & Voucher Creation – Trail Balance – Final accounts & Its Adjustment

1. PRESCRIBED BOOKS & REFERENCE BOOKS:

- i. Gupta R.L, Advanced Accountancy, S.Chand, Delhi.
- ii. Agarwala A.N, Higher Science of Accountancy, Kitab Mahal,Allahabad.
- iii. S.P. Jain and K.L. Narang, Financial Accounting
- iv. M.C.Shukla and T.S.Grawel, Adavnced Accounts(Vol. I)
- v. Gillespie Accounting system, Procedure & methods, Prentice Hall India Ltd, New Delhi.
- vi. http://www.infinsys.com/v1/downloads/tally_erp_9_doc.pdf

QUESTION PAPER PATTERN:

Section	Question Component	Numbers	Marks	Total
A	Definition/Principle Answer any 10 out of 12 questions (each in 50 words)	1-12	2	20
B	Short Answer Answer any 5 out of 8 questions (each in 300 words)	13-20	8	40
C	Essay Answer any 2 out of 4 questions (each in 600 words)	21-24	20	40
TOTAL MARKS				100

DISTRIBUTION OF QUESTIONS:

Section	Units	No. of Questions	
		Theory	Problems
A	Unit – 1	3	1
	Unit – 2	2	1
	Unit – 3	3	
	Unit – 4	2	
B	Unit – 1	1	1
	Unit – 2		1
	Unit – 3	1	1
	Unit – 4	1	2
C	Unit – 1		1
	Unit – 2		1
	Unit – 3		1
	Unit – 4		1

SOFT SKILL III - PERSONALITY ENRICHMENT

SUBJECT CODE : 19UGSL403	THEORY	MARKS : 100
SEMESTER : III	CREDITS : 3	NO. OF HOURS : 30

COURSE OBJECTIVES

- To make students understand the concepts and components of personality, thereby to apply the acquired knowledge to themselves and to march towards excellence for their respective academic careers.
- To enable students to keep themselves abreast of general knowledge and current information.
- To bring out creativity and other latent talents with proper goal setting so that self-esteem gets enhanced.
- To sharpen memory skills and other study skills which are vital for academic excellence.
- To give training for positive thinking which will keep the students in a good stead at the time of crisis.

UNIT I- Self Disclosure (6hrs)

Characteristics of self disclosure – Self disclosure benefits and appropriateness – Self disclosure and self awareness – Self disclosure and feedback.

Exercise:

1. Self Description– Reflect and answer the following questions on a sheet of paper about yourself: Who am I? What am I like? How do others perceive me? What are my strengths as a person? In what areas do I want to develop greater skills?
2. Adjective Checklist – the following exercise is aimed at providing an opportunity for participants to disclose their view of themselves to the other members of their group and to receive feedback on how the other group members perceive them.
3. Self Disclosure and Self Awareness – the purpose of this exercise is to allow participants to focus on the areas as described in the Johari Window.

UNIT II – Anger, Stress and Managing Feelings (6hrs)

The nature of stress- managing stress through social support systems – the nature of anger – guidelines for managing anger constructively – dealing with an angry person

Exercise:

1. Handling put downs techniques practiced through role plays.
2. changing your feelings discuss how people can make their assumptions more constructively.
3. defusing the Bomb exercise discuss how one can manage provocations.

UNIT III – Interpersonal Effectiveness (6hrs)

Managing anxiety and fear – Breathing – an antidote to stress – progressive muscle relaxation – understanding your shyness – building one' self esteem – avoiding self blame – taking risks, tolerating failure, persisting and celebrating success – self talk.

Exercise:

1. being positive about yourself
2. Understanding your shyness analyze the social situation of shyness and the causes of your shyness.
3. Systematic Muscle Relaxation train one in the procedure for systematic muscle relaxation.

4. Learning how to breathe deeply help one to relax systematically when one is anxious by controlling one's breathing.

UNIT IV: Study Skills (6hrs)

Importance of study environment – using VCR3 to increase memory power: visualizing, concentrating, relating, repeating, reviewing- memory hindrances – memory helpers – knowing vs memorizing – memory and studying – the SQ3R method; survey, write questions, read, recite , review – mnemonic devices – rhymes – acronyms – pegging – cooperative learning .

Exercise:

1. Using the techniques of memory enhancers to review your classroom and textbook notes

UNIT V: Goal Setting and Managing Time (6hrs)

The basis of effective goals – steps to be followed to obtain optimum results from goal setting – Identifying the reasons for procrastination – guidelines to overcome procrastination – priority management at home and college.

Exercise:

1. Steps to prepare one's short term goals and long term goals.
 2. Role play activity through relection of identifying how priority management affect one's ability to live a balanced life.

REFERENCE BOOKS:

1. Johnson, D.W. (1997). Reaching out – Interpersonal Effectiveness and Self Actualization. 6th ed. Boston: Allyn and Bacon.
2. Sherfield, R. M. ; Montgomery, R.J. and Moody, P, G. (2010). Developing Soft Skills. 4th ed. New Delhi: Pearson.
3. Robbins, S. P. and Hunsaker, Phillip, L. (2009). Training in Interpersonal skills. Tips for managing people at work. 5th ed. New Delhi: PHI Learning.

QUESTION PAPER PATTERN:

Section	Question Component	Numbers	Marks	Total
A	Essay Answer any 5 out of 10 questions (each in 1200 words)	1-10	20	100

DISTRIBUTION OF QUESTIONS:

Section	Units	No. of Questions	
		Theory	Problems
A	Unit – 1	2	
	Unit – 2	2	
	Unit – 3	2	
	Unit – 4	2	
	Unit – 5	2	

CORE - IX MOBILE APPLICATION DEVELOPMENT

SUBJECT CODE : 19UBCA309	THEORY	MARKS : 100
SEMESTER : IV	CREDITS : 4	NO. OF HOURS : 90

COURSE OBJECTIVES

- To understand concepts of Mobile Devices, Mobile OS Architectures, Android Survival and Basic Apps.
- To understand Android useful Apps, Underneath the Frameworks and Advanced Topics.

UNIT I (18hrs)

Introduction to Mobile Devices: Mobile Devices vs. Desktop Devices - ARM and Intel Architectures - Power Management - Screen Resolution -Touch Interfaces.

UNIT II (18hrs)

Application Deployment - App Store, Google Play, Windows Store - Development Environments - Eclipse - Native vs. Web Applications.

UNIT III (18hrs)

Mobile OS Architecture: Android Overview: Features, Architecture - Underlying OS – Applications - Application Frameworks – Libraries – Runtime – Kernel- Android Ecosystem – Application Stores – Publishing.

UNIT IV (18hrs)

Android Development Tools: Android SDK - Android Emulator -Development on Hardware Devices.

UNIT V (18hrs)

Basic Android Development: Writing Android Applications, Activity Lifecycle, Multi-device Support, Fragments, Data Storage, Intents, Data Sharing, Audio Playback, Photo Capture.

1. PRESCRIBED BOOKS:

- i. Ed Burnette, Hello Android: Introducing Google's Mobile Development Platform, The Pragmatic Programmers, 3rd Edition, 2010.
- ii. Reto Meier, Professional Android Application Development, Wrox Press, 2009.
- iii. Himanshu Dwivedi, Chris Clark, David Thiel, Mobile Application Security, Tata McGraw Hill, 2010.
- iv. David Mark, Jack Nutting, Jeff LaMarche, Fredrik Olsson, Beginning iOS 6 Development: Exploring the iOS SDK, Apress, 2013.
- v. Craig Hockenberry, iPhone App Development: The Missing Manual, Pogue Press, 2010.

QUESTION PAPER PATTERN:

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TOTAL MARKS				100

DISTRIBUTION OF QUESTIONS:

Section	Units	No. of Questions	
		Theory	Problems
A	Unit – 1	3	
	Unit – 2	3	
	Unit – 3	2	
	Unit – 4	2	
	Unit – 5	2	
B	Unit – 1	2	
	Unit – 2	1	
	Unit – 3	2	
	Unit – 4	1	
	Unit – 5	1	
C	Unit – 1	1	
	Unit – 2	2	
	Unit – 3	1	
	Unit – 4	1	
	Unit – 5	1	

CORE - X OPERATIONS RESEARCH WITH BIG DATA

SUBJECT CODE : 19UBCA311	THEORY	MARKS : 100
SEMESTER : IV	CREDITS : 4	NO. OF HOURS : 120

COURSE OBJECTIVES:

- To give an overall idea about the various Optimization techniques and their usages.
- To give basic idea about Big Data Platform.

UNIT I (25hrs)

Basics of Operations Research (OR): Characteristics of OR - Necessity of OR in Industry -OR and Decision making - Role of Computers in OR Linear Programming: Formulations and Graphical solution (of 2 variables) Canonical & Standard terms of Linear Programming Problem. Algebraic Solution: Simplex Method.
(Chapters: 1.1 to 1.4, 2.1 to 2.28, 3.1 to 3.54, 4.1 to 4.31)

UNIT II (25hrs)

Transportation Model: Definition - Formulation and Solution of Transportation Models - Row - Minima, Column - Minima, Matrix Minima and Vogel's Approximation Methods. Assignment Model: Definition of Assignment Model - Comparison with Transportation Model - Formulation and Solution of Assignment Model - Variations of Assignment Problem. (Chapters: 10.1 to 10.73, 11.1 to 11.60)

UNIT III (25hrs)

Sequencing Problem: Processing each of N Jobs through M Machines - Processing N Jobs through 2 Machines - Processing N Jobs through 3 Machines - Processing 2 Jobs through M Machines - Processing N Jobs through M Machines - Travelling Salesman Problem. Game Theory: Characteristics of Games - Maxmin, Minmax Criteria of Optimality - Dominance Property - Algebraic and Graphical Method of Solution of Solving 2 X 2 Games. (Chapters: 12.1 to 12.66, 15.1 to 15.52)

UNIT IV (20hrs)

PERT – CPM: Project Network Diagram – Critical Path (Crashing excluded) – PERT Computation. (Chapters: 14.1 to 14.78)

UNIT V (25hrs)

Big Data: Introduction – Big Data Glossary: Batch Processing, Cluster Computing, Data Warehouse, Data Lake, Data Mining, Hadoop, In-memory Computing, Machine Learning, Map Reduce, NoSQL, Stream Processing- Characteristics of Big Data – Solution based approaches for data – Big data Environment Setup-HDFS-MapReduce.

1. PRESCRIBED BOOKS

- i. V.Sundaresan, K.S.Ganapathy Subramanian, K.Ganesan – Resource Management Techniques (Operations Research).
- ii. Introduction to Operations Research, P.R.Vittal Gupta P.K. and HiraD.S.Problems in Operations Research, S.Chand& Co.
- iii. Big Data Architects Handbook, Syed Muhammad Fahad Akhta.

2. REFERENCE BOOKS

- i. KantiSwaroop, Gupta P.K. and Manmohan – Problems in Operations Research, Sultan Chand & Sons.
- ii. Ravidran A., Philips,D.T. and Solberg J.J.,Operations Research, John Wiley & sons.
- iii. Taha H.A., Operations Research, Macmillian Publishing company, Newyork.

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TOTAL MARKS				100

DISTRIBUTION OF QUESTIONS:

Section	Units	No. of Questions	
		Theory	Problems
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	Unit – 2	2	1
	Unit – 3	2	
	Unit – 4	2	1
	Unit – 5	2	
B	Unit – 1	1	1
	Unit – 2	1	
	Unit – 3		1
	Unit – 4	1	1
	Unit – 5	1	
C	Unit – 1	1	
	Unit – 2	1	1
	Unit – 3		1
	Unit – 4		1
	Unit – 5	1	

CORE - XI PRACTICAL – MOBILE APPLICATION DEVELOPMENT LAB

SUBJECT CODE : 19UBCA310P	PRACTICAL	MARKS : 100
SEMESTER : IV	CREDITS : 4	NO. OF HOURS : 90

COURSE OBJECTIVES:

- Setup the Development Environment.
- Create a sample Android Application.
- Understand the various parts of an Android Project.
- Use the Android Emulator.
- Install and run the application on a physical device.
- Create a simple User Interface.

1. Create a Hello World App. Run the App on the Emulator and on the Physical Device.
2. Create an App to accept the user's name and to greet him/her.
3. Create a Book List App, an App that allows a user to view and edit a list of jokes.
4. Extend the Book List App to allow the user to give ratings to books, delete books, upload book names to a server, and download book names from a server.
5. Create a GPS recording App called Walkabout. The purpose of the application is to allow users to record their GPS location information as they travel. While the application records the user's GPS data, it displays it back to the user in the form of a path drawn on top of a Google Map. While recording data, the user can launch a camera activity that will capture and store pictures on an SD-Card. When finished recording, the application gives the user the option of storing the current GPS data as a private application file to be loaded and displayed at a later time.
6. Develop an App named AppRater that suggests other Applications for users to download and try. The purpose of the application is to share fun and interesting applications with other users. The users can then rate the applications.
7. Develop an Application that demonstrates the following features of the Mobile OS Framework:
 - a. How to send SMS text messages.
 - b. How to monitor motion of the device through the Accelerometer. When the application starts up, the user is presented with an Activity that allows them to choose which feature they would like to demo by pressing one of two buttons, either SMS or Accelerometer monitoring. When the user hits one of the buttons, it launches the Activity for the selected demo.

ALLIED – IV COST AND MANAGEMENT ACCOUNTING

SUBJECT CODE : 19UCOM334	THEORY	MARKS : 100
SEMESTER : IV	CREDITS : 5	NO. OF HOURS : 90

COURSE OBJECTIVES

- This course introduces the concepts of Cost and Management Accounting

UNIT I (15hrs)

Cost Accounting: Definition, Meaning and objectives - Distinction between Cost and Financial Accounting - Elements of cost and preparation of cost sheets - Management Accounting – Definition and objectives – Distinction between management and financial accounting.

UNIT II (18hrs)

Stores Records - Purchase Order - Goods Received Note - Bin Card - Stores Ledger - Purchase, Receipt and Inspection - Inventory Control - Economic Ordering Quantity - Methods of Pricing Issued. (FIFO-LIFO-Weighted Average Method Only)

UNIT III (18hrs)

Labour Cost: Meaning – Types of Labour – objectives – Labour Turnover - Time Rate System – Piece Wage system – Taylor’s differential Piece Rate System – Premium and Bonus Plans – The Halsey Premium Plan – Rowan Plan. (Simple problems only)

UNIT IV (21hrs)

Budgetary Control: Meaning – Definition – Advantages and Limitations – Essentials of a good budgetary control system - Classification of Budgets – Problems on sales Budget , Production Budget, Cash budget, Fixed budget and Flexible Budget only.

UNIT V (18hrs)

Marginal Costing: The Concept - Break Even Analysis - Break - Even Chart - Importance and assumptions - Application of Profit Volumes Ratio - Different types of simple problems only.

1.PRESCRIBED BOOKS & REFERENCE BOOKS

1. Wheldon A.J., Cost Accounting and Costing Methods.
2. Iyengar S.P., Cost Accounting : Principles and Practice.
3. Bhar B.K., Cost Accounting : Methods and problems.
4. Bigg W.W., Cost Accounts.
5. Prasad N.K, Cost Accounting : Principles and Problems.
6. Jain S.P. and Narang K.L., Advanced Cost Accounting.
7. Agarwal M., Theory and Practices of Cost Accounting
8. Robert Anthony : Management Accounting : Text and cases.
9. Maheswari S.N., Principles of Management Accounting.

QUESTION PAPER PATTERN:

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C	Essay Answer any 2 out of 4 questions (each in 600 words)	21-24	20	40
TOTAL MARKS				100

DISTRIBUTION OF QUESTIONS:

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		Theory	Problems
A	Unit – 1	3	1
	Unit – 2	2	1
	Unit – 3	3	
	Unit – 4	2	
B	Unit – 1	1	1
	Unit – 2		1
	Unit – 3	1	1
	Unit – 4	1	2
C	Unit – 1		1
	Unit – 2		1
	Unit – 3		1
	Unit – 4		1

SOFT SKILL IV – PRACTICAL - PHP LAB

SUBJECT CODE : 19UGSL405	PRACTICAL	MARKS : 100
SEMESTER : IV	CREDITS : 3	NO. OF HOURS : 30

COURSE OBJECTIVES

This course introduces the basic concepts of PHP Scripting Language.

To develop Web Applications using basic PHP elements such as delimiters, control structures, operators, variables, arrays, and functions.

To debug and improve code for better reusability and scalability.

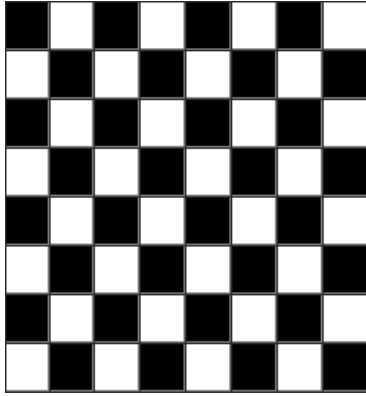
Exercise:

1. Create a simple HTML form and accept the user name and display the name through PHP echo statement.
2. Write a PHP script to count number of lines in a file.
3. Write a PHP function to test whether a number is greater than 30, 20 or 10 using Ternary operator.
4. Write a PHP program to convert word to digit.
5. Write a PHP program to remove duplicates from a sorted list.
6. Write a PHP program to compute the sum of the digits of a number.
7. Write a function to calculate the factorial of a number (a non-negative integer). The function accepts the number as an argument.
8. Write a PHP function that checks whether a passed string is a palindrome or not?
9. Write a PHP function to change the following array's all values to upper or lower case.
10. Write a PHP function to generate a random password (contains uppercase, lowercase, numeric and other) using shuffle () function.

Create a script to construct the following pattern, using a nested for loop.

```
*
* *
* * *
* * * *
* * * * *
* * * * *
* * * *
* * *
* *
*
*
```

12. Write a PHP script using nested for loop that creates a chess board as shown below. Use table width="270px" and take 30px as cell height and width.



13. Write a PHP program to check if an integer is the power of another integer.

Input: 16, 2

Example: For x = 16 and y = 2 the answer is "true", and for x = 12 and y = 2 "false"

14. Write the PHP script to get the Client IP Address.

15. Write a PHP script to calculate weeks between two dates.

EVS - ENVIRONMENTAL STUDIES

SUBJECT CODE : 19UEVS401	THEORY	MARKS : 100
SEMESTER : IV	CREDITS : 2	NO. OF HOURS : 30

COURSE OBJECTIVES

- This course introduces the concepts of Environmental Studies

UNIT-I: (6hrs)

Multidisciplinary nature of environmental studies: Definition, scope and importance.

UNIT-II: (6hrs)

Natural Resources: Renewable and non-renewable Resources:

Natural Resources and associated problems - Forest Resources: Use and over- exploitation, deforestation, case studies. -Timber extraction, mining, dams and their effects on forest and tribal people. - Water resources: Use and over-utilization of surface and ground water - floods, drought, conflicts over water, dams-benefits and problems. - Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT-III: (6hrs)

Ecosystems - Concept of an ecosystem -Structure and function of an ecosystem - Producers, consumers and decomposers - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the following ecosystem: - Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT-IV: (6hrs)

Biodiversity and its conservation:

- Introduction – Definition: genetic, species and ecosystem diversity. - Biogeographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic- and option values - Biodiversity at global, National and local levels. - India as a mega-diversity nation - Hot-spots of biodiversity.
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT-V: (6hrs)

Environmental Pollution:

Definition

- Cause, effects and control measures of:-
 - a. Air pollution
 - b. Water pollution
 - c. Soil pollution

- d. Marine pollution
- e. Noise pollution
- f. Thermal pollution
- g. Nuclear hazards
- Solid waste Management: Causes, effects and control measures of urban and Industrial wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies.
- Disaster Management: floods, earthquake, cyclone and landslides.

PRESCRIBED BOOKS:

Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.

REFERENCE BOOKS:

Cunningham, W.P.Cooper, T.H. Gorhani, E & Hepworth, M.T.2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p.

QUESTION PAPER PATTERN:

Section	Question Component	Numbers	Marks	Total
A	Definition/Principle Answer any 5 out of 8 questions (each in 250 words)	1-8	8	40
B	Short Answer Answer any 3 out of 6 questions (each in 600 words)	9-14	20	60
TOTAL MARKS				100

DISTRIBUTION OF QUESTIONS:

Section	Units	No. of Questions	
		Theory	Problems
A	Unit – 1	2	
	Unit – 2	2	
	Unit – 3	2	
	Unit – 4	1	
	Unit – 5	1	
B	Unit – 1	1	
	Unit – 2	1	
	Unit – 3	1	
	Unit – 4	1	
	Unit – 5	2	

CORE – XII PROGRAMMING IN PYTHON

SUBJECT CODE : 19UBCA312	THEORY	MARKS : 100
SEMESTER : V	CREDITS : 4	NO. OF HOURS : 90

COURSE OBJECTIVES

- To learn how to install Python, Start the Python shell.
- To learn to perform basic calculations, print text on the screen and create lists, and perform simple control flow operations using if statements and for loops.
- To learn how to reuse code with functions.

UNIT I

(18 hrs)

Introduction: Introduction to Python, Python Variables, Expressions, Statements: Variables, Keywords, Operators & Operands, Expressions, Statements, Order of Operations, String Operations, Comments, Keyboard Input. Functions: Type Conversion function, Math functions, Composition of Functions, Defining own function, Parameters, Arguments, Importing Functions.

UNIT II

(20 hrs)

Conditions & Iterations: Conditions, Modulus Operator, Boolean Expression, Logical Operators, if, if-else, if-elif-else, nested conditions. Iteration while, for, break, continue, Nested loop.

UNIT III

(18 hrs)

Recursion: Python recursion, Recursion error. Strings: Accessing values in String, Updating String, Slicing String, String Methods – upper(), find(), lower(), capitalize(), count(), join(), len(), isalnum(), isalpha(), isdigit(), islower(), isnumeric(), isspace(), isupper() max(), min(), replace(), split().

UNIT IV

(18 hrs)

Structures & Functions: List: Introduction, Traversal, Operations, Slice, Methods, Delete element, Difference between Lists and Strings. Dictionaries: Introduction, Brief idea of Dictionaries & Lists. Tuples: Introduction, Brief idea of Lists & Tuples, Brief idea of Dictionaries & Tuples. Date & Time, Modules, Defining Functions, Exit function, Default arguments.

UNIT V

(16 hrs)

Classes & Objects: Creating class, Instance objects, Accessing attributes, Built in class attributes, destroying objects, Inheritance, Method overriding, Overloading methods, Overloading operators, Data hiding. Exceptions in Python, Detecting and Handling Exceptions, Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions.

1. PRESCRIBED BOOKS

- i. Allen Downey, Jeffrey Elkner, Chris Meyers, —How to Think Like a Computer Scientist - Learning with Python, Green Tea Press,2002.

2. REFERENCES

- i. John V. Guttag, —Introduction to Computation and Programming using Python, Prentice Hall of India, 2014.
- ii. Mark Lutz, —Learning Python: Powerful Object-Oriented Programming, Fifth Edition, O'Reilly, Shroff Publishers and Distributors, 2013.

QUESTION PAPER PATTERN:

Section	Question Component	Numbers	Marks	Total
A	Definition/Principle Answer any 10 out of 12 questions (each in 50 words)	1-12	3	30
B	Short Answer Answer any 5 out of 7 questions (each in 300 words)	13-19	6	30
C	Essay Answer any 4 out of 6 questions (each in 600 words)	20-25	10	40
TOTAL MARKS				100

DISTRIBUTION OF QUESTIONS:

Section	Units	No. of Questions	
		Theory	Problems
A	Unit – 1	3	
	Unit – 2	3	
	Unit – 3	2	
	Unit – 4	2	
	Unit – 5	2	
B	Unit – 1	2	
	Unit – 2	1	
	Unit – 3	2	
	Unit – 4	1	
	Unit – 5	1	
C	Unit – 1	1	
	Unit – 2	2	
	Unit – 3	1	
	Unit – 4	1	
	Unit – 5	1	

CORE – XIII RELATIONAL DATABASE MANAGEMENT SYSTEM

SUBJECT CODE : 19UBCA313	THEORY	MARKS : 100
SEMESTER : V	CREDITS : 4	NO. OF HOURS : 90

COURSE OBJECTIVES

To gain knowledge about the DML, DDL operations and to develop a Database with enhanced models and Techniques and to understand about RDBMS, Object oriented Databases and issues using MySQL and PL/SQL.

UNIT I (20hrs)

DBMS Definition – Characteristics of DBMS – Application and advantages of DBMS– Instances – Schemas and Database States – Three Levels of Architecture – Data Independence – DBMS languages– Data Dictionary– Database Users– Data Administrators.

UNIT II (10hrs)

Data Models– Types and their comparison– Entity Relationship Model– Entity Types– Entity Sets– Attributes and its types– Keys– E-R Diagram– Data Integrity– RDBMS : Concept– Components and Codd’s rules.

UNIT III (20hrs)

Relational Algebra (Selection, Projection, Union, Intersection, Cartesian product, Different types of join like Theta join–Equi-join, Natural join, Outer join, Normalization: 1NF, 2NF, 3NF, BCNF, 4NF 5NF.

UNIT IV (20hrs)

Introduction to SQL, DDL, DML, and DCL statements– Creating Tables– Adding Constraints– Altering Tables, Update, Insert, Delete Tables & various form of SELECT– Simple, Using Special Operators for Data Access– Aggregate functions– Joining Multiple Tables (Equi Joins) – Joining a Table to itself (self Joins) Functions.

UNIT V (20hrs)

Introduction to PL/SQL (blocks of PL/SQL, Variables, constants) – Control Structure – Introduction to Stored Procedures–Functions–Cursor and Triggers.

1. PRESCRIBED BOOKS:

- i. Elmasri & Navathe, Fundamentals of Database systems, Addison & Weisely, New Delhi.

2. REFERENCES BOOKS:

- i. H. F. Korth & A. Silverschatz, Database Concepts, Tata McGraw Hill, New Delhi 2. C. J. Date, Database Systems, Prentice Hall of India, New Delhi. 3. Ivan Bayross, SQL, PL/SQL, The programming language of Oracle.

QUESTION PAPER PATTERN:

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C	Essay Answer any 4 out of 6 questions (each in 600 words)	20-25	10	40
TOTAL MARKS				100

DISTRIBUTION OF QUESTIONS:

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		Theory	Problems
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	Unit – 2	3	
	Unit – 3	2	
	Unit – 4	2	
	Unit – 5	2	
B	Unit – 1	2	
	Unit – 2	1	
	Unit – 3	2	
	Unit – 4	1	
	Unit – 5	1	
C	Unit – 1	1	
	Unit – 2	2	
	Unit – 3	1	
	Unit – 4	1	
	Unit – 5	1	

CORE – XIV PRACTICAL – PYTHON LAB

SUBJECT CODE : 19UBCA314P	PRACTICAL	MARKS : 100
SEMESTER : V	CREDITS : 4	NO. OF HOURS : 90

COURSE OBJECTIVES

- To understand why Python is a useful scripting language for developers.
- To learn how to read and write files in Python.
- To learn how to design and program Python applications.
- Design programs using Python object types.

1. Compute the GCD of two numbers.
2. Find the square root of a number (Newton's method).
3. Exponentiation (power of a number).
4. Find the maximum of a list of numbers.
5. Linear search and Binary search.
6. Selection sort, Insertion sort.
7. Merge sort.
8. First n prime numbers.
9. Multiply matrices.
10. Programs that take command line arguments (word count).
11. Find the most frequent words in a text read from a file.

ANNEXURE – I

ELECTIVE – I

1. OPERATING SYSTEM

SUBJECT CODE : 19UBCA315	THEORY	MARKS : 100
SEMESTER : V	CREDITS : 5	NO. OF HOURS : 90

COURSE OBJECTIVES

- To provide core knowledge of Operating System features, functions and techniques. Each and every Operating System function is discussed in detail. This course also provides an attempt to throw some light on the advanced topics in OS like Multiprocessor systems and Distributed OS. Case studies of WINDOWS and LINUX are organized at the end of this course so as to provide the support whatever they had pursued theoretically.
- To gain knowledge about Operating System, Memory Management and Scheduling concepts and to study about the basics of OS, Process Management, Synchronization, Memory Management and File Management.

UNIT I

(18hrs)

Introduction: Views –Goals –Types of System – OS Structure –Components – Services - System Structures – Layered Approach -Virtual Machines - System Design and Implementation - Process Management: Process - Process Scheduling – Cooperating Process – Threads – Interprocess Communication - CPU Scheduling: CPU Schedulers – Scheduling criteria – Scheduling Algorithms.

UNIT II

(20hrs)

Process Synchronization: Critical-Section problem - Synchronization Hardware – Semaphores – Classic Problems of Synchronization – Critical Region – Monitors - Deadlock: Characterization – Methods for handling Deadlocks – Prevention, Avoidance, and Detection of Deadlock - Recovery from Deadlock.

UNIT III

(16hrs)

Memory Management: Address Binding – Dynamic Loading and Linking – Overlays – Logical and Physical Address Space - Contiguous Allocation – Internal & External Fragmentation - Non Contiguous Allocation: Paging and Segmentation Schemes – Implementation – Hardware Protection – Sharing – Fragmentation.

UNIT IV

(18hrs)

Virtual Memory: Demand Paging – Page Replacement - Page Replacement Algorithms – Thrashing – File System: Concepts – Access Methods – Directory Structure – Protection Consistency Semantics – File System Structures – Allocation Methods – Free Space Management.

UNIT V

(18hrs)

I/O Systems: Overview - I/O Hardware – Application I/O Interface – Kernel I/O Subsystem – Transforming I/O Requests to Hardware Operations – Performance – Secondary Storage Structures: Protection – Goals - Domain Access Matrix – The Security problem – Authentication – Threats – Threat Monitoring – Encryption.

1. PRESCRIBED BOOKS

Silberschatz A., Galvin P.B., Gange., 2002, Operating System Principles ,Sixth Edition, John Wiley & Sons.

2. REFERENCE BOOKS

- i. H.M. Deitel, 1990, An Introduction to Operating System - Second Edition, Addison Wesley.
- ii. Andrew S. Tanenbaum, Modern Operating System, Pearson Education, II Ed.

QUESTION PAPER PATTERN:

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TOTAL MARKS				100

DISTRIBUTION OF QUESTIONS:

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	Unit – 4	2	
	Unit – 5	2	
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	Unit – 3	2	
	Unit – 4	1	
	Unit – 5	1	
C	Unit – 1	1	
	Unit – 2	2	
	Unit – 3	1	
	Unit – 4	1	
	Unit – 5	1	

ELECTIVE – II
2. E-COMMERCE

SUBJECT CODE : 19UIDE311	THEORY	MARKS : 100
SEMESTER : V	CREDITS : 5	NO. OF HOURS : 75

COURSE OBJECTIVES

- This course gives an exposure to the Electronic Commerce

UNIT-I **(15hrs)**

Electronic Commerce and Opportunities: Background- The Electronic Commerce Environment – Electronic Marketplace Technologies – Modes of Electronic Commerce: Overview: Electronic Data Interchange.

UNIT-II **(15hrs)**

Approaches to Safe Electronic Commerce: Overview – Secure Transport Protocols – Secure Transaction – Secure Electronic Payment Protocol (SEPP) – Secure Electronic Transaction (SET)

UNIT-III **(15hrs)**

Certificates for Authentication – Security on Web Servers – Payment Schemes: Internet Monetary Payment and Security Requirements- Payment and purchase order process – Online electronic cash.

UNIT-IV **(15hrs)**

Internet / Intranet Security Issues and Solutions: The Need for Computer Security – Specific Intruder Approaches – Security Strategies-Security Tools – Encryption – Enterprise Networking and Access to the Internet Antivirus Programs- Security Teams.

UNIT-V **(15hrs)**

MasterCard/Visa Secure Electronic Transaction: Introduction –Business Requirements – Concepts – Payment Processing - E-Mail and Secure E-Mail Technologies for Electronic Commerce: Introduction - The Means of Distribution – A Model for Message Handling-MIME, S/MIME, MOSS, MIME and Related Facilities for EDI over the Internet.

PRESCRIBED BOOKS:

- i. Daniel Minoli & Emma Minoli, “Web Commerce Technology Handbook”. Tata McGraw Hill – 1999.

Reference Books:

- i. K.Bajaj & D Nag , “E-Commerce”, Tata McGraw Hill – 1999.
Mamta Bhusry – “E-Commerce”.

VALUE EDUCATION

SUBJECT CODE:	THEORY	MARKS: 100
SEMESTER: V	CREDITS: 2	NO.OF HOURS : 30

UNIT 1: EDUCATION AND VALUES

Definition, Concept, Classification, Theory, Criteria and Sources of values Aims and objectives of value education

Role and Need for value education in the contemporary society, Role of education in transformation of values in society

Role of parents, teachers, society, peer group and mass media in fostering values

UNIT 2: VALUE EDUCATION AND PERSONAL DEVELOPMENT

Human Values: Truthfulness, Sacrifice, Sincerity, Self-Control, Altruism, Scientific Vision, relevancy of human values to good life.

Character Formation towards Positive Personality

Modern challenges of adolescents: emotions and behavior

Self-analysis and introspection: sensitization towards gender equality, differently abled, Respect for - age, experience, maturity, family members, neighbors, strangers, etc.

UNIT 3: HUMAN RIGHTS AND MARGINALIZED PEOPLE

Concept of Human Rights – Principles of human rights – human rights and Indian constitution – Rights of Women and children – violence against women – Rights of marginalized People – like women, children, minorities, transgender, differently abled etc
Social Issues and Communal Harmony Social issues – causes and magnitude - alcoholism, drug addiction, poverty, unemployment – communal harmony –concept – religion and its place in public domain –secular civil society

UNIT 4: VALUE EDUCATION TOWARDS NATIONAL AND GLOBAL DEVELOPMENT

Constitutional Values:(Sovereign, Democracy, Socialism, Secularism, Equality, Justice, Liberty, Freedom, Fraternity)

Social Values: (Pity and Probity, Self-Control, Universal Brotherhood).

Professional Values:(Knowledge Thirst, Sincerity in Profession, Regularity, Punctuality, Faith).

Religious and Moral Values: (Tolerance, Wisdom, character).

Aesthetic Values: (Love and Appreciation of literature, fine arts)

Environmental Ethical Values

National Integration and international understanding.

Need of Humanistic value for espousing peace in society. Conflict of cross-cultural influences, cross-border education

UNIT 5:

Guru Nanak Devji's Teachings

Relevance of Guru Nanak Devji's teachings' relevance to Modern Society

The Guru Granth sahib

The five Ks

Values and beliefs

Rights and freedom (Right of equality, Right to Education, Right to Justice, Rights of women, Freedom of religion, Freedom of culture, Freedom of assembly, Freedom of speech)

Empowerment of women

Concept of Langar

Eminent Sikh personalities

REFERENCE BOOKS:

1. Dr.Abdul Kalam. My Journey-Transforming Dreams into Actions. Rupa Publications, 2013.
2. Steven R Covey, 8th Habit of Effective People (From Effectiveness to Greatness), Free Press, NewYork, 2005.
3. Prem Singh, G.J. (2004). 'Towards Value Based Education', University News. Vol. 42 (45): P.11-12.
4. V.R. Krishna Iyer. Dialectics & Dynamics of Human Rights in India (Tagore Law Lectures) The Yesterday, Today and Tomorrow, Eastern Law House (1999, Reprint 2018)
5. <http://www.ncert.nic.in/rightside/links/pdf/framework/english/nf2005.pdf>

CORE – XV INFORMATION SECURITY

SUBJECT CODE : 19UBCA316	THEORY	MARKS : 100
SEMESTER : VI	CREDITS : 4	NO. OF HOURS : 90

COURSE OBJECTIVES:

- Understand different areas where data is processed and analyzing security aspects.
- After completion one can work in fields where huge volume of data is to be handled.

UNIT I (18hrs)

Introduction: Security – Attacks - Computer Criminals - Method of Defense Program Security: Secure Programs - Non-Malicious Program Errors- Viruses and other Malicious Code - Targeted Malicious Code - Controls against Program Threats.

UNIT II (18hrs)

Operating System Security: Protected Objects and Methods of Protection Memory Address Protection- Control of access to general Objects - File Protection Mechanism Authentication: Authentication basics- Password - Challenge – Response - Biometrics.

UNIT III (18hrs)

Database Security: Security Requirements- Reliability and Integrity- Sensitive Data Interface - Multilevel Database- Proposals for Multilevel Security.

UNIT IV (18hrs)

Security in Networks: Threats in Networks - Network Security Control- Firewalls Intrusion Detection Systems - Secure E-Mail - Networks and Cryptography - Example Protocols: PEMSSL- IPsec.

UNIT V (18hrs)

Administrating Security: Security Planning - Risk Analysis - Organizational Security Policies - Physical Security – Legal – Privacy - Ethical Issues in Computer Security - Protecting Programs and Data - Information and Law- Rights of Employees and Employers Software Failures- Computer Crime- Privacy-Ethical Issues in Computer Society - Case Studies of Ethics.

1. PRESCRIBED BOOKS:

- i. Stallings, Cryptography & N/w Security: Principles and practice, 4th Edition, 2006.
- ii. Kaufman, Perlman, Spincer, Network Security, Prentice Hall, 2nd Edition, 2003
- iii. Eric Maiwald, Network Security : A Beginners Guide, TMH, 1999
- iv. Macro Pistoia, Java Network Security, Pearson Education, 2nd Edition, 1999
- v. Whitman, Mattord, Principles of Information Security, Thomson, 2nd Edition, 2005

1. REFERENCE BOOKS:

- i. C.P.Pfleeger, and S.L.Pfleeger, Security in Computing, Pearson Education, 4th Edition, 2003
- ii. Matt Bishop, Computer Security: Art and Science, Pearson Education, 2003.

QUESTION PAPER PATTERN:

Section	Question Component	Numbers	Marks	Total
A	Definition/Principle Answer any 10 out of 12 questions (each in 50 words)	1-12	3	30
B	Short Answer Answer any 5 out of 7 questions (each in 300 words)	13-19	6	30
C	Essay Answer any 4 out of 6 questions (each in 600 words)	20-25	10	40
TOTAL MARKS				100

DISTRIBUTION OF QUESTIONS:

Section	Units	No. of Questions	
		Theory	Problems
A	Unit – 1	3	
	Unit – 2	3	
	Unit – 3	2	
	Unit – 4	2	
	Unit – 5	2	
B	Unit – 1	2	
	Unit – 2	1	
	Unit – 3	2	
	Unit – 4	1	
	Unit – 5	1	
C	Unit – 1	1	
	Unit – 2	2	
	Unit – 3	1	
	Unit – 4	1	
	Unit – 5	1	

CORE – XVI PRACTICAL- R – PROGRAMMING LAB

SUBJECT CODE : 19UBCA317P	PRACTICAL	MARKS : 100
SEMESTER : VI	CREDITS : 4	NO. OF HOURS : 90

COURSE OBJECTIVES

- This course gives practical exposure to R – Programming.
1. R Program to print “Hello World”.
 2. R Program to Add Two Vectors.
 3. Find Sum, Mean and Product of Vector in R Programming.
 4. R Program to Take Input from User.
 5. R Program to Generate Random Number from Standard Distributions.
 6. R Program to Sample from a Population.
 7. R Program to Find Minimum and Maximum.
 8. R Program to Sort a Vector.
 9. R Program to Find the Factorial of a Number.
 10. R Multiplication Table.
 11. R Program to Check Prime Number.
 12. R Program to Check Armstrong Number.
 13. R Program to Print the Fibonacci sequence.
 14. R Program to Check for Leap Year.
 15. Check if a Number is Odd or Even in R Programming.

CORE – XVII DATA COMMUNICATION AND NETWORKING

SUBJECT CODE : 19UBCA318	THEORY	MARKS : 100
SEMESTER : VI	CREDITS : 4	NO. OF HOURS : 90

COURSE OBJECTIVES

- This course introduces the basic concepts of Data Communication and Networking.
- To be familiar with various types of Computer Networks.
- To be exposed to all the Network Protocols.
- To be familiar with Routing Algorithm, and Network Devices.

UNIT I

(15hrs)

Introduction to Data Communication, Network, Protocols & Standards - Standards Organizations - Line Configuration - Topology - Transmission Mode - Classification of Network - OSI Model - Layers of OSI Model.

UNIT II

(15hrs)

Parallel and Serial Transmission - DTE/DCE such as EIA-449, EIA-530, EIA-202 and X.21 Interface - Interface Standards - Modems - Guided Media - Unguided Media - Performance - Types of Error - Error Detection - Error Correction.

UNIT III

(20hrs)

Multiplexing - Types of Multiplexing - Multiplexing Application - Telephone System - Project 802 - Ethernet - Token Bus - Token Ring - FDDI - IEEE 802.6 - SMDS - Circuit Switching - Packet Switching - Message switching - Connection Oriented and Connectionless Services.

UNIT IV

(20hrs)

History of Analog and Digital Network - Access to ISDN - ISDN Layers - Broadband ISDN - X.25 Layers - Packet Layer Protocol - ATM - ATM Topology - ATM Protocol.

UNIT V

(20hrs)

Repeaters - Bridges - Routers - Gateway - Routing algorithms - TCP/IP Network, Transport and Application Layers of TCP/IP - World Wide Web.

1. PRESCRIBED BOOKS

Behrouz and Forouzan, 2001, Introduction to Data Communication and Networking, 2nd Edition, TMH.

2. REFERENCE BOOKS

- i. Jean Walrand 1998, Communication Networks (A first Course), Second Edition, WCB/McGraw Hill.
- ii. Behrouz and Forouzan, 2006, Data Communication and Networking, 3rd Edition, TMH.

QUESTION PAPER PATTERN:

Section	Question Component	Numbers	Marks	Total
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TOTAL MARKS				100

DISTRIBUTION OF QUESTIONS:

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	Unit – 3	2	
	Unit – 4	1	
	Unit – 5	1	
C	Unit – 1	1	
	Unit – 2	2	
	Unit – 3	1	
	Unit – 4	1	
	Unit – 5	1	

CORE - XVIII MINI PROJECT

SUBJECT CODE : 19UBCA319	THEORY	MARKS : 100
SEMESTER : VI	CREDITS : 4	NO. OF HOURS : 90

COURSE OBJECTIVES

- This course gives procedure and training about project development by using recent trends in Computer Applications.
- Each student will develop and implement an Application Software based on any emerging technologies.
- Students acquire practical knowledge within the chosen area of technology for project development.
- Students will identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach.
- Students will work as an individual in development of technical projects.
- Students develop effective communication skills for presentation of project related activities.
- It helps the students to know about modern tools.
- It helps to write effective procedural code to solve small to medium sized projects.
- Project helps to make them Industry ready.
- It helps to know the current scenario happens in Software Company.

REFER ANNEXURE - I

QUESTION PAPER PATTERN:

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A	Definition/Principle Answer any 10 out of 12 questions (each in 50 words)	1-12	3	30
B	Short Answer Answer any 5 out of 7 questions (each in 300 words)	13-19	6	30
C	Essay Answer any 4 out of 6 questions (each in 600 words)	20-25	10	40
TOTAL MARKS				100

DISTRIBUTION OF QUESTIONS:

Section	Units	No. of Questions	
		Theory	Problems
A	Unit – 1	3	
	Unit – 2	3	
	Unit – 3	2	
	Unit – 4	2	
	Unit – 5	2	
B	Unit – 1	2	
	Unit – 2	1	
	Unit – 3	2	
	Unit – 4	1	
	Unit – 5	1	
C	Unit – 1	1	
	Unit – 2	2	
	Unit – 3	1	
	Unit – 4	1	
	Unit – 5	1	

ELECTIVE - I
2. COMPUTER ARCHITECTURE

SUBJECT CODE :	THEORY	MARKS : 100
SEMESTER : V	CREDITS : 5	NO. OF HOURS : 90

COURSE OBJECTIVES

- This course introduce the basic components of Computer and explain their function.
- To conceptualize the basics of organizational and architectural issues of a Digital Computer.
- To analyze performance issues in Processor and Memory design of a Digital Computer.
- To understand various Data Transfer Techniques in Digital Computer.
- To analyze Processor performance improvement using Instruction Level Parallelism.

UNIT I (18hrs)

Digital Logic Circuits: Digital Computers – Logic Gates – Boolean Algebra – Combinational Circuits – Half Adder, Full Adder, Half Subtractor, Full Subtractor and Flip Flops –Types of Flip Flops : JK, RS, T, D Flip Flops Sequential Circuits.

UNIT II (18hrs)

Digital Components: Integrated Circuits – Scale of Integration, IC logics – Decoders – Types of Decoders : 2 to 4 Decoder & 3 to 8 Decoder – Encoder - Multiplexers & Types of Multiplexers – Demultiplexers – Registers and Counters – Memory Unit (RAM & ROM).

UNIT III (18hrs)

Data representation: Data Types – Number Systems – Complements: r's Complements and (r-1)'s Complements – Uses - Fixed Point & Floating Point Representation – Binary Codes: ASCII, BCD, GRAY, Excess – 3 Code, Excess – 3 Gray Code – Uses - Error Detection Codes.

UNIT IV (18hrs)

Register Transfer Language – Bus (Constructed by using Multiplexer and Tri- state Buffer) and Memory Transfer – Arithmetic, Logic & Shift Micro operations – Types of Arithmetic circuits : 4 Bit binary adder, 4 Bit binary adder subtractor, 4 Bit arithmetic circuit – 4 Bit logic circuit – 4 Bit shifter - Arithmetic Logic Shift Unit.

UNIT V (18hrs)

Central Processing Unit: General Register Organization – Stack organization : Register and Memory stack – Instruction formats : Instruction classification depends upon size & function – Addressing Modes – Instruction Classification depends upon Addressing Mode –Program Control : Conditional and Unconditional - Reduced Instruction Set Computing (RISC).

1. PRESCRIBED BOOKS

i. Computer System Architecture: M.Morris Mano , ThirdEdition, Prentice Hall of India.

2. REFERENCE BOOK:

i. Computer Organization and Programming – C.W. Gean

ELECTIVE – I
3. DATA MINING

SUBJECT CODE :	THEORY	MARKS : 100
SEMESTER : V	CREDITS : 5	NO. OF HOURS : 90

COURSE OBJECTIVES

- This course introduces the fundamental concepts of Data Mining.

UNIT I (16hrs)

Introduction: Data mining – Functionalities – Classification – Introduction to Data Warehousing – Data Preprocessing: Preprocessing the Data – Data cleaning – Data Integration and Transformation – Data Reduction

UNIT II (20hrs)

Data Mining, Primitives, Languages and System Architecture: Data Mining – Primitives – Data Mining Query Language -Architectures of Data mining Systems. Concept Description, Characterization and Comparison: Concept Description- Data Generalization and Summarization-Analytical Characterization- Mining Class Comparison – Statistical Measures.

UNIT III (18hrs)

Mining Association Rules: Basics Concepts – Single Dimensional Boolean Association Rules from Transaction Databases-Multilevel Association Rules from transaction databases – Multi dimension Association Rules from Relational Database- Data Warehouses.

UNIT-IV (18hrs)

Classification and Prediction: Introduction – Issues – Decision Tree Induction – Bayesian Classification – Classification of Back Propagation. Classification based on Concepts from Association Rule Mining – Other Methods - Prediction – Introduction – Classifier Accuracy.

UNIT-V (18hrs)

Cluster Analysis: Introduction – Types of Data in Cluster Analysis-Petitioning Methods – Hierarchical Methods-Density Based Methods – GRID Based Method – Model based Clustering Method.

1. PRESCRIBED BOOKS

i.J.Han and M. Kamber,2001,Data Mining Concepts and Techniques,Harcourt India Pvt. Ltd - New Delhi.

2. REFERENCE BOOKS

i. K.P. Soman , Shyam Diwakar, V.Ajay ,2006, Insight into Data Mining Theory and Practice, Prentice Hall of India Pvt. Ltd - New Delhi.

ELECTIVE – II
1. IDE – PRACTICAL - INTRODUCTION TO WEB DESIGNING (HTML & CSS)

SUBJECT CODE :	PRACTICAL	MARKS : 100
SEMESTER : V	CREDITS : 5	NO. OF HOURS : 75

COURSE OBJECTIVE :

- The Student will be able to define the principle of Web page Design, define the basics in Web Design, visualize the basic concept of HTML, recognize the elements of HTML.
- Introduce basic concepts of CSS.

UNIT-I **(15hrs)**

Web Design Principles - Basic principles involved in developing a Web site - Planning process - Five Golden rules of web designing - Designing Navigation bar - Page Design - Home Page Layout - Design Concept - Basics in Web Design - Brief History of Internet - What is World Wide Web - Why create a web site - Web Standards - Audience requirement.

UNIT-II **(15hrs)**

Introduction to HTML - HTML Documents - Basic structure of an HTML document - Creating an HTML document - Markup Tags - Heading-Paragraphs - Line Breaks - HTML Tags. Elements of HTML - Working with Text, Lists, Tables and Frames - Working with Hyperlinks, Images and Multimedia, Forms and controls. Concept of CSS - Creating Style Sheet - CSS Properties - CSS Styling(Background, Text Format, Controlling Fonts, links).

UNIT-III **(15hrs)**

1. Write an HTML code to display your education details in a Tabular format.
2. Write an HTML code to display your CV on a web page.
3. Write an HTML code to create a Home page having three links: About Us, Our Services and Contact Us. Create separate web pages for the three links.
4. Write an HTML code to create a login form. On submitting the form, the user should get navigated to a profile page.
5. Write an HTML code to create your Institute website(Only Home page).

UNIT-IV **(15hrs)**

6. Write an HTML code to illustrate the usage of the following:
 - Ordered List
 - Unordered List
 - Definition List
7. Write an HTML code to create a frameset having Header, Navigation and Content sections.
8. Write an HTML code to demonstrate the usage of Inline CSS.
9. Write an HTML code to demonstrate the usage of Internal CSS.

UNIT-V**(15hrs)**

10. Write an HTML code to demonstrate the usage of External CSS.
11. Write an HTML code to create Background Image.
12. Write an HTML code to illustrate Text Formatting.
13. Write an HTML code to illustrate Controlling Fonts.
14. Write an HTML code to illustrate Styling Links.

PRESCRIBED BOOKS:

1. Developing Web Applications, Ralph Moseley and M. T. Savaliya, Wiley-India
2. Web Technologies, Black Book, Dreamtech Press
3. HTML 5, Black Book, Dreamtech Press
4. Web Design, Joel Sklar, Cengage Learning

List of Open Source Software/learning website: - Browsers like IE, Mozilla, FireFox etc -
Server software XAMPP/WAMP/LAMP - www.apachefriends.org - www.w3.org -

www.w3schools.com

ELECTIVE – II
2. E-COMMERCE

SUBJECT CODE : 19UIDE311	THEORY	MARKS : 100
SEMESTER : V	CREDITS : 5	NO. OF HOURS : 75

COURSE OBJECTIVES

- This course gives an exposure to the Electronic Commerce

UNIT-I **(15hrs)**

Electronic Commerce and Opportunities: Background- The Electronic Commerce Environment – Electronic Marketplace Technologies – Modes of Electronic Commerce: Overview: Electronic Data Interchange.

UNIT-II **(15hrs)**

Approaches to Safe Electronic Commerce: Overview – Secure Transport Protocols – Secure Transaction – Secure Electronic Payment Protocol (SEPP) – Secure Electronic Transaction (SET)

UNIT-III **(15hrs)**

Certificates for Authentication – Security on Web Servers – Payment Schemes: Internet Monetary Payment and Security Requirements- Payment and purchase order process – Online electronic cash.

UNIT-IV **(15hrs)**

Internet / Intranet Security Issues and Solutions: The Need for Computer Security – Specific Intruder Approaches – Security Strategies-Security Tools – Encryption – Enterprise Networking and Access to the Internet Antivirus Programs- Security Teams.

UNIT-V **(15hrs)**

MasterCard/Visa Secure Electronic Transaction: Introduction –Business Requirements – Concepts – Payment Processing - E-Mail and Secure E-Mail Technologies for Electronic Commerce: Introduction - The Means of Distribution – A Model for Message Handling- MIME, S/MIME, MOSS, MIME and Related Facilities for EDI over the Internet.

PRESCRIBED BOOKS:

- ii. Daniel Minoli & Emma Minoli, “Web Commerce Technology Handbook”. Tata McGraw Hill – 1999.

Reference Books:

- ii. K.Bajaj & D Nag , “E-Commerce”, Tata McGraw Hill – 1999.
- iii. Mamta Bhusry – “E-Commerce”.

ELECTIVE – II
3. CLIENT / SERVER COMPUTING

SUBJECT CODE :	THEORY	MARKS : 100
SEMESTER : V	CREDITS : 5	NO. OF HOURS : 75

COURSE OBJECTIVES

- This Subject deals with the C/S Computing, GUI.

UNIT-I (15hrs)

Introduction to Client/Server Computing – What is Client/Server Computing – Benefits of Client/Server Computing – Evolution of C/S Computing – Hardware Trends – Software Trends - Evolution of Operating Systems – N/W Trends – Business Considerations.

UNIT-II (15hrs)

Overview of C/S Applications: Components of C/S Applications – Classes of C/S Applications – Categories of C/S Applications Understanding C/S Computing : Dispelling the Myths – Obstacles – Upfront & Hidden – Open Systems & Standards – Standards – Setting Organizations – Factors of Success.

UNIT-III (15hrs)

The Client Hardware & Software : Client Component – Client Operating Systems – What is GUI – Database Access – Client Software Products : GUI Environments – Converting 3270/5250 Screens – Database Tools – Client Requirements : GUI Design Standards – Open GUI Standards – Interface Independence – Testing Interfaces .

UNIT-IV (15hrs)

The Server : Categories of Servers – Features of Server Machines – Classes of Server Machines – Server Environment : N/W Management Environment – N/W Computing Environment – Extensions – Network Operating System – Loadable Module.

UNIT-V (15hrs)

Server Operating System : OS/2 2.0 – Windows New Technology – Unix Based OS – Server Requirements : Platform Independence – Transaction Processing – Connectivity – Intelligent Database – Stored Procedure – Triggers – Load Leveling – Optimizer –Testing and Diagnostic Tools – Backup & Recovery Mechanisms.

PRESCRIBED BOOKS

- i. Dawna Travis Devire, “Client/Server Computing”. TMH
- ii. Patrick Smith & Steave Guengerich, “Client/Server Computing”. PHI

ELECTIVE – III
1. CLOUD COMPUTING

SUBJECT CODE :	THEORY	MARKS : 100
SEMESTER : VI	CREDITS : 5	NO. OF HOURS : 90

COURSE OBJECTIVES

- To introduce the broad perceptive of Cloud Architecture and Model
- To understand the concept of Virtualization and Design of Cloud Services
- To be familiar with the lead players in cloud.
- To understand the features of Cloud simulator
- To apply different cloud programming model as per need.
- To learn to design the trusted cloud Computing system

UNIT I (18hrs)

CLOUD ARCHITECTURE AND MODEL

Technologies for Network-Based System – System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture. Cloud Models:- Characteristics – Cloud Services – Cloud models (IaaS, PaaS, SaaS) – Public vs Private Cloud –Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.

UNIT II (18hrs)

VIRTUALIZATION

Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource management – Virtualization for Data-center Automation.

UNIT III (16hrs)

CLOUD INFRASTRUCTURE

Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources.

UNIT IV (20hrs)

PROGRAMMING MODEL

Parallel and Distributed Programming Paradigms – MapReduce , Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - Cloud Software Environments - Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim.

UNIT V (18hrs)

SECURITY IN THE CLOUD

Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control – Autonomic Security.

1. PRESCRIBED BOOKS

- i. John W. Rittinghouse and James F. Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010.
- ii. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", TMH, 2009.
3. Kumar Saurabh, "Cloud Computing – insights into New-Era Infrastructure", Wiley India, 2011.

2. REFERENCE BOOKS

- i. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud" O'Reilly
- ii. Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, "Mastering Cloud Computing", TMGH, 2013.

ELECTIVE – III
2. UNIX PROGRAMMING

SUBJECT CODE :	THEORY	MARKS : 100
SEMESTER : VI	CREDITS : 5	NO. OF HOURS : 90

COURSE OBJECTIVES

- This course introduces fundamentals & programming of Unix basic concepts

UNIT-I **(18hrs)**

INTRODUCTION: File and common commands - Shell - More about files - Directories- Unix System - Basics of File Directories and Filenames - Permissions - Modes - Directory hierarchy - Devices - The Grep Family - other Filters - the Stream Editor sed - the awk pattern scanning and processing language - Files and good filters.

UNIT-II **(20hrs)**

CONCEPTS OF SHELL: Command line structure – Meta characters - Creating new commands - Command arguments and parameters - program output as arguments - Shell variables - More on I/O redirection - loop in shell programs - Bundle - Setting shell attributes, Shift command line parameters - Exiting a command or the shell, evaluating arguments - Executing command without invoking a new process - Trapping exit codes -- Conditional expressions.

UNIT-III **(16hrs)**

SHELL PROGRAMMING: Customizing the call command, Functions of command, While and Until loops - Traps - Catching Interrupts - Replacing a File - Overwrite - Zap - Pick Command - News Command - Get and Put tracking File changes.

UNIT-IV **(16hrs)**

FEATURES IN UNIX: Standard Input and Output - Program Arguments - File Access - A screen at a time printer - On bugs and debugging - Examples - Zap - Pick - Interactive File comparison program - Accessing the Environment - Unix System calls - Low Level I/O, File System Directories and Modes, Processors, Signal and Interrupts

UNIT-V **(20hrs)**

PROGRAM DEVELOPMENT AND DOCUMENT PREPARATION: Program development - Four Function Calculator - Variables and Error Recovery - Arbitrary Variable Names, Built-in Functions, Compilation into a Machine, Control Flow and Relational Operators, Functions and Procedures - Performance Evaluation - Ms Macro Package - Troff Level - Tbl and eqn Preprocessors - Manual Page - Other Document preparation.

1. PRESCRIBED BOOKS

- i. Brian W. Kernighan, Rob Pike - The UNIX Programming Environment - Prentice Hall of India(1984).

2. REFERENCE BOOKS

- i. Steven Earhart - The UNIX System for MSDOS Users - Galgotia book source P. Ltd.(1990).
- ii. Stefen Prata - Advanced UNIX - A Programmer Guide.

ELECTIVE – III
3. R - PROGRAMMING

SUBJECT CODE :	THEORY	MARKS : 100
SEMESTER : VI	CREDITS : 5	NO. OF HOURS : 90

COURSE OBJECTIVES

- In this course you will learn how to program in R and how to use R for effective data analysis.

UNIT-I (18hrs)

Introduction - How to run R - R Sessions and Functions - Basic Math – Variables - Data Types – Vectors – Conclusion - Advanced Data Structures - Data Frames – Lists – Matrices – Arrays - Classes.

UNITII (18hrs)

R Programming Structures - Control Statements – Loops – Looping Over Non-vector Sets – IfElse - Arithmetic and Boolean Operators and values - Default Values for Argument - Return Values - Deciding Whether to explicitly call return Returning Complex Objects - Functions are Objective - No Pointers in R – Recursion - A Quicksort Implementation Extended - Example: A Binary Search Tree.

UNITIII (18hrs)

Doing Math and Simulation in R - Math Function - Extended Example Calculating Probability Cumulative Sums and Products Minima and Maxima Calculus - Functions for Statistical Distribution – Sorting - Linear Algebra Operation on Vectors and Matrices - Extended Example: Vector cross Product Extended Example: Finding Stationary Distribution of Markov Chains - Set Operation - Input /Output - Accessing the Keyboard and Monitor - Reading and writer Files.

UNITIV (18hrs)

Graphics - Creating Graphs - The Workhorse of R Base Graphics - the plot() Function – Customizing Graphs - Saving Graphs to Files.

UNITV (18hrs)

Probability Distributions - Normal Distribution Binomial Distribution Poisson Distributions other Distribution - Basic Statistics - Correlation and Covariance – Ttests – ANOVA - Linear Models - Simple Linear Regression - Multiple Regression Generalized Linear Models - Logistic Regression – Poisson Regression other Generalized Linear Models Survival Analysis, Nonlinear Models, Splines Decision Random Forests,

1. PRESCRIBED BOOKS

- i. The Art of R Programming, Norman Matloff, Cengage Learning
- ii. R for Everyone, Lander, Pearson
- iii. Siegel, S. (1956), Nonparametric Statistics for the Behavioral Sciences, McGrawHill International, Auckland.
- iv. R Cookbook, PaulTeetor, Oreilly.

2. REFERENCE BOOKS

- i. R in Action, Rob Kabacoff, Manning
- ii. Venables, W. N. and Ripley, B. D. (2000), S Programming, SpringerVerlag, New York.
- iii. Venables, W. N. and Ripley, B. D. (2002), Modern Applied Statistics with S, 4th ed., SpringerVerlag, New York.

QUESTION PAPER PATTERN:

Section	Question Component	Numbers	Marks	Total
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DISTRIBUTION OF QUESTIONS:

Section	Units	No. of Questions	
		Theory	Problems
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	Unit – 4	1	
	Unit – 5	1	
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	Unit – 2	2	
	Unit – 3	1	
	Unit – 4	1	
	Unit – 5	1	