GURU NANAK COLLEGE (AUTONOMOUS)

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

Guru Nanak Salai, Velachery, Chennai – 600042.

B.Sc. Computer Science

(SEMESTER PATTERN WITH CHOICE BASED CREDIT SYSTEM)

Syllabus

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

VISION

- To create a unique and futuristic space in imparting quality higher education in Computer Science in the International arena and to augment a pool of knowledge base for the uplift of the Indian society and to manifest the perfection and quality in the mankind.

MISSION

- To contribute to the overall development of the society on the national and global scale, be excellence in education, Teaching-Learning and engaging the Student with Extra-Curricular activities on par with by international standards.

PROGRAMME OUTCOME

PO 1: Implement knowledge of computing fundamentals, computing specialization and domain knowledge for the abstraction and conceptualization of computing models.

PO 2: Identify and Analyze user needs and use them in the selection, creation of high level reliable software systems.

PO 3: Use the techniques, skills and modern hardware and software tools necessary for innovative software solutions
.

PO 4: Employ essential IT support skills gained to install, configure, secure and ability to do preliminary Troubleshooting.

PO 5: Collaborate effectively with teams to accomplish shared computing design, evaluation, or implementation goals..

PROGRAMME SPECIFIC OUTCOME:

PSO 1 :   Employ appropriate concepts of problem-solving methods for varied applications

PSO 2 :   Develop aptitude to meet the challenges and keep themselves abreast of the upcoming trends in the IT industry

B.Sc. (COMPUTER SCIENCE)
COURSE STRUCTURE 2019-20 BATCH

Semester	Part	Course Component	Subject Code	Subject Name	Credits	Hours	Internal	External	Total
Semester - I	I	Language	19UTAM141/ 19USAN141/ 19UHIN141/ 19UFRE141	Language – I	3	6	50	50	100
	II	English	19UENG241	English - I	3	4	50	50	100
	III	Core Paper-I	19UCSC301	Problem Solving using C Programming	4	6	50	50	100
	III	Core Paper-II	19UCSC302P	Problem Solving using C Practical	4	4	50	50	100
	III	Allied-I	19UMAT333	Mathematics I	5	6	50	50	100
	IV	Non Major Elective-I / Basic/ Advance Tamil	19UADT401/ 19UBAT401/ 19UBAH401/ 19UNME401M	Advanced Tamil - I / Basic Tamil –I / Basic Hindi - I/ HTML Practical	2	2	-	100	100
	IV	Soft Skills-I	19UGSL401	Introduction to Study Skill	3	2	-	100	100
				Total Credits: 24 / Total HOURS per week: 30					
Semester - II	I	Language	19UTAM142/ 19USAN142/ 19UFRE142/ 19UHIN142	Language – II	3	6	50	50	100
	II	English	19UENG242	English - II	3	4	50	50	100
	III	Core Paper-III	19UCSC303	Analysis of Algorithms and Data Structures	4	6	50	50	100
	III	Core Paper-IV	19UCSC304P	Analysis of Algorithms and Data Structures Using C Practical	4	4	50	50	100
	III	Allied-II	19UMAT334	Mathematics II	5	6	50	50	100
	IV	Non Major Elective-II / Basic/ Advance Tamil	19UADT402/ 19UBAT402/ 19UBAH402/ 19UNME402M	Advanced Tamil -II / Basic Tamil –II / Basic Hindi - II / Visual Basic Applications Practical	2	2	-	100	100
	IV	Soft Skills-II	19UGSL402	Life Skills	3	2	-	100	100
				Total Credits: 24 / Total HOURS per week: 30					

B.Sc. (COMPUTER SCIENCE)
COURSE STRUCTURE 2019-20 BATCH

Semester	Part	Course Component	Subject Code	Subject Name	Credits	Hours	Internal	External	Total
Semester - III	I	Language	19UTAM143/ 19USAN143/ 19UFRE143/ 19UHIN143	Language – III	3	6	50	50	100
	II	English	19UENG243	English - III	3	4	50	50	100
	III	Core Paper-V	19UCSC305	Programming in Java	4	8	50	50	100
	III	Core Paper-VI	19UCSC306P	Programming in Java Practical	4	4	50	50	100
	III	Allied-III	19UMAT342	Operations Research	5	6	50	50	100
		Soft Skills-III	19UGSL403	Job Oriented Skills	3	2	-	100	100
	IV	2.EVS	19UEVS401	Environmental Studies	-	-	-	-	-
				Total Credits: 22 / Total HOURS per week: 30					
Semester - IV	I	Language	19UTAM144/ 19USAN144/ 19UFRE144/ 19UHIN144	Language – IV	3	6	50	50	100
	II	English	19UENG244	English - IV	3	4	50	50	100
	III	Core Paper-VII	19UCSC307	VB.NET Programming and Database Management System	4	8	50	50	100
	III	Core Paper-VIII	19UCSC308	RDBMS with VB.NET Practical	4	4	50	50	100
	III	Allied-IV	19UMAT344	Statistical Methods and their Applications	5	4	50	50	100
	III	Allied-IV	19UMAT345P	Statistical Methods and their Applications – Practical	-	2	50	50	100
	IV	Soft Skills-IV	19UGSL406	Quantitative Aptitude	3	2		100	100
	IV	EVS	19UEVS401	Environmental Studies	2	-	-	100	100
				Total Credits: 24 / Total HOURS per week: 30					

B.Sc. (COMPUTER SCIENCE)
COURSE STRUCTURE 2019-20 BATCH

Semester	Part	Course Component	Subject Code	Subject Name	Credits	Hours	Internal	External	Total
Semester - V	III	Core Paper-IX	19UCSC309	Operating systems	4	6	50	50	100
	III	Core Paper-X	19UCSC310	Digital Logic and Computer Architecture	4	6	50	50	100
	III	Core Paper-XI	19UCSC311	Web Programming with PHP and MySQL	4	6	50	50	100
	III	Core Paper-XII	19UCSC312P	Web Programming with PHP and MySQL Practical	4	6	50	50	100
	III	Elective-I (Interdisciplinary Elective)	19UIDE312	Internet and its applications	5	5	50	50	100
	IV	Value Education	19UVED401	Value Education	2	1	-	100	100
Total Credits: 25 / Total HOURS per week: 30									
Semester - VI	III	Core Paper-XIII	19UCSC313	Software Engineering	4	6	50	50	100
	III	Core Paper-XIV	19UCSC314	Python Programming	4	6	50	50	100
	III	Core Paper-XV	19UCSC315P	Python Programming Practical	4	6	50	50	100
	III	Elective-II	19UCSC316/ 19UCSC318/ 19UCSC319/ 19UCSC320/ 19UCSC321	Data Communication & Networking / Data Mining / Software Testing / Data Science / Cloud Computing	5	6	50	50	100
	III	Elective-III	19UCSC318/ 19UCSC319/ 19UCSC320/ 19UCSC321/ 19UCSC322/ 19UCSC323/ 19UCSC324	Mini Project / Fundamentals of Multimedia /Android Application Development Practical / Artificial Intelligence	5	6	50	50	100
	V	Extension Activity	19UEXT501	Participation in NSS/NCC/ROTRACT etc.	1	-	-	-	-
Total Credits: 23/ Total HOURS per week: 30									
Grand Total Credits: 142/ Total Hours per week: 180									

INTERNSHIP

- To provide opportunities for experiential learning in varied areas of the discipline beyond 'teaching-training' and enhance professional growth of the students.
- To help students prepare for career in computer science and develop a road map for the same.
- To provide students with an environment that facilitates increasing knowledge, enhancing skills/ competencies.
- To enable students to identify strengths, identify and upgrade those skills that need improvement in line with their career goals.
- To enable students to strengthen their commitment towards becoming responsible well-trained professionals with a code of ethics.

CORE PAPER-I
PAPER TITLE: PROBLEM SOLVING USING C PROGRAMMING

SUBJECT CODE: 19UCSC301	THEORY	MARKS 100
SEMESTER: I	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:
- The course provides complete knowledge of problem-solving techniques.
- Develop an in-depth understanding of functional and logical programming paradigms using C Programming Language

UNIT I: (18 Hours)
Planning the Computer Program: Problem definition, Program design, Debugging, Types of Errors in programming, Techniques of Problem Solving: Flow charting, 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 – Multi-dimension 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 a data file.

PRESCRIBED BOOKS:
1. P. K. Sinha&PritiSinha, 2017 ‒Computer Fundamentals‖, BPB Publications, 6thEdition.
2. Dr. Anita Goel, Computer Fundamentals, Pearson Education,2010.
3. E. Balaguruswamy, 2016, 8th Edition, Programming in ANSI C, TMH Publishing Company Ltd.
4. Kanetkar Y., 2018 LET US C - 16th Edition BPB Pub., NewDelhi.

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, 2nd Edition, PHI.
5. H. Schildt, C,2004, The Complete Reference, 4th Edition, TMH
6. Gottfried. B.S, 1996, Programming with C, Second Edition, TMH Pub. Co. Ltd., New Delhi.

WEBSITES FOR REFERENCES:

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

QUESTION PAPER PATTERN:

Section	Question Component	Numbers	Marks	Total
A	Answer any 10 out of 12	1-12	3	30
B	Answer any 5 out of 7	13-19	6	30
C	Answer any 4 out of 6	20-25	10	40
TOTAL MARKS			**100**	

DISTRIBUTION OF QUESTIONS:

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

CORE PAPER-II
PAPER TITLE: PRACTICAL - PROBLEM SOLVING USING C LAB

SUBJECT CODE:19UCSC302P	PRACTICAL	MARKS 100
SEMESTER: I	CREDITS: 4	TOTAL HOURS: 60

COURSE OBJECTIVES:
- To learn problem solving techniques.

- This course provides to write C programs using decision making, branching, looping constructs.

(15 Hours)

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 n numbers. (using for- statement)

(15 Hours)

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 of the week.(switch)
8. Write a program for counting the number of vowels, consonants, words, white spaces in a line of text. (switch)

(15 Hours)

9. Write a program to arrange a set of numbers in ascending order. (1DArray).
10. Write a program to implement linear search.(1DArray)
11. Write a program to implement binary search. (1DArray)
12. Write a program to add two matrices. (2DArrays)

(15 Hours)

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.

COURSE COMPONENT: ALLIED MATHEMATICS – I
(For B.Sc. Computer Science and BCA)

SUBJECT CODE:19UMAT333	THEROY & PRACTICAL	MARKS 100
SEMESTER: I	CREDITS: 5	TOTAL HOURS: 90

COURSE OBJECTIVES: To improve basics in Mathematics and analytical skills

UNITI: **(18 Hours)**
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 Hours)**
MATRICES: Eigen Values – Eigen Vectors - Cayley - Hamilton Theorem (without proof)
Chapter 4 Section 4.5, 4.5.2, 4.5.3

UNIT III: **(18 Hours)**
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 Hours)**
DIFFERENTIAL CALCULUS: n^{th} derivatives - Leibnitz Theorem - Jacobians -
Radius of Curvature (Cartesian Coordinates only) – Maxima and Minima of functions of two variables.
Chapter 1, Section 1.1.1 to 1.3.1 and Section 1.4.3

UNIT V: **(18 Hours)**
TRIGONOMETRY: Expansions of Sinnθ, Cosnθ, tannθ - Expansions of $Sin^n\theta$, $Cos^n\theta$- Hyperbolic and
Inverse hyperbolic functions.
Chapter 6, Section 6.1 to 6.3.

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

PRESCRIBED BOOKS:
1. AlliedMathematics, A.Singaravelu.
2. Ancillary Mathematics, A. ManickavasagamPillai andNarayanan.

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, NewDelhi.
3. Ancillary Mathematics Volume 1 and 2 by P.Balasubramanian&K.G.Subramanian.

WEBSITES
   1. www.freetechbooks.com/mathematics- f38.html
   2. www.e-booksdirectory.com
   3. www.freebookcenre.net/SpecialCat/Free-Mathematics-Books-Download.html

QUESTION PAPER PATTERN:

Section	Question Component	Numbers	Marks	Total
A	Answer any 10 out of 12	1-12	3	30
B	Answer any 5 out of 7	13-19	6	30
C	Answer any 4 out of 6	20-25	10	40
	TOTAL MARKS			**100**

DISTRIBUTION OF QUESTIONS:

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

NON MAJOR ELECTIVE
PAPER TITLE: PRACTICAL – HTML PRACTICAL

SUBJECT CODE: 19UNME401M	PRACTICAL	MARKS 100
SEMESTER: I	CREDITS: 2	TOTAL HOURS: 30

COURSE OBJECTIVE:
- To train how to apply htmltags
- Train students to develop Simple websites

1) Create an HTML document with the following formatting options:
   I.   Bold
   II. Italics
   III. Underline
   IV. Headings (Using H1 to H6 heading styles)
   V. Font (Type, Size and Color)
2) Ordered List
3) Create an HTML document which consists of Unordered List
4) Create an HTML document which implements Internal linking as well as external linking.
5) Create a table using HTML which consists of columns for Roll No., Student's name and grade.

Result		
Roll No.	Name	Grade

6) Create a form using HTML which has the following types of controls:
   I. Text Box
   II. Option/radio buttons
   III. Check boxes
   IV. Reset and Submit buttons
7) Create HTML documents (having multiple frames) in the following three formats

Frame1
Frame2

8) Create a HTML document to add image
9) Design mark sheet using HTML tags.
10) Create Guru Nanak College Website using HTML tags

CORE PAPER- III
PAPER TITLE: ANALYSIS OF ALGORITHMS AND DATA STRUCTURES

SUBJECT CODE: 19UCSC303	THEORY	MARKS 100
SEMESTER: II	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVE:
- To ensure that the student evolves into a competent programmer capable of designing and analyzing implementations of algorithms and data structures for different kinds of problems.
- To choose appropriate data structures and algorithms, understand the ADT/libraries, and use it to design algorithms for a specific problem.

UNIT I: **(18 Hours)**
Introduction: Basic Design and Analysis techniques of Algorithms, Correctness of Algorithm. Algorithm Design Techniques: Iterative techniques, Divide and Conquer Algorithms.

UNIT II: **(18 Hours)**
Sorting Techniques: Elementary sorting techniques - Bubble Sort, Insertion Sort, Merge Sort, Selection Sort - Advanced Sorting Techniques-Heap Sort, Quick Sort. Searching Techniques: Linear and Binary search.

UNIT III: **(18 Hours)**
Introduction to Data structure-Arrays: Single and Multi-dimensional Arrays, Sparse Matrices -Stacks: Implementing stack using array - Recursion - Prefix, Infix and Postfix expressions, Conversion from Infix to Postfix – Postfix evaluation.

UNIT IV: **(18 Hours)**
Queues: Array implementation of Queue, Priority Queues, Circular Queue - Linked Lists: Singly, Doubly- representation of Stack and Queue as Linked Lists.

UNIT V: **(18 Hours)**
Trees: Introduction; Binary Trees, Binary Search Tree: Creation and Traversal: Inorder, Preorder and Postorder. Graph: Definition, Types of Graphs, Traversal – Breadth First Search and Depth First Search.

PRESCRIBED BOOKS:
1. SartajSahni, Data Structures, "Algorithms and applications in C++", Second Edition, Universities Press, 2011.
2. E. Horowitz and S. Shani,1999, Fundamentals of Data Structures in C++ , Galgotia Pub, 2nd Edition

REFERENCE BOOKS:
1. T.H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein-Introduction to Algorithms, PHI, 3rd Edition 2009.
2. Sarabasse& A.V. Gelder Computer Algorithm –Introduction to Design and Analysis, Publisher– Pearson 3rd Edition 1999.
3. Adam Drozdek, "Data Structures and algorithm in C++"*,* Third Edition, Cengage Learning, 2012.
4. Aaron M. Tenenbaum, Moshe J. Augenstein, YedidyahLangsam, "Data Structures Using C and C++:, Second edition, PHI, 2009.

5. Robert L. Kruse, "Data Structures and Program Design in C++", Pearson.
6. D.S Malik, Data Structure using C++, Second edition, Cengage Learning, 2010.

QUESTION PAPER PATTERN:

Section	Question Component	Numbers	Marks	Total
A	Answer any 10 out of 12	1-12	3	30
B	Answer any 5 out of 7	13-19	6	30
C	Answer any 4 out of 6	20-25	10	40
	TOTAL MARKS			**100**

DISTRIBUTION OF QUESTIONS:

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

CORE PAPER-IV
PAPER TITLE: PRACTICAL - ANALYSIS OF ALGORITHMS AND DATA STRUCTURES USING C LAB

SUBJECT CODE: 19UCSC304P	PRACTICAL	MARKS 100
SEMESTER: II	CREDITS: 4	TOTAL HOURS: 60

COURSE OBJECTIVES:

- Implement various algorithms and data structures in C++
- Compare the performance of different algorithms for same problem. **(15 Hours)**

1. Implement Insertion Sort (The program should report the number of comparisons)
2. Implement Merge Sort(The program should report the number of comparisons)
3. Implement Selection Sort ((The program should report the number of comparisons)
4. Implement Quick Sort (The program should report the number of comparisons)

(15 Hours)

5. Array implementation of stack
6. Conversion of infix to postfix using stack operations
7. Postfix Expression Evaluation. **(15 Hours)**
8. Array implementation of Queue

9. Implementation of Recursive function –Fibonacci series

10. Implementation of Single Linked list
11. Implementation of Stack using linked list
12. Implementation of queue using linked list **(15 Hours)**

13. Implementation of Doubly Linked list
14. Creation and traversal of Binary Search Tree. (Preorder, Inorder, Postorder)
15. Creation and traversal of Graph (DFS,BFS)

COURSE COMPONENT: ALLIED MATHEMATICS – II
(For B.Sc. Computer Science and BCA)

SUBJECT CODE: 19UMAT334	THEROY & PRACTICAL	100 MARKS
SEMESTER: II	CREDITS: 5	TOTAL HOURS: 90

COURSE OBJECTIVES:
- To improve basics in mathematics and analytical skills

UNIT - I: (18 Hours)

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 Hours)

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 Hours)

DIFFERENTIAL EQUATION: Second order Differential Equation with Constant Coefficient 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 Hours)

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 Hours)

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. Duraipandian and S. Udayabaskaran, S. Chand Publications, 2016 Edition

REFERENCE BOOKS:
1. Allied Mathematics,A.Singaravelu.
2. Ancillary Mathematics, A. Manickavasagam Pillai andNarayanan.
3. Allied Mathematics, S.G. Venkatachalapathy, Margham Publications, 2016Edition
4. P.Kandasamy and K.Thilagavathi, Allied Mathematics Volume I and Volume II -- 2004, S.Chand and Co, NewDelhi.
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.htmlwww.e-booksdirectory.com
2. www.freebookcenre.net/SpecialCat/Free-Mathematics-Books-Download.html

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C	Answer any 4 out of 6	20-25	10	40
	TOTAL MARKS			**100**

DISTRIBUTION OF QUESTIONS:

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

PAPER TITLE: VISUAL BASIC APPLICATIONS PRACTICAL

SUBJECT CODE: 19UNME402M	PRACTICAL	MARKS 100
SEMESTER: II	CREDITS: 2	TOTAL HOURS: 30

COURSE OBJECTIVES:
- To use the properties and methods of forms and controls to create VB programs.
- To write procedures to perform input, processing, and output.

Type a page of Text and record a macro in MS-Word to do the following.
- Font name – Times New Roman
- Font size – 12pt
- Font Color – blue
- Justify text
- Adjust line spacing and space before and after. Also make the   macro run automatically.

1. Write VBA code for Picture Viewer
2. Create a macro in Excel that selects the cell that we specify.
3. Write VBA code that Assigning a color to the text in B1, border, background color for selected cells and color to tab of a worksheet.
4. Write a program to create the user forms using VBA code
5. Use the function to count the number of non-empty cells in the first column and use it to display the data in the dialog box.
6. In a list of student's data write a program to find the number of passes and failures and also the pass percentage.
7. Write a program to calculate number of words in a string.
8. Write a program to cut copy and paste from a macro.
9. Write a program to scroll horizontally and vertically.

CORE PAPER-V
PAPER TITLE: PROGRAMMING IN JAVA

SUBJECT CODE: 19UCSC305	THEORY	MARKS 100
SEMESTER: III	CREDITS: 4	TOTAL HOURS: 120

COURSE OBJECTIVES:
- To understand the importance of Classes & objects, in-built packages and thread.
- To provide knowledge in Applet programming and awt class

UNIT I: (24 Hours)

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

UNIT II: (24 Hours)

Classes – Objects – Methods - Constructors – Overloading methods – Inheritance – Overriding methods – Finalizer and Abstract Methods-Visibility Control- Arrays– String Class –– String Arrays – String Methods - String Buffer Class - Java Utility Classes: Wrapper-Vector-Calendar-Random

UNIT III: (24 Hours)

INTERFACES: Defining Interfaces-Extending Interfaces-Implementing Interfaces-Accessing Interfaces- Packages: Creating Packages- Accessing Packages – Importing Packages – Exception Handling throw and throws – Thread: Creating Threads-Stopping and Blocking a Thread-Life Cycle of a Thread-Using Thread Methods-Thread Priority-Synchronization- Implementing the Runnable Interface.

UNIT IV: (24 Hours)

INPUT / OUTPUT FILES: Concept of Streams-Stream Classes-Byte Stream Classes-Character Stream Classes –Using the File Class-Creation of Files- Applet Programming: Applet Life Cycle - **INTRODUCING THE AWT:** Working with Windows, Graphics: Drawing Lines, Drawing Rectangles, Drawing Ellipses and Circles, Drawing arcs and Drawing Polygons- Working with Text

UNIT V: (24 Hours)

AWT Classes- Working with Frames- Working with Color-Working with Fonts-Using AWT Controls: Labels - Button-Check Box-Radio Button-Choice-List – Scrollbars, Layout Managers: Flow Layout-Border Layout - Grid Layout - Card Layout - Grid bag Layout- Menu Bars and Menus –Dialog Boxes-Event Classes: The Action Event Class, The Focus Event Class and The Mouse Event Class - Event Listener Interfaces: The ActionListener Interface, The Focus Listener Interface and The Mouse Listener Interface.

PRESCRIBED BOOKS:
1. P.Naughton and H.Schildt - Java 2(The Complete Reference) – 2018, 10th Edition TMH
2. Programming with Java, - A Primer – E. Balaguruswamy, 5thEdition.

REFERENCE BOOKS
1. Ken Arnold,The Java Programming Language-Third Edition, Addison Wesley Longman , 2000

2. Ivan Bayross, HTMl Javascript, DHTML, and PHP, First Edition- 2015,Fourth Revised Edition: 2010
3. Sachin. B.Patil, FAQ's in Java, Mr.Purushothaman, 2011 Scitech Publications(India) Pvt . ltd
4. Programming in Java –C.Muthu
5. Cay S. Horstmann, Gary Cornell – Paper Java 2 Volume I – Fundamentals, 5th Edition. PhI, 2000.
6. K.Arnold and J.Gosling – The Java Programming Language – Second Edition Addison Wesley, 1996.

WEBSITES FOR REFERENCE:

1. http://www.vogella.com/tutorials/JavaIntroduction/article.html
2. http://www.math.hcmuns.edu.vn/~hvthao/courses/java_programming/lecture_notes/

QUESTION PAPER PATTERN:

Section	Question Component	Numbers	Marks	Total
A	Answer any 10 out of 12	1-12	3	30
B	Answer any 5 out of 7	13-19	6	30
C	Answer any 4 out of 6	20-25	10	40
	TOTAL MARKS			**100**

DISTRIBUTION OF QUESTIONS:

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

CORE PAPER-VI
PAPER TITLE: PRACTICAL - PROGRAMMING IN JAVA LAB

SUBJECT CODE:19UCSC306P	PRACTICAL	MARKS 100
SEMESTER: III	CREDITS: 4	TOTAL HOURS: 60

COURSE OBJECTIVES:
- To implement solutions to various I/O operations, Threads, Exceptions and String manipulations.
- To learn and practice applet programming and awt class to develop GUI based programming.

APPLICATION   **(40 Hours)**

1. Calculate Simple and Compound Interest
2. Largest of 3numbers
3. To illustrate class and object
4. Factorial using recursion
5. To illustrate constructors
6. Method overloading
7. To illustrate inheritance
8. Method overriding
9. To illustrate Thread
10. To illustrate Exception handling

APPLET   **(20 Hours)**
11. Generate various shapes using Applet
12. Point class manipulation
13. Draw a Human face
14. Program to create Checkbox, choice, Radio Button, Label and Textbox
15. Change Font and Color

COURSE COMPONENT: OPERATIONS RESEARCH -III
(For B.Sc. Computer Science)

SUBJECT CODE: 19UMAT342	THEORY & PROBLEMS	MARKS: 100
SEMESTER: III	CREDITS: 5	TOTAL HOURS: 90

COURSE OBJECTIVES:

- To give an overall idea about the various Optimization techniques and their usages.

UNIT - I: (18 Hours)
LINEAR PROGRAMMING: - Formulation - Graphical Solution - Simplex method
Chapter 2, Section 2.1 to 2.8
Chapter 3, Section 3.1.1to 3.1.3

UNIT - II: (18 Hours)
TRANSPORTATION PROBLEM: Mathematical formulation – Initial basic feasible solution – Test of optimality (MODI method) – Maximization problem – Unbalanced Transportation problem.
Chapter 7, Section 7.1 to 7.5

UNIT - III: (18 Hours)
ASSIGNMENT PROBLEM: Mathematical formulation – Optimality (Hungarian) – Maximization problem, Unbalanced assignment problem
Chapter 8, Section 8.1 to 8.7

UNIT - IV: (18 Hours)
SEQUENCING PROBLEM: n jobs through 2 machines, n jobs through 3 machines, 2 jobs through m machines, n jobs through m machines
Chapter 14
Section 14.1 to 14.7

GAME THEORY: Two person zero –sum games – Maximin-Minimax Principle –Saddle point and value of the game-Games without saddle point, Mixed Strategies – Dominance Property – solving 2 x n game or m x 2 game by graphical method
Chapter 16 Section 16.1 to 16.4 & 16.6 to 16.7

UNIT - V: (18 Hours)
NETWORK ANALYSIS:-PERT – CPM: Project Network Diagram – Critical Path (Crashing excluded) – PERT computation
Chapter 15, Section 15.1 to 15.7
Content and treatment as in
Resource Management Techniques (Operations Research) by V.Sundaresan, K.S.Ganapathy Subramanian, K.Ganesan (A.R Publications) Ninth edition-June 2015

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.
4. Introduction to Operations Research, P.R.Vittal

5. Gupta P.K. and Hira D.S. Problems in Operations Research, S.Chand& Co.

WEBSITES:
1. www.researchgate.com
2. www.freecomputerbooks.com/special/operationsresearch.html
3. www.freetechbooks.com

WEBSITES FOR REFERENCE:
1. https://www.tutorialspoint.com/big_data_analytics/index.htm
2. https://www.tutorialspoint.com/hadoop/hadoop_big_data_overview.htm

QUESTION PAPER PATTERN:

Section	Question Component	Numbers	Marks	Total
A	Answer any 10 out of 12	1-12	3	30
B	Answer any 5 out of 7	13-19	6	30
C	Answer any 4 out of 6	20-25	10	40
	TOTAL MARKS			**100**

DISTRIBUTION OF QUESTIONS:

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

SYLLABUS FOR UNDER GRADUATES
DEPARTMENT OF ENGLISH
UG Part IV SOFT SKILLS
2019 Batch onwards

2020-21

SECOND YEAR

THIRD SEMESTER: Job Oriented Skills

SUBJECT CODE: 19UGSL403	THEORY	MARKS 100	
SEMESTER: III	CREDITS: 2	TOTAL HOURS: 30	

COURSE OBJECTIVES:

- 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 Interviews
Letter of Application and CV
Technical Writing - Circulars, Memos, Agenda and Minutes
Group Discussion
Review
    i.   Books
   ii.   Films

BOOKS FOR REFERENCE:

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

Section	Question Component	Numbers	Marks	Total
A	Answer any 5 out of 7	1-7	2	10
B	Answer any 4 out of 6	8-13	5	20
C	Answer Internal Choice	14 & 15	10	20
TOTAL MARKS				**50**

PAPER TITLE: VB.NET PROGRAMMING AND DATABASE MANAGEMENT SYSTEMS

SUBJECT CODE: 19UCSC307	THEORY	MARKS 100
SEMESTER: IV	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:
- Code programs and develop GUI interface using Visual Basic .Net.
- The student will use Visual Basic .Net to build Window applications using structured and object-based programming techniques.

UNIT I: (18 Hours)
VISUAL BASIC .NET AND THE .NET FRAMEWORK: Introduction to .net framework -Features, Common Language Runtime (CLR) ,Framework Class Library(FCL).Visual Studio.Net – IDE, Languages Supported, Components. Visual Programming, VB.net- Features, IDE- Menu System, Toolbars, Code Designer, Solution Explorer, Object Browser, Toolbox, Class View Window, Properties Window, Server Explorer, Task List, Output Window, Command Window.
Elements of Visual Basic .net -Properties, Events and Methods of Form, Label, TextBox, ListBox, Combo Box, RadioButton, Button, Check Box, Progress Bar, Date Time Picker, Calendar, Picture Box,HScrollbar, VScrollBar, Group Box, ToolTip,Timer

UNIT II: (18 Hours)
PROGRAMMING IN VISUAL BASIC .NET: Data Types, Keywords, Declaring Variables and Constants, Operators, Understanding Scope and accessibility of variables, Conditional Statements-If- Then, If-Then-Else, Nested If, Select Case, and Looping Statement- Do loop, For Loop, For Each-Next Loop, While Loop, Arrays- Static and Dynamic.
FUNCTIONS, BUILT-IN DIALOG BOXES, MENUS AND TOOLBAR: Menus and toolbars- Menu Strip, Tool Strip, Status Strip, Built-In Dialog Boxes –Open File Dialogs, Save File Dialogs, Font Dialogs, Color Dialogs, Print Dialogs, InputBox, Msg Box, Interfacing With End user.

UNIT III: (18 Hours)
Creating MDI Parent and Child, Functions and Procedures- Built-In Functions- Mathematical and String Functions, User Defined Functions and Procedures.

INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS:
Introduction – Databases and Application Development – **Components of Database MANAGEMENT SYSTEM:** Database Engine – Data Dictionary – Query Processor – Report Writer – Forms Generator – Application Generator – Communication and Integration – Security and other Utilities.
ADVANTAGES OF THE DBMS APPROACH: Focus on Data – Data Independence - Data Independence and Client/Server Systems. Brief history of DBMS: Hierarchical – Network - Relational and Object-Oriented Databases. The Feasibility Study: Costs – Benefits.

UNIT IV: (18 Hours)

DATABASE DESIGN AND DATA NORMALIZATION:
DATABASE DESIGN: Introduction – Identifying user requirements – Business objects – Tables and Relationships – Definitions – Primary key.

CLASS DIAGRAMS: Classes and Entities – Associations and Relationships – Class Diagram Details.

DATATYPES (DOMAINS/OBJECTS): Text – Numbers – Dates and Times – Binary Objects – Computed Values – User-Defined Types – Events.

DATA NORMALIZATION: Introduction – Tables, Classed, and Keys – Relational Database – Primary Key – Composite Keys - Surrogate Keys – Sample Database for a Video Store – First Normal Form: Repeating groups – Nested Repeating groups. Second Normal Form: Problems with 1NF – 2NF Definition – Dependence. Third Normal Form: Problems with 2NF – Definition – Checking work with Non – Redundancy. Beyond 3NF: Boyce-Codd Normal Form – Fourth Normal Form – Domain-Key Normal Form. Data Rules and Integrity – Converting a class diagrams to Normalized tables: one-to-many, Many-to-many, N-ary Associations, Generalization, Composition, Reflexive associations. Data Dictionary: DBMS Table Definition – Data Volume and Usage.

UNIT V: (18 Hours)
 QUERIES AND SUB QUERIES:
 DATA QUERIES: Introduction – Three Tasks of a Query Language – Four Questions to Retrieve data – Query Basics: Single Tables – Introduction to SQL – Sorting Output – Distinct – Criteria – Boolean Algebra – DeMorgan's Law – WHERE Clauses. Computations: Basic Arithmetic Operators – Aggregation – Functions. Subtotals and GROUPBY: HAVING (Conditions on totals) – WHERE versus HAVING. Multiple Tables: Joining Tables – Identifying Columns in Different tables – Joining many tables – Table Alias – Create View.
Advanced Queries and Sub queries: Introduction – Sub Queries: Calculations – Sub queries and sets of data – Subquery with ANY and ALL – Subtraction: NOT IN – OUTER JOINS – SQL SELECT, UNION, INTESECT, EXCEPT – Multiple JOIN columns – Reflexive Join CASE Function – Inequality Joins – Questions with "Every" need the EXISTS – Clause – SQL Data Definition Commands – SQL Data Manipulation Commands: INSERT, DELETE, UPDATE – Quality: Testing Queries.

PRESCRIBED BOOKS
1. Visual Basic.Net Black Book by Steven HolznerDreamtech Press The Complete Reference. 1st Edition.
2. G. V. Post – Database Management Systems Designing and Building Business Application – McGraw Hill International edition – 3rd Edition.

REFERENCE BOOKS
1. Visual Basic .NET Jeffery R. Shapiro Tata McGraw HillsReferenceBooks:Murach's
2. Beginning Visual basic .Net By Anne Bohem
3. R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd Edition, McGraw-Hill, 2002.
4. A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw Hill, 2010.
5. R. Elmasri, S.B. Navathe Database Systems Models, Languages, Design and application Programming, 6th Edition, Pearson Education, 2013.
6. Raghu Ramakrishnan – Database Management Systems – WCB/McGraw Hill – 1998.

QUESTION PAPER PATTERN:

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B	Answer any 5 out of 7	13-19	6	30
C	Answer any 4 out of 6	20-25	10	40
	TOTAL MARKS			**100**

DISTRIBUTION OF QUESTIONS:

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

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CORE PAPER-VIII
PAPER TITLE: PRACTICAL - RDBMS WITH VB.NET LAB

</div>

SUBJECT CODE: 19UCSC308	PRACTICAL	MARKS 100
SEMESTER: IV	CREDITS: 4	TOTAL HOURS: 60

COURSE OBJECTIVES:
- Design, formulate, and construct simple applications with VB.NET, assemble multiple forms, modules, and menus into working VB.NET solutions
- Translate general requirements into data-related solutions using database concepts

(30 Hours)

1. Create a button-click option to display a label
2. Create mouse move over to change button color
3. Create list box to display the selected item cost in web form. Create another label to display the total cost
4. Create a VB.NET program to calculate Boiling point of water using Compare Validator
5. Create a VB.NET program for User input name validation using Required Field Validator
6. Create a VB.NET program Checking the appropriate values using Validation button
7. Create a VB.NET program for Feedback form
8. Create a VB.NET for displaying the images with clear option
9. Creating a file holding variables, hyperlinks with lock & unlock methods

(30 Hours)

Oracle /MS-Access

For the following programs, create a database and perform the required operations given below:
  i. Display a message when connection established with Database
  ii. Create a table in Master Database
  iii. Updating the fields of a table in Database
  iv. Selecting the rows from a table in Database
  v. Retrieving the Result in Dataset & Checkbox List by selecting afield
  vi. Bind the dataset to a Radio button list with different forms
  vii. Create a Table header fields in the form of drop downlist
  viii. Use a Menu Driven Program:
      a. Insertion
      b. Deletion
      c. Modification
      d. Generate simple reports using queries.
10. Telephone directory maintenance.
11. Payroll.
12. Invoice System.
13. Mark sheet Processing.
14. Inventory System.
15. Library information system

COURSE COMPONENT: STATISTICAL METHODS AND THEIR APPLICATIONS
(For B.Sc. Computer Science)

SUBJECT CODE: 19UMAT344	THEORY& PROBLEMS	MARKS: 100
SEMESTER: IV	CREDITS: 3	TOTAL HOURS :60

COURSE OBJECTIVES:
- To introduce basic concepts of Statistics and computing statistical aspects

UNIT-I: (12 Hours)
Measures of location – Arithmetic Mean, Median, Mode, Geometric Mean, Harmonic Mean,
- Measures of Dispersion -- Range, Mean Deviation, Quartile Deviation, Standard deviation.
Chapter 7 & 8 (Volume I)

UNIT-II: (12 Hours)
Correlation -Types of Correlation-Scatter diagram –Karl Pearsons Coefficient of Correlation-
Rank Correlation Coefficient- Regression Lines
Chapter 10 & 11 (Volume I)

UNIT-III: (12 Hours)
Probability of an Event – Addition and Multiplication theorems – Baye's theorem.
Chapter 1 (Volume II)

UNIT-IV: (12 Hours)
Test of Significance based on t, Chi-Square and F-distributions with respect to Mean and
Variance.
Chapter 3, 4 & 5 (Volume II)

UNIT-V: (12 Hours)
Analysis of Variance – One way and Two Way Classification – Analysis of CRD, RBD –
Latin Square Designs
Chapter 5 & 6 (Volume II)

Content and treatment as in
Statistical Methods by S P.Gupta(Sultan Chand & Sons) Revised edition 2009

REFERENCE BOOKS:

1. Fundamental of Mathematical Statistics - S.C. Gupta & V.K. Kapoor - SultanChand
2. Wilks, S.S.: Elementary Statistical Analysis - Oxford and IBH
3. Snedecor, G.W., & Cochran, W.G.(1967): Statistical Methods, Oxford andIBH
4. Prentice Hall 4. Statistical Methods - Dr. S.P. Gupta - Sultan Chand &Sons

WEBSITES:
1. www.e-booksdirectory.com
2. www.bookboon.com/en/statistics-andmathematics-ebooks
3. www.freebookcentre.net

QUESTION PAPER PATTERN:

Section	Question Component	Numbers	Marks	Total
A	Answer any 10 out of 12	1-12	3	30
B	Answer any 5 out of 7	13-19	6	30
C	Answer any 4 out of 6	20-25	10	40
	TOTAL MARKS			**100**

DISTRIBUTION OF QUESTIONS:

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

COURSE COMPONENT: STATISTICAL METHODS AND THEIR APPLICATIONS PRACTICAL

SUBJECT CODE: 19UMAT345P	PRACTICALS	MARKS: 100
SEMESTER: IV	CREDITS: 2	TOTAL HOURS: 30

1. Construction of univariate and bivariate frequency distribution with samples of size not proceeding200.
2. Diagrammatic and graphical representation of various statistical data and frequency distributions.
3. Cumulative frequency curve and Lorenz curves.
4. Computation of various measures of location, dispersion, moments, skewness and kurtosis.
5. Curve fitting by the   method of least squares.
   (i) $y = ax + b$; (ii) $y = ax^2 + bx + C$; (iii) $y = ae^{bx}$ (iv) $y = ax^b$
6. Computation of correlation coefficients - regression lines (raw data and grouped data) – correlation coefficients,
7. Exact test based on t, Chi-square, and F distributions with regard to mean, variance and correlation coefficients.
8. Analysis of variance – one way and two way classification, CRD,RBD

Content and treatment as in
Statistical Methods by S P.Gupta(Sultan Chand & Sons) Revised edition 2009

REFERENCE BOOKS:

1. Statistical and Numerical Methods by P.R.Vittal and V. Malini
2. Mode, E.B.: Elements of Statistics - Prentice Hall Wilks, S.S.: Elementary Statistical Analysis - Oxford and IBH Snedecor, G.W., & Cochran, W.G.: Statistical Methods, Oxford and IBH Simpson and Kafka: Basic Statistic
3. Burr, I.W.: Applied Statistical Methods, Academic Press.
   Croxton, FE. and Cowden, D.J.: Applied General Statistics, Prentice Hall
   Ostleo, B.: Statistics in Research, Oxford & IBH.
4. Sydney Siegel- Non-parametric Methods for Behavioural Sciences.
5. Daniel, W W- Biostatistics.

SKILL BASED SUBJECT
PAPER TITLE: QUANTITATIVE APTITUDE

SUBJECT CODE: 19UGSL406	**THEORY**	**MARKS 100**
SEMESTER: IV	**CREDITS: 3**	**TOTAL HOURS: 30**

COURSE OBJECTIVES:
- To improve aptitude skill.

UNIT-I: **(6 Hours)**
Divisibility – HCF and LCM – Decimal Fractions – Square roots and Cube Roots – Logarithms – Antilogrithms.

UNIT-II: **(6 Hours)**
Averages – Percentage – Profit and Loss - Ratio and Proposition – Partnership – Alligation and mixture.

UNIT-III: **(6 Hours)**
Time and work – Pipes and Cistern – Time and Distance – Boats and Streams.

UNIT-IV: **(6 Hours)**
Simple Interest – Compound Interest – Stocks and Shares – True Discount – Banker's discount.

UNIT-V: **(6 Hours)**
Area – Volume and surface Areas – Heights and Distances – Data Interpretation: Tabulation – Bar Graphs – Pie Charts – Line Graphs.

REFERENCE BOOKS:

1. R.S. Aggarwal, Objective Arithmetic , S. Chand & Company, New Delhi , 2005
2. Govind Prasad Singh and Rakesh Kumar, Text Book of Quickest Mathematics (for all Competitive Examinations), KiranPrakashan, 2012
3. R.S. Aggarwal, Quantitative Aptitude, S. Chand & Company, New Delhi, 2012

PAPER TITLE - ENVIRONMENTAL STUDIES

SUBJECT CODE: 19UEVS401	THEORY	MARKS: 100
SEMESTER: IV	CREDITS: 2	TOTAL HOURS:

UNIT-1:
The Multidisciplinary nature of environmental studies Definition; Scope and importance, Need for public awareness.

UNIT-2:
Natural Resources: Renewable and non-renewable resources: Natural resources and associated problems.
 a) Forest resources: Use and Over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water dams benefits and problems.
 c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, Case studies.
 f) 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-3:
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: -
a. Forest ecosystem

b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT-4:

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: habital 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-5: Environmental Pollution: Definition - Causes, 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.

UNIT-6: Social Issues and the Environment

 - From Unsustainable to Sustainable development.
- Urban problems related to energy. - Water conservation, rain water harvesting, watershed management.
 - Resettlement and rehabilitation of people; its problems and concerns. Case studies.
 - Environmental ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and Control of Pollution) Act.
- Wildlife Protection Act.
- Forest Conservation Act.
- Issues involved in enforcement of environmental legislation.
- Public awareness.

UNIT-7:
Human Population and the Environment
- Population growth, variation among nations.
- Population explosion-Family welfare Programme.
- Environment and human health.
 - Human Rights.
- Value Education.
- HIV/AIDS.
- Women and Child Welfare.
- Role of information Technology in Environment and human health.
 - Case Studies. UNIT-8: Field Work (Practical).
 - Visit to a local area to document environmental assets-river/forest/grassland/ hill/mountain.
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural.
- Study of common plants, insects, birds.
- Study of simple ecosystems-pond, river, hill slopes, etc. SIX MONTHS COMPULSORY CO

UNIT-8: Field Work (Practical).
- Visit to a local area to document environmental assets-river/forest/grassland/ hill/mountain.
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural.
- Study of common plants, insects, birds.
- Study of simple ecosystems-pond, river, hill slopes, etc

CORE PAPER-IX
PAPER TITLE: OPERATING SYSTEMS

SUBJECT CODE: 19UCSC309	THEORY	MARKS 100
SEMESTER: V	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:
- To have an in-depth understanding of process concepts, scheduling algorithms, deadlock and memory management.
- Students will familiarize on the general structure of an operating system and case study is also provided.

UNIT I: **(18 Hours)**
Introduction: Views –Goals – OS Structure –Components – Services - System Design and Implementation. Process Management: Process - Process Scheduling – Cooperating Process – Threads – Inter process Communication.

UNIT II: **(18 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: **(18 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 ,2004, An Introduction to Operating System,- Third Edition, Addison Wesley Pearson Publication

WEBSITES FOR REFERENCES:

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

QUESTION PAPER PATTERN:

Section	Question Component	Numbers	Marks	Total
A	Answer any 10 out of 12	1-12	3	30
B	Answer any 5 out of 7	13-19	6	30
C	Answer any 4 out of 6	20-25	10	40
TOTAL MARKS				**100**

DISTRIBUTION OF QUESTIONS:

Sections	Units	NO. of Questions	
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Section A	Unit – 1	2	
	Unit – 2	3	
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	Unit – 4	2	
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	Unit – 5	1	
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	Unit – 2	1	
	Unit – 3	2	
	Unit – 4	1	
	Unit -5	1	

PAPER TITLE: DIGITAL LOGIC AND COMPUTER ARCHITECTURE

SUBJECT CODE: 19UCSC310	THEORY	MARKS 100
SEMESTER: V	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:
- This course gives knowledge about various basic digital gates used in digital system and to develop and construct logical circuits using logic gates, combinational and Sequential circuits.
- To acquaint students with the basic concepts of functional components, architecture, register organization and performance metrics of a computer.

UNIT I: (18 Hours)
Binary Systems & Code conversion, Boolean Algebra & Logic Gates – Truth Tables – Universal Gates – Simplification of Boolean functions: K-map, – Combinational Logic: Adders & Subtractors.

UNIT II: (18 Hours)
Multiplexer – Demultiplexer - Sequential Logic: RS, Clocked RS, D, JK, Master Slave JK, T Flip-Flops – Shift Registers – Types of Shift Registers.

UNIT III: (18 Hours)
Basic Computer Organization and Design: Computer registers, bus system, instruction set, timing and control, instruction cycle, memory reference, input-output and interrupt.

UNIT IV: (18 Hours)
Central Processing Unit: Register organization arithmetic and logical micro-operations, stack organization, micro programmed control codes, machine language, assembly language, input output programming.

UNIT V: (18 Hours)
Input-output Organization: Peripheral devices, I/O interface, Modes of data transfer, direct memory access.

PRESCRIBED BOOKS:
1. M. Morris Mano, 2014, 4th Edition, Digital Logic and Computer Design, Prentice-Hall of India Pvt. Ltd.
2. M. Mano, Computer System Architecture, Pearson Education 2007, 3rd Edition.

REFERENCE BOOKS:
1. W. Stallings, Computer Organization and Architecture Designing for Performance, 8th Edition, Prentice Hall of India, 2009
2. A. J. Dos Reis, Assembly Language and Computer Architecture using C++ and JAVA, Course Technology, 2004
3. V. Vijayendran, 2004, Digital Fundamentals, S. Viswanathan (Printers & Publishers) Pvt. Ltd.

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	Unit – 5	1	
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	Unit – 2	2	
	Unit – 3	1	
	Unit – 4	1	
	Unit - 5	1	

PAPER TITLE: WEB PROGRAMMING WITH PHP AND MYSQL

SUBJECT CODE: 19UCSC311	THEORY	MARKS 100
SEMESTER: V	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:

- Creating, Reading and writing cookies, sessions
- Learn different ways of connecting to MySQL through PHP, and how to create tables, enter data, select data, change data, and delete data. Connect to SQL Server and other data sources.

UNIT -I INTRODUCTION: **(18 Hours)**

Introduction- open source - PHP — history- features -variables- statements- operators -conditional statements - if – switch - nesting conditions - merging forms with conditional statements - loops - while - do – for   loop iteration with break and continue.

UNIT - II ARRAYS AND FUNCTIONS: **(18 Hours)**

Arrays: Creating an array- modifying array - processing array – grouping form with arrays - using array functions - creating user defined functions - using files

UNIT - III   **(18 Hours)**

Sessions – cookies – executing external programs – creating sample applications using PHP.

My SQL:

Effectiveness of MYSQL – MYSQL Tools – Pre-requisites for MYSQL connection – Databases and tables – MYSQL data types

UNIT – IV   **(18 Hours)**

Creating and manipulating tables – Insertion, Updation and Deletion of rows in tables – Retrieving data - Sorting and Filtering retrieved data – Advanced data filtering - Data Manipulation functions – Aggregate functions – Grouping data – Sub Queries – Joining Tables – Set Operators – Full text searching.

UNIT V PHP with MYSQL: **(18 Hours)**

Working MYSQL with PHP – Database Connectivity – usage of MYSQL with PHP commands, processing result sets of queries – handling errors – debugging and diagnostic functions – Validating user input through Database layer and Application layer – formatting query output with Character, Numeric, Date and Time – sample Database Applications.

PRESCRIBED BOOKS:
1. VIKRAM VASWANI, "PHP and MySQL", Tata McGraw-Hill, 2007
2. BEN FORTA , "MySQL Crash course" SAMS, 2006, 2nd Edition
3. C.J.DATE, "An Introduction to Database Systems", Addison Wesley, Sixth Edition.
4. Ramesh Elmasri and ShamkantB.Navathe, "fundamentals of Database Systems", Pearson Education, Thrid Edition.

REFERENCE BOOKS:
1. Tim Converse, Joyce Park and Clark Morgan, "PHP 5 and MySQL", Wiley India, 2008.
2. Robert Sheldon, Geoff Moes, "Beginning MySQL", Wrox, 2005.
3. Alexis Leon and Mathews Leon, "Database Management Systems", Vikas, 2008.

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	Unit – 3	2	
	Unit – 4	1	
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CORE PAPER- XII
PAPER TITLE: WEB PROGRAMMING WITH PHP AND MYSQL PRACTICAL

SUBJECT CODE: 19UCSC312P	PRACTICAL	MARKS 100
SEMESTER: V	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:
- Understand how server-side programming works on the web using PHP scripts
- How MySQL can be used with programming languages like PHP to create dynamic websites for visitors.

(18 Hours)

1. Creating simple webpage using PHP
2. Use of conditional statements in PHP
3. Use of looping statements in PHP

(18 Hours)

4. Creating different types of arrays
5. File manipulation using PHP
6. Creation of sessions

(18 Hours)

7. Creation of cookies
8. Creating simple applications using PHP with input validations
9. Creating simple table with constraints
10. Insertion, Updating and Deletion of rows in MYSQL

(18 Hours)

11. Searching of data by different criteria
12. Sorting of data
13. Demonstration of joining tables

(18 Hours)

14. Usage of aggregate functions
15. Database connectivity in PHP with MYSQL

ELECTIVE-I (INTER DISCIPLINARY)
(Offered to other departments)
PAPER TITLE: INTERNET AND ITS APPLICATIONS PRACTICAL

SUBJECT CODE: 19UIDE312	PRACTICAL	MARKS 100
SEMESTER: V	CREDITS: 5	TOTAL HOURS: 75

COURSE OBJECTIVES:
- To understand and design simple websites using the basic HTML tags, TABLE tags, FRAMES and forms.
- To provide the students with the basic knowledge of World Wide Web, Web Browsers to develop websites, creating E-mails, Sending and receiving mails.

UNIT I: (15 Hours)
Introduction to Computers: Programming Language types History of Internet Personal Computers History of World Wide Web

UNIT II: (15 Hours)
Web Browsers -Internet Explorer - connecting to Internet Features of Internet explorer- Searching the Internet -online help and tutorials-File Transmission Protocol (FTP) Browser settings.

UNIT III: (15 Hours)
Attaching a file, Electronic mail creating an E-mail id sending and Receiving mails attaching a file-Instance messaging - other web browsers.

UNIT IV: (15 Hours)
Introduction to HTML Tags for Document structure (HTML, Head, and Body Tag). Headings paragraph(<p> tag) – Font style elements: (bold, italic, strike, font) - line breaks- headers - Linking-Images- lists – table – Frames – Forms : Input

UNIT V: (15 Hours)
E-marketing consumer tracking Electronic advertising search engine-CRM-credit card payments Digital cash and e-wallets micro payments-smart card

PRESCRIBED BOOKS:
1. Internet and World Wide Web Third edition H.M.Deitel, P.J. Deitel and A.B.Goldberg- PHI

REFERENCE BOOKS:

1. The Internet -Complete Reference Harley Hahn, Tata McGrawHill

PRACTICAL

(10 Hours)

1. To illustrate body and pre tags
2. Create an HTML document with the following formatting options:
    a. Bold
    b. Italics
    c. Underline
    d. Headings (Using H1 to H6 heading styles)
    e. Font (Type, Size and Color)
3. Create a webpage to demonstrate font variation.
4. To illustrate Ordered list tag

(15 Hours)

5. To illustrate unordered list tag
6. To illustrate image tag
7. Write a program to set background image using body tag.
8. Create an HTML document which implements Internal linking as well as external linking.
9. To illustrate Table tag
10. To illustrate frame tag

(15 Hours)

11. Create a form using HTML which has the following types of controls:
    I. Text Box
    II. Option/radio buttons
    III. Check boxes
    IV. Reset and Submit buttons

12. Creating e-mail id, sending and receiving mail with attachment, CC, BC
13. Design mark sheet using HTML tags.

(5 Hours)

14. Create Guru Nanak College Website using HTML tags
15. Design a website to submit your resume.

PAPER TITLE: VALUE EDUCATION

SUBJECT CODE:19UVED401	THEORY	MARKS: 100
SEMESTER: V	CREDITS: 2	NO.OF HOURS PER WEEK: 2

UNIT I: Education and Values

Definition, Concept, Classification, Theory, Criteria and Sources of values Aims and objectives of value education Role and Need for value education in the contemporary society, Role of education in transformation of values in society Role of parents, teachers, society, peer group and mass media in fostering values

UNIT II: Value Education and Personal Development

Human Values: Truthfulness, Sacrifice, Sincerity, Self-Control, Altruism, Scientific Vision, relevancy of human values to good life. Character Formation towards Positive Personality Modern challenges of adolescents: emotions and behavior Self-analysis and introspection: sensitization towards gender equality, differently abled, Respect for - age, experience, maturity, family members, neighbors, strangers, etc.

UNIT III : Human Rights and Marginalized People

Concept of Human Rights – Principles of human rights – human rights and Indian constitution – Rights of Women and children – violence against women – Rights of marginalized People – like women, children, minorities, transgender, differently abled etc

Social Issues and Communal Harmony Social issues – causes and magnitude - alcoholism, drug addiction, poverty, unemployment – communal harmony –concept –religion and its place in public domain –secular civil society

UNIT IV: Value Education towards National and Global Development

Constitutional Values:(Sovereign, Democracy, Socialism, Secularism, Equality, Justice, Liberty, Freedom, Fraternity)
Social Values: (Pity and Probity, Self-Control, Universal Brotherhood).
Professional Values:(Knowledge Thirst, Sincerity in Profession, Regularity, Punctuality, Faith).
Religious and Moral Values: (Tolerance, Wisdom, character).
Aesthetic Values: (Love and Appreciation of literature, fine arts)
Environmental Ethical Values
National Integration and international understanding.
Need of Humanistic value for espousing peace in society. Conflict of cross-cultural influences, cross-border education

UNIT V:

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

REFERENCES

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

CORE PAPER- XIII
PAPER TITLE: SOFTWARE ENGINEERING

SUBJECT CODE: 19UCSC313	THEORY	MARKS 100
SEMESTER: VI	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:
- To impart knowledge of basic Software engineering methods and practices.
- A general understanding of software development models such as the waterfall and cost estimation techniques, design, implementation and maintenance of software products.

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: **(18 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: **(18 Hours)**
Implementation issues: Structured Coding techniques – coding style – standards and guidelines – documentation guidelines – type checking – scooping 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, 5th Edition - Tata McGraw-Hill book Company.

REFERENCE BOOKS:
1. Richard E.Fairley, Software EngineeringConcepts,McGraw-Hill,1985
2. Ian Sommerville, Software Engineering-10thEdition,Pearson,2015
3. Roger S.Pressman, Software Engineering: A Practitioner's Approach-9th Edition, McGraw-Hill,2019
4. R.S.Pressman, 1997, Software Engineering – 1997 - Fourth Ed., McGrawHill.
5. RajibMall, 2014, Fundamentals of Software Engineering, 4th Edition, PHI.

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

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

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CORE PAPER-XIV
PAPER TITLE: PYTHON PROGRAMMING

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SUBJECT CODE: 19UCSC314	THEORY	MARKS 100
SEMESTER: VI	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVE:
- To introduce object-oriented programming using an easy-to-use language.
- To use iterators and generators, lists, tuples, and dictionaries in Python programs.

UNIT I: (18 Hours)
INTRODUCTION TO PYTHON-Getting Started: Introduction to Python- an interpreted high level language, interactive mode and script mode.
Variables, Expressions and Statements: Variables and Types - mutable and Immutable variable and Keywords. - Operators and Operands in Python: Arithmetic, relational and logical operators-Operator precedence, Expressions and Statements (Assignment statement); Taking input (using raw_input () and input ()) and displaying output - print statement - Comments in Python.

CONDITIONAL AND LOOPING CONSTRUCT:
if - else statement and nested if – else while, for, use of range function in for, Nested loops - break, continue, and pass statement - Use of compound expression in conditional constructs

UNIT II: (18 Hours)
FUNCTIONS: Built-In Function, invoking built in functions - Module (Importing entire module or selected objects using from statement) - Functions from math, random, time & date module. - Composition - User Define Function: Defining, invoking functions, passing parameters (default parameter values, keyword arguments) - Scope of variables, void functions and functions returning values

UNIT III: (18 Hours)
STRINGS: Creating, initializing and accessing the elements; String operators: +, *, in, not in, range, slice [n:m] - String built in functions & methods: len, capitalize, find, isalnum, isalpha, isdigit, lower, islower, isupper, upper, lstrip, rstrip, isspace, istitle, partition, replace, join, split, count, decode, encode, swapcase - Strings constants defined in string module - Regular Expression and Pattern Matching.
Lists: Concept of mutable lists, creating, initializing and accessing the elements of list - List operations (Concatenation, Repetation, Membership, list slices), List comprehensions - List functions & methods: len, insert, append, extend, sort, remove, reverse, pop
Tuples: Immutable concept, creating, initializing and accessing the elements in a tuple;- Tuple functions: cmp(), len(), max(), min(), tuple().

UNIT IV: (18 Hours)
Sets Concept of Sets, creating, initializing and accessing the elements of Sets operation (Membership, union, intersection, difference, and symmetric difference
Dictionaries: Concept of key-value pair, creating, initializing and accessing the elements in a dictionary, Traversing, appending, updating and deleting elements - Dictionary functions & Methods: cmp, len, clear(), get(), has_key(), items(), keys(), update(), values()
I/O and File Handling: Output Formatting - Reading and Writing Files (text and binary mode)

UNIT V: (18 Hours)

ERRORS AND EXCEPTIONS: Syntax Errors, Exceptions, Handling Exceptions, Raising Exceptions - User-defined Exceptions, Defining Clean-up - Actions (try - finally), Predefined Clean-up Actions

Introduction to Object Oriented concepts in Python - Object Oriented concepts - Objects, Python Scopes and Namespaces - Classes, Class Objects, Instance Objects, Method Objects, Class and Instance Variables - Inheritance

PRESCRIBED BOOKS
1. Learning Python by Mark Lutz, O'Reilly Publication, 5th Edition.

REFERENCE BOOKS
1. Programming with python, A users Book, Michael Dawson, Cengage Learning
2. Python Essential Reference, David Beazley, Third Edition
3. Python Bible

WEBSITE
1. https://docs.python.org

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	Unit – 5	1	
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	Unit – 2	2	
	Unit – 3	1	
	Unit – 4	1	
	Unit -5	1	

CORE PAPER-XV
PAPER TITLE: PYTHON PROGRAMMING PRACTICAL

SUBJECT CODE: 19UCSC315P	PRACTICAL	MARKS 100
SEMESTER: VI	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVE:
- To learn and understand python looping, control statements and string manipulations.
- To acquire programming skills and Object-Oriented Skills in core Python.

(18 Hours)

1. Write a python program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. Write a Python program to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria:
   Grade A: Percentage >=80
   Grade B: Percentage>=70 and <80
   Grade C: Percentage>=60 and <70
   Grade D: Percentage>=40 and <60
   Grade E: Percentage<40
3. Write a program to sum all the elements from n1 to n2 where n1 and n2 are positive integers.

(18 Hours)

4. Input an array of n numbers and find separately the sum of positive numbers and negative numbers.
5. Write a program to print sum and multiply two matrices.
6. Write a program to find the roots of a quadratic equation

(18 Hours)

7. Write a Python Program to check whether the given string is palindrome or not using built in string manipulation methods.
8. Write a Python Program to read a word and prints the number of letters, vowels and percentage of vowels in the word using dictionary
9. Write a Python Program to check a given sentence is a pangram or not using function/ Module.

(18 Hours)

10. Write a python program, using user-defined functions to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
11. Write a python program to display the first n terms of Fibonacci series.
12. Write a python program to find sum of the following series for n terms: $1 - 2/2! + 3/3! - \text{-- - -} n/n!$
13. Write an Object oriented Python program to create two Time objects: current Time, which contains the current time; and breadTime, which contains the amount of time it takes for a bread maker to make bread. Then we'll use addTime to figure out when the bread will be done. Write the print Time function to display the time when the bread will be done by the bread maker.

(18 Hours)

14. Write a python program to illustrate list
15. Write a python program to illustrate exception handling

PAPER TITLE: DATA COMMUNICATION AND NETWORKING

SUBJECT CODE: 19UCSC316	THEORY	MARKS 100
SEMESTER: VI	CREDITS: 5	TOTAL HOURS: 90

COURSE OBJECTIVES:
- Demonstrate understanding about various data communication transmission media, interface and Modulation techniques.
- To understand the various protocols, topologies, layers and configurations.

UNIT I: **(18 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: **(18 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: **(18 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, activeDocument.

UNIT V: **(18 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, 5th Edition, TMH.
2. William Stallings, Cryptography and Network Security -8th Edition,PHI.
3. Cryptography and Network Security (UPTU), V.S.Bagad, I.A.Dhotre, Technical Publications.

REFERENCE BOOKS:

1. Jean Walrand 1998, Communication Networks (A first Course), Second Edition, WCB/TMH.
2. Behrouz and Forouzan, 2006, Data Communication and Networking, 3rd Edition, TMH.
3. Bruce, Schneider, Applied Cryptography, 2nd Edition , Toha Wiley &Sons,1996.
4. Dougals R.Stinson, Cryptography- Theory and Practice ,CRCPress,1995

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	Unit – 3	1	
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	Unit – 5	1	

ELECTIVE II
PAPER TITLE: DATA MINING

SUBJECT CODE: 19UCSC318	THEORY	MARKS 100
SEMESTER: VI	CREDITS: 5	TOTAL HOURS: 90

COURSE OBJECTIVES:
- To clean data and to check for missing data
- To understand the concept of clustering and classification

UNIT I: (18 Hours)
Introduction: Data mining – Functionalities – Classification – Introduction to Data Warehousing – Data Preprocessing: Preprocessing the Data – Data cleaning – Data Integration and Transformation – Data Reduction

UNIT II: (18 Hours)
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: (18 Hours)
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 and Data Warehouses.

UNIT IV: (18 Hours)
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: (18 Hours)
Cluster Analysis: Introduction – Types of Data in Cluster Analysis, Petitioning Methods – Hierarchical Methods Density Based Methods – GRID Based Method – Model based Clustering Method.

PRESCRIBEDBOOKS
1. J.Han and M. Kamber, 2012,3rd Edition, Data Mining Concepts and Techniques, Harcourt India Pvt. Ltd - NewDelhi.

REFERENCE BOOKS
1. K.P. Soman, ShyamDiwakar, V.Ajay, 2006, Insight into Data Mining Theory and Practice,
   Prentice Hall of India Pvt. Ltd – New Delhi.

WEBSITES FOR REFERENCES:
1. http://www.academicpress.com
2. http://www.mkp.com

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C	Answer any 4 out of 6	20-25	10	40
TOTAL MARKS				**100**

DISTRIBUTION OF QUESTIONS:

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	Unit – 2	3	
	Unit – 3	2	
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	Unit – 3	1	
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	Unit – 5	1	
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	Unit – 2	2	
	Unit – 3	1	
	Unit – 4	1	
	Unit -5	1	

ELECTIVE II
PAPER TITLE: SOFTWARE TESTING

SUBJECT CODE: 19UCSC319	THEORY	MARKS 100
SEMESTER: VI	CREDITS: 5	TOTAL HOURS: 90

COURSE OBJECTIVES:
- To test the work products such as requirements, design and code.
- To validate if the test object is complete and works as per the expectation of the user.

UNIT I: **(18 Hours)**
Principles of Testing – Software Development Life Cycle Models.

UNIT II: **(18 Hours)**
White Box Testing – Black Box testing – Integration Testing.

UNIT III: **(18 Hours)**
System and Acceptance Testing – Performance Testing – Regression Testing.

UNIT IV: **(18 Hours)**
Testing Object-Oriented Systems – Usability and Accessibility Testing Organization structures for Testing Teams.

UNIT V: **(18 Hours)**
Test Planning, Management, Execution, and Reporting – Software Test Automation – Test Metrics and Measurements.

PRESCRIBED BOOKS:
Software Testing Principles and Practices, Srinivasan Desikan& Ramesh Gopalswamy, Pearson Education.2009 Edition.

REFERENCE BOOKS:
Software Testing Technique-Beizer Boris, Dreamtech.

WEBSITES FOR REFERENCES:
1. http://www.inf.ed.ac.uk/teaching/courses/st/2011-12/Resource-folder/

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ELECTIVE II
PAPER TITLE: DATA SCIENCE

SUBJECT CODE: 19UCSC320	THEORY	MARKS 100
SEMESTER: VI	CREDITS: 5	TOTAL HOURS: 90

COURSE OBJECTIVES:
- To analyze how to collect, clean and prepare a data and explain the method of summarizing the data
- To evaluate the data science findings

UNIT I: (18 Hours)
Data Scientist's Tool Box: Turning data into actionable knowledge, introduction to the tools that will be used in building data analysis software: version control, markdown, git, GitHub, R, and RStudio.

UNIT II: (18 Hours)
R Programming Basics: Overview of R, R data types and objects, reading and writing data, Control structures, functions, scoping rules, dates and times, Loop functions, debugging tools, Simulation, code profiling.

UNIT III: (18 Hours)
Getting and Cleaning Data: Obtaining data from the web, from APIs, from databases and from colleagues in various formats. Basics of data cleaning and making data —tidy‖.

UNIT IV: (18 Hours)
Exploratory Data Analysis: Essential exploratory techniques for summarizing data, applied before formal modeling commences, eliminating or sharpening potential hypotheses about the world that can be addressed by the data, common multivariate statistical techniques used to 45 visualize high-dimensional data.

UNIT V: (18 Hours)
Reproducible Research: Concepts and tools behind reporting modern data analyses in a reproducible manner, to write a document using R markdown, integrate live R code into a literate statistical program, compile R markdown documents using knitr and related tools, and organize a data analysis so that it is reproducible and accessible to others

PRESCRIBED BOOKS

1. RACHEL SCHUTT, Cathy O'Neil, "Doing Data Science: Straight Talk from the Frontiline" by Schroff/O'Reilly, 2013. 1st Edition Kindleedition.
2. Foster Provost, Tom Fawcett, "Data Science for Business" What You Need to Know About Data Mining and Data-Analytic Thinking" by O'Reilly, 2013.1st edition, kindleedition

REFERENCE BOOKS

1. John W. Foreman, "Data Smart: Using data Science to Transform Information into Insight" by John Wiley & Sons,2013.
2. Ian Ayres, "Super Crunchers: Why Thinking-by-Numbers Is the New Way to Be Smart" Ist Edition by Bantam,2007.

3. Eric Seigel, "Predictive Analytics: The Power to Predict who Will Click, Buy, Lie, or Die", 1st Edition, by Wiley,2013.
4. Matthew A. Russel, "Mining the Social Web: Data mining Facebook, Twitter, Linkedln, Goole+, GitHub, and More", Second Edition, by O'Reilly Media,2013..

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ELECTIVE II
PAPER TITLE: CLOUD COMPUTING

SUBJECT CODE: 19UCSC321	THEORY	MARKS 100
SEMESTER: VI	CREDITS: 5	TOTAL HOURS: 90

COURSE OBJECTIVES:
- To analyse the components of cloud computing and its business perspective.
- To evaluate the various cloud development tools and to collaborate with real time cloud services.

UNIT- I: **(18 Hours)**
Beyond the Desktop: Introduction to the Cloud Computing - Are you ready for computing the Cloud? -Developing Cloud Services.

UNIT-II: **(18 Hours)**
Cloud Computing for Everyone- Cloud Computing for the Family- Cloud Computing for the Community- Cloud Computing for the Corporation.

UNIT- III: **(18 Hours)**
Using cloud Services: Collaborating on Calendars, Schedules, and Task Management - Collaborating on Event Management -Collaborating on Contact Management -Collaborating on Project Management.

UNIT -IV: **(18 Hours)**
Using cloud Services: Collaborating on Word -Collaborating on Spreadsheets-Collaborating on Presentations: Preparing Presentations Online-Evaluating Web-Based Presentation Applications.

UNIT- V: **(18 Hours)**
Using cloud Services: Collaborating on Databases- Storing and Sharing files and other online content: Understanding Cloud storage- Evaluating Online File Storage and Sharing Services.

PRESCRIBED BOOK
1. Michael Miller, ‒Cloud Computing‖, Pearson Education Inc, 1st Edition, 2008
2. Ricardo Puttini, Thomas Erl, and Zaigham Mahmood,‖ Cloud Computing: Concepts, Technology & Architecture‖, Prentice Hall, 2013, 1st Edition.

REFERENCE BOOK:
1. Rajkumar Buyya & Co., ‒Cloud Computing Principles and Paradigms‖,John Wiley & Sons Publications,2011.
2. Ray Rafaels,Cloud Computing: From Beginning to End,2018.

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ELECTIVE III
PAPER TITLE: FUNDAMENTALS OF MULTIMEDIA

SUBJECT CODE: 19UCSC322	THEORY	MARKS 100
SEMESTER: VI	CREDITS: 5	TOTAL HOURS: 90

COURSE OBJECTIVES:

- This course will expose students to the theoretical and fundamental concepts of multimedia, its applications and the techniques involved.
- Understand the building blocks of Multimedia such as text, audio, animation, image and video.

UNIT - I: (**18 Hours**)
Multimedia Definition: CDROM and the Multimedia High Way, Where to use Multimedia – Introduction to Making Multimedia: The stages of a Project – Where you need – Hardware – Software – Creativity - Organization - Multimedia Skills: The Team – Project Manager - Multimedia Designer - Interface Designer – Writer - Video Specialist - Audio Specialist - Multimedia Programmer - Producer of Multimedia for the Web.

UNIT – II: (**18 Hours)**
Multimedia Hardware and Software: Macintosh and Windows production Platform, Basic Software Tools: Text Editing and Word Processing Tool – OGR Software – Painting and Drawing Tools – 3-D Modeling and Animation Tools – Image-Editing tools – Sound Editing Tools – Animation, Video and Digital Movie Tools - Multimedia Authoring Tools: Making Instant Multimedia

UNIT - III: (**18 Hours)**
Multimedia Building Blocks: Text – About Fonts and Faces, Using Text in Multimedia – Sound: The Power of Sound – Digital Audio – Making Digital Audio Files – MIDI Audio – MIDI Vs Digital Audio – Multimedia System Sounds – Audio File Formats.

UNIT – IV: (**18 Hours**)
Images: Making Still Images – Color – Animation: The Power of Motion – Principles of Animation – Animation by Computer – Video: Using video – How video Works and Is Displayed – Digital Video Containers – Shooting and Editing Video.

UNIT –V: (**18 Hours**)
Multimedia and Internet: Internet History – Internetworking – Multimedia on the Web - Designing for the World Wide Web: Developing for the web – Text for the Web – Images for the Web – Sound for the Web – Animation for the Web – Video for the Web.

PRESCRIBED BOOKS:
1. Tay Vaughan, Multimedia making it with, 9th Edition, Tata McGraw Hill, 2017.
2. Fundamentals of Multimedia, Ze-Nian Li, Mark S. Drew, Jiangchuan Liu. 2nd Edition.

WEBSITES FOR REFERENCES:
1. https://www.elsevier.com/books/introduction-to-multimedia-systems/mitra/978-0-08-092478-

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ELECTIVE III
PAPER TITLE: ANDROID APPLICATION DEVELOPMENT PRACTICAL

SUBJECT CODE:19UCSC323	PRACTICAL	MARKS 100
SEMESTER: VI	CREDITS: 5	TOTAL HOURS: 90

COURSE OBJECTIVES:
- To study platforms and toolkits for fast development of modern Android applications
- To provide skills to develop applications on mobile platform and deploying software to mobile devices.

UNIT I: **(18 Hours)**

Getting Started with Android Programming - Using Eclipse for Android Development - Using Android Emulator.
Exercises:
1. Exploring the Eclipse, Exploring Emulator
2. Styles, Themes And Progress Dialog
3. Linking Activities With Intent

UNIT II: **(18 Hours)**

Activities, Fragments and Intents - Getting to know the Android User Interface.

Exercises:
4. Fragments: Adding Fragments Dynamically, Communication Between Fragments
5. Intent Filters
6. Adding Categories, Displaying Notifications On Status Bar
7. View Groups: Linear Layout, Absolute Layout, Table Layout, Relative Layout, Frame Layout, Scroll View, Action Bar
8. Creating User Interface Programmatically 6.Registering Events for Views

UNIT III: **(18 Hours)**

Designing your User Interface with Views - Displaying pictures and menus with Views.
 Exercises:
9.   Basic Views: Handling View Events, Text View, Buttons, Progress Bar View, Auto Complete Text View
10. Views: Picker View, List View, Spinner View, Image View, Grid View, Web View
11. Specialized Fragments: List Fragment, Dialog Fragment, Preference Fragment
12. Menus with Views

UNIT IV: **(18 Hours)**

Data Persistence - Working with Audio and Video - Content Providers.
Exercises:
13. Saving and loading user preferences
14. Persisting Data to files
15. Creating and using databases
16. Audio and Video
17. Sharing Data using Content providers

UNIT V: (18 Hours)

Messaging - Developing Android Services - Publishing Android Applications.
Exercises:
18. SMS Messaging
19. Getting feedback after sending a message
20. Sending Email
21. Creating a Simple Service
22. Running repeated tasks using the timer class
23. Establishing communication between a service and activity

PRESCRIBED BOOKS:
1. Lee Wei-Meng, 2012,"Beginning Android 4 Application Development", Wiley India

REFERENCE BOOKS:
1. CinarOnur , "Android Apps with Eclipse", 2012,Apress, Springer(India) Private Limited.
2. Meier Reto, "Professional Android 2 Application Development", 2010, WileyIndia.

WEBSITE FOR REFERENCES:
1. http://deveIoper.android.com/training/basics/firstapp/index.html
2. www.vogella.com/articles/Android/article.html
3. www.coreservelets.com/antIroid-tutorial/
4. www.edumobile.org/android/category/android-beginner-tutorial/
5. www.edureka.in/blog/catcgory/androicI/android-development-tutorial/

ELECTIVE III
PAPER TITLE: ARTIFICIAL INTELLIGENCE

SUBJECT CODE: 19UCSC324	THEORY	MARKS 100
SEMESTER: VI	CREDITS: 5	TOTAL HOURS: 90

COURSE OBJECTIVES:
- Become familiar with basic principles of AI toward problem solving, inference, perception, knowledge representation, and learning.
- To conceptualize the basic ideas and techniques underlying the design of intelligent systems.

UNIT I: **(18 Hours)**
INTRODUCTION: Introduction to Artificial Intelligence, Background and Applications, Turing Test and Rational Agent approaches to AI, Introduction to Intelligent Agents, their structure, behavior and environment.

UNIT II: **(18 Hours)**
PROBLEM SOLVING AND SEARCHING TECHNIQUES: Problem Characteristics, Production Systems, Control Strategies, Breadth First Search, Depth First Search, Hill climbing and its Variations, Heuristics Search Techniques: Best First Search, A* algorithm, Constraint Satisfaction Problem, Means-End Analysis, Introduction to Game Playing, Min-Max and Alpha-Beta pruning algorithms.

UNIT III: **(18 Hours)**
KNOWLEDGE REPRESENTATION: Introduction to First Order Predicate Logic, Resolution Principle, Unification, Semantic Nets, Conceptual Dependencies, Frames, and Scripts, Production Rules, Conceptual Graphs. Programming in Logic (PROLOG)

UNIT IV: **(18 Hours)**
DEALING WITH UNCERTAINTY AND INCONSISTENCIES: Truth Maintenance System, Default Reasoning, Probabilistic Reasoning, Bayesian Probabilistic Inference, Possible World Representations.

UNIT V: **(18 Hours)**
UNDERSTANDING NATURAL LANGUAGES: Parsing Techniques, Context-Free and Transformational Grammars, Recursive and Augmented Transition Nets.

PRESCRIBED BOOKS:
1. DAN.W. Patterson, Introduction to A.I and Expert Systems – PHI, 2015, 3rd Edition
2. Stuart Russell & Peter Norvig, Artificial Intelligence-A Modern Approach, LPE, Pearson Prentice Hall, 2016, 3rd Edition.

REFERENCE BOOKS:
1. Rich & Knight, Artificial Intelligence – Tata McGraw Hill, 2nd edition,1991.
2. W.F. Clocksin and Mellish, Programming in PROLOG, Narosa Publishing House, 3rd edition, 2001.
3. Ivan Bratko, Prolog Programming for Artificial Intelligence, Addison-Wesley, Pearson Education, 3rd edition,2000.

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