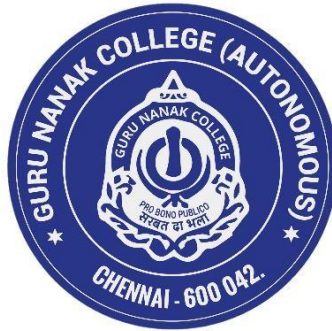


# **GURU NANAK COLLEGE (AUTONOMOUS)**

(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 2022-23 and thereafter)

## **PREAMBLE**

Bachelor of Computer Applications (BCA) is a 3 Year - undergraduate programme spread over six semesters. By incorporating the most recent developments into the curriculum and providing students with a thorough understanding within a structured framework, this course is intended to bridge the gap between IT industries and Academic institutions.

The corporate landscape is rapidly changing as a result of a number of innovative technologies that have emerged in the IT industry. The difficulties facing the IT industry now differ greatly from those of past few years. Students who want to pursue careers in information technology need to be well-versed in the newest advances due to the ever-changing technological landscape.

The BCA curriculum is specifically created to meet the knowledge and skill demands of the modern industry. It includes theoretical and practical training sessions that can provide students with the skills they need for the lucrative occupations of the future. This course aids students in pursuing further computer science education as well as building a successful career in the field.

# **LEARNING OUTCOME BASED CURRICULUM FRAMEWORK**

From the Academic Year 2022- 23 and there after

## **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**

1. 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.
2. Increase Industry - Institute Interaction to enlighten the students about the required skills to be successful in their career.
3. Train and develop the students as IT professionals with confidence, competence, commitment and character

## **PROGRAMME OUTCOMES BCA COMPUTER APPLICATION**

The following points are the expected outcomes of the three-year BCA Computer Application programme of Guru Nanak College:

- PO 1:** Understand the concepts of key areas in computer Applications.
- PO 2:** Analyze and apply latest technologies to solve problems in the areas of computer applications.
- PO 3:** Analyze and synthesis computing systems through quantitative and qualitative techniques.
- PO 4:** Apply technical and professional skills to excel in business.
- PO 5:** Develop practical skills to provide solutions to industry, society and business.

## **PROGRAMME SPECIFIC OUTCOMES BCA COMPUTER APPLICATION**

- PSO 1:** Apply their abilities in systematic planning, developing, testing and executing complex computer applications that contributes to multi-disciplinary creativity, permutation, modernization to address global interest.
- PSO 2:** Explore technical knowledge in diverse computer application fields and encounter an environment that promotes the growth of abilities for a successful profession, entrepreneurship, and higher education.

**COURSE STRUCTURE**  
**BACHELOR OF COMPUTER APPLICATION (B.C.A)**  
**2022-23 Batch onwards**

Semester	Part	Course Component	Subject Name	Credits	Hours	Internal	External	Total
Semester – I	I	Language	Tamil – I	3	6	50	50	100
	II	English	English – I	3	4	50	50	100
	III	Core Paper-I	Problem Solving Using C Programming	4	6	50	50	100
	III	Core Paper-II	Practical – Problem Solving Using C Lab	4	4	50	50	100
	III	Allied-I	Mathematics - I	5	6	50	50	100
	IV	Non Major Elective-I / Basic/ Advance Tamil	Block Chain Technology	2	2	-	100	100
	IV	Soft Skills-I	Introduction to Study Skills	3	2	-	100	100
<b>Total Credits: 24 / Total Hours per week: 30</b>								
Semester - II	I	Language	Tamil – II	3	6	50	50	100
	II	English	English – II	3	4	50	50	100
	III	Core Paper-III	Programming in JAVA	4	5	50	50	100
	III	Core Paper-IV	Practical – JAVA Lab	4	5	50	50	100
	III	Allied-II	Mathematics II	5	6	50	50	100
	IV	Non Major Elective-II / Basic/ Advance Tamil	Practical –Data Manipulation Using SQL	2	2	-	100	100
	IV	Soft Skills-II	Life Skills	3	2		100	100
<b>Total Credits: 24 / Total Hours per week: 30</b>								
Semester - III	III	Core Paper-V	Operations Research with Big Data	4	5	50	50	100
	III	Core Paper-VI	Mobile Application Development	4	6	50	50	100
	III	Core Paper-VII	Practical – Mobile Application Development Lab	4	5	50	50	100
	III	Core Paper-VIII	Data Structures and Algorithms	4	6	50	50	100
	III	Allied-III	Financial Accounting	5	6	50	50	100
	IV	Soft Skills-III	Job-Oriented Skills	3	2	-	100	100
<b>Total Credits: 24 / Total Hours per week: 30</b>								

**COURSE STRUCTURE**  
**BACHELOR OF COMPUTER APPLICATION (B.C.A)**  
**2022-23 Batch onwards**

Semester	Part	Course Component	Subject Name	Credits	Hours	Internal	External	Total
Semester - IV	III	Core Paper-IX	Web Technology	4	7	50	50	100
	III	Core Paper-X	Practical – Web Applications Lab	4	6	50	50	100
	III	Core Paper-XI	Cloud Computing	4	7	50	50	100
	III	Allied-IV	Cost and Management Accounting	5	6	50	50	100
	IV	Soft Skills-IV	Practical – Tally Lab	3	2	-	100	100
	IV	EVS	Environmental Studies	2	2	-	100	100
<b>Total Credits: 22 / Total Hours per week: 30</b>								
Semester - V	III	Core Paper XII	Programming in Python	4	6	50	50	100
	III	Core Paper XIII	Practical – Python Lab	4	6	50	50	100
	III	Core Paper XIV	Operating Systems	4	6	50	50	100
	III	Elective-I	Information Security/Computer Architecture/ Relational Database Management System	5	6	50	50	100
	III	Elective-II	IDE – Introduction to Web Designing (HTML& CSS)/ E-Commerce/Client/Server Computing Client/Server Computing	5	5	50	50	100
	IV	Value Education	Value Education	2	1	-	100	100
	V	Internship	Internship	2	-	-	-	-
<b>Total Credits: 26 / Total Hours per week: 30</b>								
Semester - VI	III	Core Paper-XV	Software Engineering	4	6	50	50	100
	III	Core Paper-XVI	R-Programming	4	6	50	50	100
	III	Core Paper-XVII	Practical - R-Programming Lab	4	6	50	50	100
	III	Core Paper-XVIII	Mini Project	4	6	50	50	100
	III	Elective-III	Data Communication and Networking/ Unix Programming/ Data Mining	5	6	50	50	100
	V	Extension Activity	Extension Activity	1	-	-	-	-
<b>Total Credits: 22 / Total Hours per week: 30</b>								
<b>Grand Total Credits: 142 / Total Hours: 180</b>								

## ANNEXURE - I

<b>Course Component</b>	<b>Subject Name</b>
<b>Elective - I</b>	a) Information Security b) Computer Architecture c) Relational Database Management System
<b>Elective - II</b>	a) IDE – Introduction to Web Designing (HTML& CSS) b) E-Commerce c) Client/Server Computing
<b>Elective - III</b>	a) Data Communication and Networking b) Unix Programming c) Data Mining

## CORE - I PROBLEM SOLVING USING C PROGRAMMING

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : I</b>	<b>CREDITS : 4</b>	<b>NO. OF HOURS : 90</b>

### **Course Framework:**

*This course introduces the basic concepts of C programming.*

### **Course Outcome:**

On completion of the course the students will be able

1. To get the exposure of Problem Solving Techniques: Flowcharting, Algorithms.
2. To Understand the basic terminology used in computer programming.
3. To write, compile and debug programs in C language.
4. To use different data types in a computer program.
5. To use different data structures and create/update basic data files.

### **UNIT I: Planning the Computer Program:**

**(18 Hours)**

Problem definition, Program design, Debugging, Types of Errors in programming, Techniques of Problem Solving: Flowcharting, Algorithms.

C Fundamentals: Character set - Identifiers and Keywords - Data Types - Constants - Variables - Declarations - Expressions - Statements - Operators: Arithmetic, Unary, Relational and Logical, Assignment and Conditional.

### **UNIT II:**

**(18 Hours)**

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, go to statements - comma operator.

### **UNIT III:**

**(18 Hours)**

Functions: Definition - Proto-types - Passing arguments - Recursions. Storage Classes - automatic, external, static, register variables -Library functions.

### **UNIT IV:**

**(18 Hours)**

Arrays - Defining and Processing - Passing arrays to functions – Multidimensional arrays - Arrays and String. Structures - User defined data types – Unions.

### **UNIT V:**

**(18 Hours)**

Pointers - Declarations - Passing pointers to Functions - Operation in Pointers - Pointer and Arrays - Arrays of Pointers - Files : Creating , Processing, Opening and Closing adata file.

### **PRESCRIBED BOOKS:**

1. P. K. Sinha & Priti Sinha, “Computer Fundamentals”, BPB Publications, 6<sup>th</sup> Edition.
2. Dr. Anita Goel, Computer Fundamentals, Pearson Education, 2010.
3. E. Balaguruswamy, 2016, 7<sup>th</sup> Edition, Programming in ANSI C, TMH Publishing Company Ltd.
4. Kanetkar Y., 1999, Let us C, BPB Pub., New Delhi.

**REFERENCE BOOKS:**

1. K.R.Venugopal,Programming with C,1997,McGraw-Hill
2. Varalakshmi,Programming using C,2000(Reprint July 2001), V.Ramesh5
3. R.Rajaram,C Programming Made Easy,V.Ramesh
4. B.W. Kernighan and D.M.Ritchie, 1988, The C Programming Language, 2<sup>nd</sup> Edition, PHI.
5. H. Schildt, C,2004, The Complete Reference, 4<sup>th</sup> Edition, TMH
6. Gottfried. B.S, 1996, Programming with C, Second Edition, TMH Pub. Co. Ltd., New Delhi.

**WEBSITES:**

1. <http://www.cprogramming.com/>
2. <http://www.richardclegg.org/previous/ccourse/>

**QUESTION PAPER PATTERN:**

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

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



## CORE – II PRACTICAL – PROBLEM SOLVING USING C LAB

<b>SUBJECT CODE :</b>	<b>PRACTICAL</b>	<b>MARKS : 100</b>
<b>SEMESTER : I</b>	<b>CREDITS : 4</b>	<b>NO. OF HOURS : 60</b>

### **Course Framework:**

*This course gives exposure to hands on training in C programming.*

### **Course Outcome:**

On completion of the course the students will be able

1. To get the exposure of hands on training in C programming
2. To familiarize the student with basic concepts of computer programming and developer tools.
3. To present the syntax and semantics of the “C” language as well as data types offered by the language.
4. To allow the student to write their own programs using standard language infrastructure regardless of the hardware or software platform.
5. To understand the role of functions involving the idea of modularity.

### **Lab Exercises:**

1. Write a program to add, subtract, multiply and divide two numbers.  
(Arithmetic operation).
2. Write a program to check if a number is even or odd. (if-else)
3. Write a program to find the largest of three numbers. (using if-else, logical &&)
4. Write a program to find the maximum and minimum of nnumbers.  
(using for- statement)
5. Write a program to check for prime number. (do while loop)
6. Write a program to check for Armstrong number. (while loop)
7. Write a program to accept day number and print the day ofthe week. (switch)
8. Write a program for counting the number of vowels, consonants, words, white spaces in a line of text. (switch)
9. Write a program to arrange a set of numbers in ascending order. (1D Array).
10. Write a program to implement linear search.(1D Array)
11. Write a program to implement binary search. (1D Array)
12. Write a program to add two matrices. (2D Arrays)
13. Write a program to check whether a string is a palindrome or not. (String)
14. Write a program to print Fibonacci series using function.
15. Write a program to find factorial of a number using recursive function.

## ALLIED I - MATHEMATICS – I

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : I</b>	<b>CREDITS : 5</b>	<b>NO. OF HOURS : 90</b>

### **Course Framework:**

*To improve basics in Mathematics and Analytical Skill*

### **Course Outcome:**

On completion of the course the students will be able

1. To acquire the knowledge in computing solutions of Summation series involving Binomial, Exponential and Logarithmic Series
2. To Compute the eigen values and eigen vectors of a given matrix and apply CayleyHamilton theorem in computing the integrals powers and also the inverse of a given matrix.
3. To get the Knowledge in solving polynomial equations including reciprocal equations and application of Newton's method in finding approximate roots to the polynomial equations.
4. To Compute radius of curvature using Cartesian co-ordinates and also evaluate maxima and minima of functions involving two variables.
5. To acquire the skill in the expansion of Trigonometric functions and compute a solution for Hyperbolic and Inverse hyperbolic functions.

### **UNIT I**

**(18 hrs)**

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**

**(18 hrs)**

Matrices: Eigen Values – Eigen Vectors - Cayley - Hamilton Theorem (without proof) Chapter 4 Section 4.5, 4.5.2, 4.5.3

### **UNIT III**

**(18 hrs)**

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**

**(18 hrs)**

Differential Calculus:  $n^{\text{th}}$  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**

**(18 hrs)**

Trigonometry: Expansions of  $\text{Sin}n\theta$ ,  $\text{Cos}n\theta$ ,  $\text{tann}\theta$  - 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. Durai Pandian and S. Udayabaskaran, S. Chand Publications, 2016 Edition.

### **PRESCRIBED BOOKS**

1. Allied Mathematics, A. Singaravelu.
2. Ancillary Mathematics, A. Manickavasagam Pillai and Narayanan.

### **REFERENCE BOOKS**

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

### **WEBSITES:**

1. [www.freetechbooks.com/mathematics-f38.html](http://www.freetechbooks.com/mathematics-f38.html)
2. [www.ebooksdirectory.com](http://www.ebooksdirectory.com)
3. [www.freebookcentre.net/SpecialCat/Free-Mathematics-Books-Download.html](http://www.freebookcentre.net/SpecialCat/Free-Mathematics-Books-Download.html)

### **QUESTION PAPER PATTERN:**

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

### **DISTRIBUTION OF QUESTIONS:**

Sections	Units	No. of Questions	
		Theory	Problems
<b>Section A</b>	Unit – 1		2
	Unit – 2	1	2
	Unit – 3	1	1
	Unit – 4		2
	Unit – 5	1	2
<b>Section B</b>	Unit – 1		2
	Unit – 2		1
	Unit – 3		2
	Unit – 4		1
	Unit – 5		1
<b>Section C</b>	Unit – 1		1
	Unit – 2		2
	Unit – 3		1
	Unit – 4		1
	Unit – 5		1

## NME - I BLOCK CHAIN TECHNOLOGY

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : I</b>	<b>CREDITS : 2</b>	<b>NO. OF HOURS : 30</b>

### **Course Framework:**

*Introduction of consensus and hyper ledger fabric in block chain technology.*

### **Course Outcome:**

On completion of the course the students will be able.

1. To understand the block technologies and its business use.
2. To analyse the block chain applications in a structure manner.
3. To explain the modern concepts of block chain technology systematically.
4. To handle the cryptocurrency.
5. To understand the modern currencies and its market usage.

### **UNIT - I**

**(6 hrs)**

History: Digital Money to Distributed Ledgers - Block chain Architecture and Design-Basic crypto primitives: Signature-Hash chain to Block chain-Basic consensus mechanisms.

### **UNIT - II**

**(6 hrs)**

Requirements for the consensus protocols-Proof of Work (PoW)- Permissioned Block chains-Design goals-Consensus protocols for Permissioned Block chains.

### **UNIT - III**

**(6 hrs)**

Decomposing the consensus process-Hyper ledger fabric components-Chain code Design and Implementation

### **UNIT – IV**

**(6 hrs)**

Block chain in Financial Software and Systems (FSS): -Settlements, -KYC, -Capital markets-Insurance- Block chain in trade/supply chain

### **UNIT – V**

**(6 hrs)**

Block chain for Government: Digital identity, land records and other kinds of record keeping- Block chain Cryptography: Privacy and Security on Block chain.

### **PRESCRIBED BOOKS**

1. Mark Gates, “Block chain: Ultimate guide to understanding block chain, bit coin, crypto currencies, smart contracts and the future of money”, Wise Fox Publishing and Mark Gates 2017.
2. Salman Baset, Luc Desrosiers, Nitin Gaur, Petr Novotny, Anthony O'Dowd, Venkatraman Ramakrishna, “Hands-On Block chain with Hyper ledger: Building decentralized applications with Hyperledger Fabric and Composer”, 2018.
3. Bahga, Vijay Madiseti, “Block chain Applications: A Hands-On Approach”, Arshdeep Bahga, Vijay Madiseti publishers 2017.

## **REFERENCE BOOKS**

1. Andreas Antonopoulos, "Mastering Bitcoin: Unlocking Digital Crypto currencies", O'Reilly Media, Inc. 2014.
2. Melanie Swa, "Block chain ", O'Reilly Media 2014. WEB REFERENCES: □ NPTEL & MOOC courses titled blockchain technology □ [blockgeeks.com/guide/what-is-block-chain-technology](http://blockgeeks.com/guide/what-is-block-chain-technology) □ <https://nptel.ac.in/courses/106105184/>

**SOFT SKILLS – I**  
**PAPER TITLE: INTRODUCTION TO STUDY SKILLS**

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER: I</b>	<b>CREDITS: 3</b>	<b>NO. OF HOURS : 30</b>

**COURSE FRAMEWORK:**

- To help, develop and improve the vocabulary of the learners
- To help the learners develop the skill of inference
- To help the learners to acquire writing skills in English

Use of Dictionary and Dictation

Speech Sounds in English & Right Pronunciation Stress & Intonation Vocabulary

Building Exercises Listening and Reading Comprehension Paragraph and Essay

Writing

**REFERENCE BOOKS:**

1. Hewings, Martin. 1999. Advanced English Grammar: A Self- study Reference and Practice Book for South Asian Students. Reprint 2003. Cambridge University Press. New Delhi.
2. Lewis Norman. 1991. Word Power Made Easy.
3. Mohan, Krishna & Meenakshi Raman. 2000. Effective English Communication. Tata Mc Graw Hill Publishing Company Ltd.
4. Mohan, Krishna & Meera Banerji. 2001. Developing Communication Skills. Macmillan. Syamala. 2002. Effective English Communication for You. Emerald Publishers, Chennai.
5. Harishankar, Bharathi. Ed. Essentials of Language and Communication. University of Madras.
6. Swan, Michael and Catherine Walter. 1990. The Cambridge English Course-2. Cambridge University Press.

## CORE - III PROGRAMMING IN JAVA

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : II</b>	<b>CREDITS : 4</b>	<b>NO. OF HOURS : 75</b>

### **Course Framework:**

*This course introduces the concepts of Object Oriented Programming in JAVA.*

### **Course Outcome:**

On completion of the course the students will be able

1. To understand the principles and practice of object oriented analysis and design in the construction of robust, maintainable programs which satisfy their requirements.
2. To implement, compile, test and run Java programs comprising more than one class, to address a particular software problem.
3. To demonstrate the principles of object oriented programming.
4. To understand the use of simple data structures like arrays in a Java program.
5. To understand the concept of package, interface, multithreading and File handling in JAVA.

### **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.

### **PRESCRIBED BOOKS**

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

**REFERENCE BOOKS**

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

**QUESTION PAPER PATTERN:**

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

**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 - IV PRACTICAL - JAVA LAB

<b>SUBJECT CODE :</b>	<b>PRACTICAL</b>	<b>MARKS : 100</b>
<b>SEMESTER : II</b>	<b>CREDITS : 4</b>	<b>NO. OF HOURS : 75</b>

### Course Framework:

*This course gives hands on training in JAVA programming.*

### Course Outcome:

On completion of the course the students will be able

1. To understand programming language concepts, particularly object-oriented concepts in Java.
2. To write, debug, and document well-structured Java applications.
3. To Implement Java classes from specifications and effectively create and use objects from predefined class libraries.
4. To understand the behavior of primitive data types, object references, and arrays.
5. To apply decision and iteration control structures to implement algorithms.

### Lab Exercises:

#### 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

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : II</b>	<b>CREDITS : 5</b>	<b>NO. OF HOURS : 90</b>

### Course Framework:

*To improve basics in mathematics and analytical skills*

### Course Outcome:

On completion of the course the students will be able

1. To demonstrate skill in computing integrations containing an integer parameter
2. To identify the concept of difference tables and use them in computing problems involving Newton and Lagrange formulae.
3. To acquire knowledge in solving second order differential equations involving constant coefficients.
4. To acquire skill in computing solutions to partial differential equations of different types.
5. To identify the basics of Laplace transformation and apply different properties in computing problems.

### UNIT I

(18 hrs)

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

(18 hrs)

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

(18 hrs)

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

(18 hrs)

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

(18 hrs)

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

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

**REFERENCE BOOKS:**

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

**WEBSITES:**

1. [www.freetechbooks.com/mathematics-f38.html](http://www.freetechbooks.com/mathematics-f38.html)
2. [www.e-booksdirectory.com](http://www.e-booksdirectory.com)
3. [www.freebookcentre.net/SpecialCat/Free-Mathematics-Books-Download.html](http://www.freebookcentre.net/SpecialCat/Free-Mathematics-Books-Download.html)

**QUESTION PAPER PATTERN:**

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

**DISTRIBUTION OF QUESTIONS:**

Sections	Units	No. of Questions	
		Theory	Problems
<b>Section A</b>	Unit – 1		2
	Unit – 2	1	1
	Unit – 3		3
	Unit – 4		3
	Unit – 5		2
<b>Section B</b>	Unit – 1		1
	Unit – 2		2
	Unit – 3		1
	Unit – 4		2
	Unit – 5		1
<b>Section C</b>	Unit – 1		1
	Unit – 2		1
	Unit – 3		2
	Unit – 4		1
	Unit – 5		1

## NME – II PRACTICAL – DATA MANIPULATION USING SQL

<b>SUBJECT CODE :</b>	<b>PRACTICAL</b>	<b>MARKS : 100</b>
<b>SEMESTER : II</b>	<b>CREDITS : 2</b>	<b>NO. OF HOURS : 30</b>

### Course Framework:

*Enhance the knowledge in the processes of Database Development and Administration using SQL.*

### Course Outcome:

On completion of the course the students will be able

1. To understand basic concepts of how a database stores information via tables.
2. To understand the SQL syntax for various statements.
3. To write complex SQL queries to retrieve information from databases with many tables to support business decision making.
4. To write SQL DDL to create, modify and drop objects within a relational database.
5. To retrieve and store information in a relational database using SQL in a multi-user, web based environment.

### Lab Exercises:

1. Table creation and simple Queries
2. SQL Data Type Specification
3. SQL Constraint specification (Primary key, Foreign key, Unique, check, Not Null)
4. Queries using ALTER, DROP, TRUNCATE
5. Queries using COMMIT, ROLLBACK
6. Insertion, Selection, Deletion, Updation of records
7. Selection with Where clause
8. Duplicate removal with Distinct clause
9. SQL Queries with Operators ( Arithmetic Operators, Comparison Operators, Logical Operators)
10. SQL Queries with Operators (Like, In, Between)
11. SQL Queries with Grouping Function ( Group By)
12. SQL Queries using Aggregate Function (Max, Min, Count, Sum, Avg)
13. SQL Queries using Sort Function (Order By)
14. SQL Queries using Join Operation
15. Nested SQL with sub Queries
16. SQL Union and Intersection Operation
17. SQL with Group By function
18. SQL Queries using Views
19. SQL Queries using Alias
20. Create Database using SQL

## **SOFT SKILLS – II PAPER**

### **TITLE: LIFE SKILLS**

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS: 100</b>
<b>SEMESTER: II</b>	<b>CREDITS: 3</b>	<b>NO. OF HOURS : 30</b>

#### **COURSE FRAMEWORK:**

- To build the confidence of learners to face the challenges of a globalized society
- To sensitize learners' ethical, moral and social values in their work environment
- To help them understand how to overcome stress-related problems
- To train the learners to use their time effectively

#### SWOC Analysis

Etiquette

Stress Management

Time Management

Discussion of Success Stories

- i. Auto-suggestions
- ii. Problem solving
- iii. Decision Making
- iv. Presentation Skills-Oral/PPT

#### **REFERENCE BOOKS:**

1. Pease, Allen. 1998. Body Language: How to read other's thoughts by their gestures. Sudha Publications. New Delhi.
2. Powell. In Company. MacMillan

#### **WEBLINKS:**

1. <http://www.essentiallifefskills.net//>

## CORE - V OPERATIONS RESEARCH WITH BIG DATA

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : III</b>	<b>CREDITS : 4</b>	<b>NO. OF HOURS : 75</b>

### **Course Framework:**

*To give an overall idea about the usage of various optimization techniques and the introduction of Big Data Platform.*

### **Course Outcome:**

On completion of the course the students will be able

1. To formulate a real-world problem as a mathematical programming model.
2. To understand the theoretical workings of the simple method for linear programming and perform iterations of it by hand
3. To understand the relationship between a linear program and its dual, including strong duality and complementary slackness
4. To perform sensitivity analysis to determine the direction and magnitude of change of a model's optimal solution as the data change
5. To solve specialized linear programming problems like the transportation and assignment problems

### **UNIT I**

**(15hrs)**

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**

**(15hrs)**

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**

**(15hrs)**

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**

**(15hrs)**

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

### **UNIT V**

**(15hrs)**

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.

### **PRESCRIBED BOOKS**

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

### **REFERENCE BOOKS**

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

### **QUESTION PAPER PATTERN:**

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

### **DISTRIBUTION OF QUESTIONS:**

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

## CORE - VI MOBILE APPLICATION DEVELOPMENT

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : III</b>	<b>CREDITS : 4</b>	<b>NO. OF HOURS : 90</b>

### Course Framework:

*Introduction of Mobile Devices, Mobile OS Architectures, Android Apps and Advanced Topics.*

### Course Outcome:

On completion of the course the students will be able

1. To understand concepts of mobile devices, Mobile OS Architectures, Android survival and basic apps.
2. To understand android useful apps, underneath the frameworks and advanced topics.
3. To apply general programming knowledge in the field of developing mobile applications.
4. To understand the specific requirements, possibilities and challenges for developing a mobile context.
5. To deploy applications to the Android marketplace for distribution.

### 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.

### PRESCRIBED BOOKS

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



**QUESTION PAPER PATTERN:**

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

**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 – MOBILE APPLICATION DEVELOPMENT LAB

<b>SUBJECT CODE :</b>	<b>PRACTICAL</b>	<b>MARKS : 100</b>
<b>SEMESTER : III</b>	<b>CREDITS : 4</b>	<b>NO. OF HOURS : 75</b>

### Course Framework:

*This course gives hands on training to understand and create Development Environment for various android applications.*

### Course Outcome:

On completion of the course the students will be able

1. To setup the development environment.
2. To create a sample android application.
3. To understand the various parts of an android project.
4. To use the Android Emulator.
5. To Install and Run the application on a physical device.

### Lab Exercises:

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.

## CORE - VIII DATA STRUCTURES AND ALGORITHMS

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : III</b>	<b>CREDITS : 4</b>	<b>NO. OF HOURS : 90</b>

### **Course Framework:**

*This course introduces fundamental data structures, algorithms, and abstract data types and its usages.*

### **Course Outcome:**

On completion of the course the students will be able

1. To get the familiarity with major algorithms and data structures.
2. To analyze performance of algorithms and choose the appropriate data structure and algorithm design method for a specified application.
3. To determine which algorithm or data structure to use in different scenarios and familiar with writing recursive methods.
4. To understand the abstract properties of various data structures such as stacks, queues, lists, trees and graphs and apply various data structures effectively in application programs.
5. To understand the various sorting algorithms, including bubblesort, insertion sort, selection sort, heap sort and quick sort.

### **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.

**PRESCRIBED BOOKS**

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

**REFERENCE BOOKS**

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

**QUESTION PAPER PATTERN:**

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

**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	

## ALLIED- III FINANCIAL ACCOUNTING

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : III</b>	<b>CREDITS : 5</b>	<b>NO. OF HOURS : 90</b>

### Course Framework:

*This course aims to familiarize the fundamentals of Financial Accounting.*

### Course Outcome:

On completion of the course the students will be able

1. To understand the role of accounting and its limitations.
2. To prepare financial statements in accordance with generally accepted.
3. To demonstrate accounting principles.
4. To demonstrate knowledge of each step in the accounting cycle.
5. To support basic level of recording and reporting of financial information for business.

### UNIT I (16 Hrs)

Meaning and scope of Accounting, objectives of accounting – Basic accounting concepts and conventions – Objectives of Accounting – Accounting transactions.

### UNIT II (20 Hrs)

Double entry- book keeping, types of accounts, Accounting Terminology – Journal – Ledger –Preparation of Trial Balance – Simple problems – excluding Suspense Accounts.

### UNIT III (18 Hrs)

Preparation of Final Accounts and Adjustments to Final Accounts. (Simple problems only)

### UNIT IV (18 Hrs)

Depreciation – Meaning – causes – types- problems based on Straight Line and Diminishing Balance methods only.

### UNIT V (18 Hrs)

#### 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 – Trial Balance – Final accounts & Its Adjustment

### PRESCRIBED BOOKS

1. Gupta R.L, Advanced Accountancy, S.Chand, Delhi.
2. Agarwala A.N, Higher Science of Accountancy, Kitab Mahal,Allahabad.

### REFERENCE BOOKS

1. S.P. Jain and K.L. Narang, Financial Accounting
2. M.C.Shukla and T.S.Grawel, Adavnced Accounts(Vol. I)
3. Gillespie Accounting system, Procedure & methods, Prentice Hall India Ltd, New Delhi.

**WEBSITE:**

1. <http://www.accountingtools.com/articles/2017/5/15/basic-accounting-principles>
2. <https://booksgoogle.in/books?isbn+8126909935>
3. [https://en.wikipedia.org/wiki/Single-entry\\_book\\_keeping\\_system](https://en.wikipedia.org/wiki/Single-entry_book_keeping_system)

**QUESTION PAPER PATTERN:**

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

**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 SKILLS – III**  
**PAPER TITLE: JOB-ORIENTED SKILLS**

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS: 100</b>
<b>SEMESTER: III</b>	<b>CREDITS: 3</b>	<b>NO. OF HOURS : 30</b>

**COURSE FRAMEWORK:**

- To prepare the students to be job-ready.
- To help learners use English Language appropriately to the role or situation.
- To develop confidence in them to face Interviews.
- To train them to prepare their own CV/Resume

Different kinds of InterviewsLetter

of Application and CV

Technical Writing - Circulars, Memos, Agenda and MinutesGroup

Discussion

Review

- i. Books
- ii. Films

**REFERENCE BOOKS:**

1. Harishankar, Bharathi. ed. Essentials of Spoken and Presentation Skills. University of Madras.
2. John, Seely. 1998. The Oxford Guide to writing and speaking. Oxford U P, 1998, Delhi.
3. The Princeton Language Institute and Lanny Laskowski. 2001. 10 days to more confident Public Speaking. Warner Books.
4. <http://jobsearch.about.com/cs/curriculumvitae.html//>
5. <http://www.cvtips.com//>

**QUESTION PAPER PATTERN**

**UG - SOFT SKILLS**

**TIME – 3 HRS**

**MAXIMUM MARKS – 50**

**PART – A (5X2=10)**

Answer any FIVE from the questions given below from Q.No.1 to Q.No.7 (5 out of 7)

**PART – B (4X5=20)**

Answer any FOUR from the questions given below from Q.No.8 to Q.No.13 (4 out of 6)

**PART – C (2X10=20)**

Answer TWO questions only choosing one each from Q.No.14 & Q.No.15 (Internal Choice)

## CORE - IX WEB TECHNOLOGY

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : IV</b>	<b>CREDITS : 4</b>	<b>NO. OF HOURS : 105</b>

### **Course Framework:**

*This course introduces the concepts of ASP, VB Script & Java Script*

### **Course Outcome:**

On completion of the course the students will be able

1. To develop web pages using HTML and Cascading Style Sheets.
2. To create XML documents and schemas.
3. To incorporate knowledge of client-side (JavaScript) and server-side scripting(PHP, ASP.NET) languages to build dynamic web pages.
4. To familiarize with Web Application Terminologies, Internet Tools, E –Commerce and other web services.
5. To develop database applications with MYSQL.

### **UNIT I**

**(20hrs)**

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**

**(20hrs)**

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**

**(20hrs)**

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**

**(20hrs)**

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**

**(25hrs)**

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



**PRESCRIBED BOOKS**

1. Bayross, 2000, Web Enable Commercial Application Development Using HTML, DHTML, Javascript, Perl CGI, BPB Publications.
2. Russell Jones, Mastering Active Server Pages 3, BPB Publications.

**REFERENCE BOOKS**

1. Hathleen Kalata, Internet Programming with VBScript and JavaScript, Thomson Learning
2. Mike McGrath, XML Harness the Power ofXML in easy steps, Dreamtech Publications
3. T.A. Powell, 2002, Complete Reference HTML, TMH.
4. J. Jaworski, 1999, Mastering Javascript, BPB Publications.
5. Powell, Thomas; Schneider, Fritz, JavaScript: The Complete Reference, 2nd edition 2004, TMH

**QUESTION PAPER PATTERN:**

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

**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 PRACTICAL - WEB APPLICATIONS LAB

<b>SUBJECT CODE :</b>	<b>PRACTICAL</b>	<b>MARKS : 100</b>
<b>SEMESTER : IV</b>	<b>CREDITS : 4</b>	<b>NO. OF HOURS : 90</b>

### **Course Framework:**

*This course gives training in Web Designing and Applications.*

### **Course Outcome:**

On completion of the course the students will be able

1. To develop a dynamic webpage by the use of java script and DHTML.
2. To write a well formed / valid XML document.
3. To connect a java program to DBMS and perform insert, update and delete operations on DBMS table.
4. To write a server side java application called Servlet.
5. To write a JSP to catch form data sent from client and store it on database.

### **Lab Exercises: 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. (UseAD 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 - XI CLOUD COMPUTING

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : IV</b>	<b>CREDITS : 4</b>	<b>No. OF HOUR : 105</b>

### **Course Framework:**

*To introduce the broad perceptive of cloud architecture and its model.*

### **Course Outcome:**

On completion of the course the students will be able

1. To understand the concept of Cloud Security.
2. To learn the Concept of Cloud Infrastructure Model.
3. To gain a clear understanding of the concepts that underlie distributed computing systems along with design and implementation issues.
4. To understand key mechanisms and models for distributed systems.
5. To learn how to design and implement distributed algorithms.

### **UNIT I CLOUD ARCHITECTURE AND MODEL**

**(20hrs)**

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 VIRTUALIZATION**

**(20hrs)**

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 CLOUD INFRASTRUCTURE**

**(20hrs)**

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 PROGRAMMING MODEL**

**(20hrs)**

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 SECURITY IN THE CLOUD**

**(25hrs)**

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.

### **PRESCRIBED BOOKS**

1. John W.Rittinghouse and James F.Ransome, “Cloud Computing: Implementation, Management, and Security”, CRC Press, 2010.
2. 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.

### **REFERENCE BOOKS**

1. George Reese, “Cloud Application Architectures: Building Applications and Infrastructure in the Cloud” O'Reilly
2. Rajkumar Buyya, Christian Vecchiola, S.Thamarai Selvi, ‘Mastering Cloud Computing’, TMGH,2013.

### **QUESTION PAPER PATTERN:**

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

### **DISTRIBUTION OF QUESTIONS:**

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

## ALLIED – IV COST AND MANAGEMENT ACCOUNTING

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : IV</b>	<b>CREDITS : 5</b>	<b>NO. OF HOURS : 90</b>

### **Course Framework:**

*This course demonstrates a comprehensive range of Cost and Management Accounting concepts and the related terminologies.*

### **Course Outcome:**

On completion of the course the students will be able

1. To understand the cost and management accounting techniques for evaluation, analysis and application in managerial decision making.
2. To compare and contrast marginal and absorption costing methods in respect of profit reporting.
3. To apply marginal and absorption costing approaches in job, batch and process environments.
4. To understand accounting principles.
5. To demonstrate knowledge of each step in the accounting cycle.

### **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**

**(21hrs)**

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**

**(18 hrs)**

Financial Statement Analysis: meaning, nature, importance – Techniques or Tools of Financial Statement Analysis – Comparative Financial Statement, Common Measurement or Size Statements, Trend Analysis.

### **UNIT V**

**(18 Hrs)**

#### **Introduction to Accounting Package: MS - Excel (Only Internal)**

Financial Statement Analysis - Comparative Financial Statement, Common Measurement Statements and Trend Analysis using Excel Spreadsheet.

### PRESCRIBED 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.

### REFERENCE BOOKS

1. Prasad N.K, Cost Accounting : Principles and Problems.
2. Jain S.P. and Narang K.L., Advanced Cost Accounting.
3. Agarwal M., Theory and Practices of Cost Accounting
4. Robert Anthony : Management Accounting : Text and cases.
5. Maheswari S.N., Principles of Management Accounting.

### E- LEARNING:

1. <http://www.yourarticlelibrary.com/cost-accounting/cost-accounting-meaning>
2. <https://www.tutorsonnet.com/introduction-to-labour-remuneration-homework-help.php>
3. [http://wwwaccoutingexplination.com/materials\\_and\\_inventory\\_cost\\_control.htm](http://wwwaccoutingexplination.com/materials_and_inventory_cost_control.htm)

### QUESTION PAPER PATTERN:

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

### 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 IV – PRACTICAL - TALLY LAB

<b>SUBJECT CODE :</b>	<b>PRACTICAL</b>	<b>MARKS : 100</b>
<b>SEMESTER : IV</b>	<b>CREDITS : 3</b>	<b>NO. OF HOURS : 30</b>

### **Course Framework:**

*This course is designed to impart knowledge regarding concepts of Financial Accounting Tally is an accounting package which is used for learning to maintain accounts.*

### **Course Outcome:**

On completion of the course the students will be able

1. To enter the accounting transactions in computerized format and find the financial result of a concern.
  2. To acquire the skill of financial decision making in a systemized manner.
  3. To interpret financial statements as well as evaluation of stock at the end.
  4. To enter accounting voucher entries including advance voucher entries.
  5. To do reconcile bank statement.
- 
1. Create, modify, delete Company and Group Company
  2. Create, modify, delete Accounting Groups and sub Groups
  3. Create, modify, delete Single Ledger and Multiple Ledgers and their Group Allocation
  4. Create, modify, and delete voucher types
  5. Take a simple problem for usage of different accounting vouchers
  6. Prepare a final account for ABC Company using below given sample data.
    - A. Create a Company as “ABC Company” in Tally with inventory management.
    - B. Pass the following Entries :- (i). XYZ started “ABC Company” by bringing Capital Rs.3,00,000/- Cash. (ii) He deposited Rs.1,00,000/- cash at ICICI bank. (iii) He paid electricity bill for Rs.1,200/- by cash. (iv) He withdrawn Rs.10,000/- cash for his personal use. (v) He purchased the following item from Computer Lab.  
Ltd. on credit with 4% Vat rate. (a) Computer - 10 Nos. - @20000/- each  
(vi) He sold the following item to Som nath Traders in cash with 4% Vat rate.  
(a) Computer - 5 Nos. - @27500/- each (vii) He received Rs.6,000/- as commission from Rohit by cash. (viii) He paid House Rent for Rs.5,000/- by cash. (ix) He withdrawn Rs.25,000/- cash from ICICI Bank. (x) He purchased furniture for Rs. 25,000/- by cash for office use.
    - C. Show the Trial Balance and Balance Sheet of “Sagar Industries Ltd.”
    - D. Show the Vat Computation report of the above company.
    - E. Show the Cash Book & Bank Book of the company.
    - F. Show the Day Book.
    - G. Backup and restore the company data.



## EVS - ENVIRONMENTAL STUDIES

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : IV</b>	<b>CREDITS : 2</b>	<b>NO. OF HOURS : 30</b>

### **Course Framework:**

*This course introduces the concepts of Environmental Studies*

### **Course Outcome:**

On completion of the course the students will be able

1. To know the importance of environmental studies and methods of conservation of natural resources.
2. To describe the structure and function of an ecosystem.
3. To identify the values and conservation of bio-diversity.
4. To explain the causes, effects and control measures of various types of pollutions.
5. To select the appropriate methods for waste management.

### **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.

## CORE – XII PROGRAMMING IN PYTHON

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : V</b>	<b>CREDITS : 4</b>	<b>NO. OF HOURS : 90</b>

### Course Framework:

*This course is a depth introduction to fundamental python programming concepts.*

### Course Outcome:

On completion of the course the students will be able

1. To learn how to install Python, Start the Python shell.
2. To learn how to perform basic calculations, performsimple control flow operations using if statements and for loops.
3. To learn how to reuse code with functions.
4. To describe the semantics of python programming language and illustrate the process ofstructuring the data using lists, dictionaries, tuples, strings and sets.
5. To understand the concepts of object-oriented programming in python.

### 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.

### PRESCRIBED BOOKS

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

### REFERENCE BOOKS

1. John V. Guttag, —Introduction to Computation and Programming using
2. Python, Prentice Hall of India, 2014.
3. 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	<b>Definition/Principle</b> Answer any 10 out of 12 questions (each in 50 words)	1-12	3	<b>30</b>
B	<b>Short Answer</b> Answer any 5 out of 7 questions (each in 300 words)	13-19	6	<b>30</b>
C	<b>Essay</b> Answer any 4 out of 6 questions (each in 600 words)	20-25	10	<b>40</b>
<b>TOTAL MARKS</b>				<b>100</b>

### 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 PRACTICAL – PYTHON LAB

<b>SUBJECT CODE :</b>	<b>PRACTICAL</b>	<b>MARKS : 100</b>
<b>SEMESTER : V</b>	<b>CREDITS : 4</b>	<b>NO. OF HOURS : 90</b>

### Course Framework:

*To learn how to design and develop python applications.*

### Course Outcome:

On completion of the course the students will be able

1. To understand why python is a useful scripting language for developers.
2. To learn how to read and write files in Python.
3. To learn how to design and program python applications.
4. To design programs using python object types.
5. To demonstrate the basic database design for storing data as part of a multi-step data gathering, analysis and processing.

### Lab Exercises:

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.

## CORE – XIV OPERATING SYSTEMS

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : V</b>	<b>CREDITS : 4</b>	<b>NO. OF HOURS : 90</b>

### **Course Framework:**

*This course introduces the functions of operating systems.*

### **Course Outcome:**

On completion of the course the students will be able

1. To understand the difference between different types of modern operating systems, virtual machines and their structure of implementation and applications.
2. To understand the difference between process & thread, issues of scheduling of user level processes
3. To gain knowledge about the concepts of deadlock in operating systems and how they can be managed / avoided and implement them in multiprogramming system.
4. To demonstrate the design and management concepts along with issues and challenges of main memory, virtual memory and file system.
5. To understand the types of I/O management, disk scheduling, protection and security problems faced by operating systems and how to minimize these problems.

### **UNIT I:**

**(15 Hours)**

Introduction: Views –Goals – OS Structure –Components – Services - System Design and Implementation. Process Management: Process - Process Scheduling – Cooperating Process –Threads - Interprocess Communication.

### **UNIT II:**

**(24 Hours)**

CPU Scheduling: CPU Schedulers – Scheduling criteria – Scheduling Algorithms - Process Synchronization: Critical-Section problem - Synchronization Hardware – Semaphores – Classic Problems of Synchronization – Critical Region.

### **UNIT III:**

**(18 Hours)**

Deadlock: Characterization – Methods for handling Deadlocks – Prevention, Avoidance, and Detection of Deadlock - Recovery from deadlock. Secondary Storage Structures: Protection – Goals- Domain Access matrix.

### **UNIT IV:**

**(18 Hours)**

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 – Sharing - Fragmentation.

### **UNIT V:**

**(15 Hours)**

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.

### **PRESCRIBED BOOKS:**

1. Silberschatz A., Galvin P.B., Gange, 2012, Operating System Principles, Tenth Edition, John Wiley & Sons.

**REFERENCE BOOKS:**

1. H.M. Deitel ,1990, An Introduction to Operating System,- Second Edition,Addison Wesley

**WEBSITES:**

1. <http://www.ics.uci.edu/~ics143/lectures.html>
2. <http://williamstallings.com/Extras/OS-Notes/notes.html>

**QUESTION PAPER PATTERN:**

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

**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	

## VALUE EDUCATION

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100</b>
<b>SEMESTER: V</b>	<b>CREDITS: 2</b>	<b>NO.OF HOURS : 15</b>

### Course Framework:

Values are socially accepted norms to evaluate objects, persons, and situations that form part and parcel of sociality.

A value system is a set of consistent values and measures. Knowledge of the values is inculcated through education. It contributes in forming true human being, who is able to face life and make it meaningful. There are different kinds of values like, ethical or moral values, doctrinal or ideological values, social values and aesthetic values. Values can be defined as broad preferences concerning appropriate courses of action or outcomes. As such, values reflect a person's sense of right and wrong or what "ought" to be. There are representative values like, "Equal rights for all", "Excellence deserves admiration". "People should be treated with respect and dignity". Values tend to influence attitudes and behavior and help to solve common human problems. Values are related to the norms of a culture.

### Course Outcome:

On completion of the course the students will be able

1. To inculcate the value system in their real life scenarios.
2. To implement the role of culture and civilization, roles and responsibilities in the society.
3. To effectively follow Salient values for life such as forgiveness, ability to sacrifice, self-esteem, teamwork and creative thinking.
4. To reflect the human rights, social values and welfare of the citizen.
5. To consider the relation between values and personal behavior affecting the achievement of a sustainable future.

### UNIT 1: EDUCATION AND VALUES

(3hrs)

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

(3hrs)

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

(3hrs)

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 (3hrs)**

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:**

**(3hrs)**

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, 8<sup>th</sup> 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>

**QUESTION PAPER PATTERN:**

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

**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 – XV SOFTWARE ENGINEERING

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : VI</b>	<b>CREDITS : 4</b>	<b>NO. OF HOURS : 90</b>

### **Course Framework:**

*This course introduces the details about the concepts of life cycle of software.*

### **Course Outcome:**

On completion of the course the students will be able

1. To apply the software engineering lifecycle by demonstrating competence in communication, planning, analysis, design, construction, and deployment.
2. To work in one or more significant application domains.
3. To develop and deliver quality software.
4. To demonstrate an understanding of apply current theories, models, and techniques that provide a basis for the software lifecycle.
5. To demonstrate an ability to use the techniques and tools necessary for engineering practice.

### **UNIT I: (18 Hours)**

Introduction to Software Engineering Some definition – Some size factors – Quality and productivity factors – Managerial issue. Planning a Software Project: Defining the problem - Developing a solution strategy – planning the development process – planning an organization structure – other planning activities.

### **UNIT II: (18 Hours)**

Software Cost Estimation: Software – Cost factors – Software cost estimation techniques – specification techniques – level estimation – estimating software maintenance costs. The software requirements specification – formal specification techniques - languages and processors for requirements specification.

### **UNIT III: (20 Hours)**

Software Design: Fundamental Design concepts – Modules and modularizing Criteria – Design Notations – Design Techniques – Detailed Design Consideration – Real time and distributed system design – Test plan – Mile stones walk through and inspection.

### **UNIT IV: (16 Hours)**

Implementation issues: Structured Coding techniques – coding style – standards and guidelines – documentation guidelines – type checking – scoping rules – concurrency mechanisms.

### **UNIT V: (18 Hours)**

Quality assurance – walk through and inspection - Static analysis – symbolic exception – Unit testing and Debugging – System testing – Formal verification: Enhancing maintainability during development – Managerial aspects of software maintenance – Configuration management – source code metrics – other maintenance tools and techniques.

### **PRESCRIBED BOOKS:**

1. Richard E.Fairly - Software Engineering Concepts, 5<sup>th</sup> Edition - Tata McGraw-Hill book Company.

**REFERENCE BOOKS:**

1. Richard E.Fairley,Software Engineering Concepts,McGraw-Hill,1985
2. Ian Sommerville,Software Engineering-9<sup>th</sup> Edition,Darling Kindersley,2011
3. Roger S.Pressman,Software Engineering A Practitioner's Approach-6<sup>th</sup> Edition, McGraw-Hill,2005
4. R.S.Pressman, 1997, Software Engineering – 1997 - Fourth Ed., McGraw Hill.
5. RajibMall ,2004,Fundamentals of Software Engineering,2<sup>nd</sup> Edition, PHI.

**WEBSITES:**

1. <http://people.cs.missouri.edu/~duanye/cs4320/lectures.htm>
2. <http://iiscs.wssu.edu/drupal/node/4566>

**QUESTION PAPER PATTERN:**

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

**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 R - PROGRAMMING

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : VI</b>	<b>CREDITS : 4</b>	<b>NO. OF HOURS : 90</b>

### Course Framework:

*This course introduce the concept of R program for effective data analysis.*

### Course Outcome:

On completion of the course the students will be able

1. To install, code and use R programming Language in R studio IDE.
2. To describe key terminologies, concept and techniques employed in Statistical Analysis.
3. To define , calculate , implement probability and probability distributions to solve a wide variety of problems
4. To conduct and interpret a variety of hypothesis tests to aid decision making.
5. To understand, analyze, interpret correlation and regression to analyze the underlying relationships between different variables.

### 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-vectorSets – If Else - 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 Fir 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,

### PRESCRIBED BOOKS

1. The Art of R Programming, Norman Matloff, Cengage Learning R for Everyone, Lander, Pearson
2. Siegel, S. (1956), Nonparametric Statistics for the Behavioral Sciences, McGrawHill International, Auckland.
3. R Cookbook, Paul Teetor, Oreilly.

### REFERENCE BOOKS

1. R in Action, Rob Kabacoff, Manning
2. Venables, W. N. and Ripley, B. D. (2000), S Programming, SpringerVerlag, New York.
3. 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
A	<b>Definition/Principle</b> Answer any 10 out of 12 questions (each in 50 words)	1-12	3	<b>30</b>
B	<b>Short Answer</b> Answer any 5 out of 7 questions (each in 300 words)	13-19	6	<b>30</b>
C	<b>Essay</b> Answer any 4 out of 6 questions (each in 600 words)	20-25	10	<b>40</b>
<b>TOTAL MARKS</b>				<b>100</b>

### 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 – XVII PRACTICAL- R – PROGRAMMING LAB

<b>SUBJECT CODE :</b>	<b>PRACTICAL</b>	<b>MARKS : 100</b>
<b>SEMESTER : VI</b>	<b>CREDITS : 4</b>	<b>NO. OF HOURS : 90</b>

### **Course Framework:**

*This course gives practical exposure to R – Programming.*

### **Course Outcome:**

On completion of the course the students will be able

1. To master the use of the R and R-Studio interactive environment.
  2. To expand R by installing R packages.
  3. To explore and understand how to use the R documentation.
  4. To read structured data into R from various sources.
  5. To understand the different data types in R.
- 
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 - XVIII MINI PROJECT

<b>SUBJECT CODE :</b>	<b>PRACTICAL</b>	<b>MARKS : 100</b>
<b>SEMESTER : VI</b>	<b>CREDITS : 4</b>	<b>NO. OF HOURS : 90</b>

### **Course Framework:**

*This course gives procedure and training about project development by using recent trends in Computer Applications.*

### **Course Outcome:**

On completion of the course the students will be able

1. To acquire knowledge about the software development stages such as analysis, design, coding, testing and maintaining the project.
2. To design an effective software using various application
3. To get hands on experience on, troubleshooting, maintenance, fabrication, innovation, record keeping, documentation etc thereby enhancing the skill and competency part of technical education.
4. To promote the concept of entrepreneurship.
5. To inculcate innovative thinking and thereby preparing them for main project



**REFER ANNEXURE - I**

## ANNEXURE - I

### ELECTIVE – I INFORMATION SECURITY

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : V</b>	<b>CREDITS : 5</b>	<b>NO. OF HOURS : 90</b>

#### Course Framework:

*This course provides introduction about data security in information systems.*

#### Course Outcome:

On completion of the course the students will be able

1. To acquire a basic understanding of cryptography, how it has evolved, and some keyencryption techniques used today.
2. To understand the security policies (such as authentication, integrity and confidentiality)
3. To develop protocols to implement such policies in the form of message exchanges.
4. To identify factors driving the need for network security.
5. To determine and analyze software vulnerabilities and security solutions to reduce the risk of exploitation.

#### 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.

#### PRESCRIBED BOOKS:

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

**REFERENCE BOOKS:**

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

**QUESTION PAPER PATTERN:**

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

**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**  
**COMPUTER ARCHITECTURE**

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : V</b>	<b>CREDITS : 5</b>	<b>NO. OF HOURS : 90</b>

**Course Framework:**

*This course introduce conceptualize the basics of organizational and architectural issues of a Digital Computer.*

**Course Outcome:**

On completion of the course the students will be able

1. To understand the sequence and execution of microinstructions.
2. To understand input and output peripheral devices and their communication with the rest of the computer components.
3. To get the knowledge about major components of a computer including CPU, Memory, I/O and storage.
4. To analyze design issues in terms of speed, technology, cost, performance.
5. To use appropriate tools for design, verify and test the CPU architecture.

**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).

**PRESCRIBED BOOKS:**

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

**REFERENCE BOOKS:**

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

**QUESTION PAPER PATTERN:**

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

**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**  
**RELATIONAL DATABASE MANAGEMENT SYSTEM**

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : V</b>	<b>CREDITS : 5</b>	<b>NO. OF HOURS : 90</b>

**Course Framework:**

*This course introduces the basic knowledge about the DML, DDL operations and to develop a Database with enhanced models and Techniques in RDBMS.*

**Course Outcome:**

On completion of the course the students will be able

1. To analyze Data Base design methodology.
2. To acquire knowledge in fundamentals of Data Base Management System.
3. To analyze the difference between traditional file system and DBMS.
4. To handle with different Data Base languages.
5. To draw various data models for Data Base and Write queries mathematically.

**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.

**PRESCRIBED BOOKS:**

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

**REFERENCE BOOKS:**

1. 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:**

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

**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-II**



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

<b>SUBJECT CODE :</b>	<b>PRACTICAL</b>	<b>MARKS : 100</b>
<b>SEMESTER : V</b>	<b>CREDITS : 5</b>	<b>NO. OF HOURS : 75</b>

**Course Framework:**

*This course introduces the principle of Webpage Design and visualize the basic concept of HTML.*

**Course Outcome:**

On completion of the course the students will be able

1. To develop web pages using HTML and Cascading Style Sheets.
2. To create XML documents and Schemas.
3. To incorporate Knowledge of client-side (JavaScript) and server-side scripting (PHP, ASP.NET) languages to build dynamic web pages
4. To familiarize with Web Application Terminologies, Internet Tools, E –Commerce and other web services.
5. To develop database applications with MYSQL.

**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 ExternalCSS.
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](http://www.apachefriends.org) - [www.w3.org](http://www.w3.org) - [www.w3schools.com](http://www.w3schools.com)

**QUESTION PAPER PATTERN:**

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**ELECTIVE – II  
E-COMMERCE**

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : V</b>	<b>CREDITS : 5</b>	<b>NO. OF HOURS : 75</b>

**Course Framework:**

*This course gives an exposure of Electronic Commerce and its applications*

**Course Outcome:**

On completion of the course the students will be able

1. To understand the foundations and importance of E-commerce.
2. To analyze branding and pricing strategies.
3. To determine the effectiveness of market research.
4. To identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.
5. To effectively integrate IT-based solutions into the user environment.

**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:**

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

**REFERENCE BOOKS:**

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

**QUESTION PAPER PATTERN:**

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**ELECTIVE – II**  
**CLIENT / SERVER COMPUTING**

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : V</b>	<b>CREDITS : 5</b>	<b>NO. OF HOURS : 75</b>

**Course Framework:**

*This course deals with the Client Server Computing and GUI.*

**Course Outcome:**

On completion of the course the students will be able

1. To understand the basics and evolution of client / server computing.
2. To understand about the client/server applications and operating systems.
3. To learn the client hardware, software and GUI environment.
4. To understand about the types of servers and network managing environment.
5. To learn the platform independent, transaction processing, testing and diagnostic tools.

**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:**

1. Dawna Travis Devire, “Client/Server Computing”. TMH
2. Patrick Smith & Steave Guengerich, “Client/Server Computing”. PHI

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**ELECTIVE -III**



**ELECTIVE-III**  
**DATA COMMUNICATION AND NETWORKING**

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : VI</b>	<b>CREDITS : 5</b>	<b>NO. OF HOURS : 90</b>

**Course Framework:**

*This course introduces the basic concepts of Data Communication and Networking devices*

**Course Outcome:**

On completion of the course the students will be able

1. To understand the fundamental concepts of computer networking and provide the knowledge of different protocols at different layers of models.
2. To understand the techniques used to share network bandwidth among the multiple users and provide the depth knowledge of DLL fundamentals.
3. To learn how the data is transferred between the computers over the network.
4. To learn about the synchronization in distributed systems and thread implementations.
5. To gain knowledge about distributed file systems.

**UNIT I: (20 HOURS)**

Introduction to Data Communication, Network, Protocols and Standards - Line Configuration - Topology - Transmission mode - Classification of Network - OSI Model

- Layers of OSI Model.

**UNIT II : ( 18 HOURS)**

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 Corrections.

**UNIT III: (20 HOURS)**

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: (16 HOURS)**

Repeaters - Bridges - Routers - Gateway - Routing algorithms: Distance Vector, link State, path vector Routing, Multicast Routing - TCP/IP Network, Transport Layer of TCP/IP: TCP, TCP Services, TCP Features - Application Layers of TCP/IP: Namespace, DNS, Distribution of Namespace, Dns in the Internet, Resolution, DNS messages, Types of Records, Registers, Dynamics DNS, Encapsulation- World Wide Web: Architecture, Client, Server, URL, Cookies. Web document: Static Document, Dynamic Document, active Document.

**UNIT V : ( 16 HOURS)**

Computer Security Concepts-Security Attacks: Active Attacks, Passive Attacks - Message authentication Codes: message Authentication Requirements, Message Authentication Functions Requirements for message Authentication codes-Electronic mail Security: s/MIME, Domain Keys Identified Mail- IP Security: IP Security Overview, IP Security Policy, Encapsulating Security payload, Combining Security Associations, Internet key Exchange, Cryptographic suits- Firewalls: The Need for Firewalls, Firewall Characteristics, Types of Firewalls, Firewalls Basing, Firewall Location and Configuration.

**PRESCRIBED BOOKS:**

1. Behrouz and Forouzan, 2017, Introduction to Data Communication and Networking, 5<sup>th</sup> Edition, TMH.
2. William Stallings, Cryptography and Network Security -6<sup>th</sup> Edition, PHI.
3. Cryptography and Network Security (UPTU), V.S.Bagad, I.A.Dhotre, Technical Publications.

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**ELECTIVE – III  
UNIX PROGRAMMING**

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : VI</b>	<b>CREDITS : 5</b>	<b>NO. OF HOURS : 90</b>

**Course Framework:**

*This course introduces fundamentals & programming of unix basic concepts.*

**Course Outcome:**

On completion of the course the students will be able

1. To access a file using the relative path name.
2. To erase, copy and move a file and cut columns of data from a file.
3. To create a directory and display the contents of a directory.
4. To change the working directory.
5. To return and remove to the home directory.

**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.

**PRESCRIBED BOOKS:**

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

**REFERENCE BOOKS:**

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

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**ELECTIVE – III  
DATA MINING**

<b>SUBJECT CODE :</b>	<b>THEORY</b>	<b>MARKS : 100</b>
<b>SEMESTER : VI</b>	<b>CREDITS : 5</b>	<b>NO. OF HOURS : 90</b>

**Course Framework:**

*This course introduces the fundamental concepts of Data Mining.*

**Course Outcome:**

On completion of the course the students will be able

1. To understand the functionality of the various data mining and data warehousing component.
2. To analyze the techniques of various data.
3. To understand different methodologies used in data mining and data warehousing.
4. To compare different approaches of data warehousing and data mining with various technologies.
5. To evaluate the performance of different data-mining algorithms.

**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.

**PRESCRIBED BOOKS**

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

**REFERENCE BOOKS**

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

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