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. Information Technology

(SEMESTER PATTERN WITH CHOICE BASED CREDIT SYSTEM)

Syllabus

(For the candidates admitted in the Academic year 2020-21 and thereafter)

VISION

To provide an outstanding I C T education for our students and enable them to be leaders with successful careers in industry, academia and government

MISSION

- The future of students is driven by their aspirations and not bound by their Circumstances.
- The IT course will nurture creativity, lateral thinking and Problem-solving skills.
- To train young minds into industry ready professionals.
- Up – Knowledging   Up - skilling

PROGRAMME OUTCOME

PO1: Develop appropriate skill set, analytical abilities, and construct computer-based solutions for real life problems.

PO2: Solve problems in Big Data Concepts by Evaluating current real-world scenarios and use appropriate techniques.

PO3: Employ techniques, skills, and modern hardware and software tools necessary for Information technology.

PO4: Explain effectively in a variety of concepts pertaining to Information Technology and Big Data.

PO5: Produce results to assigned problems in a given situation by Collaborating with team members of the team at various levels

PROGRAMME SPECIFIC OUTCOMES

PSO 1: Employ appropriate concepts in the areas like Web services, Data Analytics, Cloud Computing, Design and Analysis of Algorithms and User Interface Design and core computing subjects and apply them in real world scenarios.

PSO 2: Implement the knowledge and skills gained and meet the current demand of IT Industry and be successful personnel.

B.Sc. (Information Technology)
COURSE STRUCTURE 2020 -23Batch

Sem.	Part	Course Component	Subject Name	Subject Code	Credits	Hours	Internal	External	Total
I	I	**Language**	Language – I	19UTAM121	3	6	50	50	100
	II	**English**	English- I	19UENG241	3	4	50	50	100
	III	**Core I**	Problem solving using C program	20UBIT301	4	6	50	50	100
		Core II	Problem solving using C lab	20UBIT302P	4	4	50	50	100
		Allied I	Allied Mathematics	20UMAT333	5	6	50	50	100
	IV	**1. NME/ Basic/ Advance Tamil**	Practical - Multimedia Lab	20UNME401B	2	2	50	50	100
		2. Soft Skill I	Introduction to Study Skills	19UGSL401	3	2	50	50	100
				CREDIT TOTAL = 24					
II	I	**Language**	Language – II	19UTAM122	3	6	50	50	100
	II	**English**	English- II	19UENG222	3	4	50	50	100
	III	**Core III**	Programming in Java	20UBIT303	4	5	50	50	100
		Core IV	Practical - Programming in Java Lab	20UBIT304P	4	5	50	50	100
		Allied II	Operation Research	19UMAT338	5	6	50	50	100
	IV	**1. NME/ Basic /Advance Tamil**	Practical - E-Commerce Lab	20UNME402M	2	2	50	50	100
		2. Soft Skill II	Life Skills	19UGSL402	3	2	50	50	100
				CREDIT TOTAL = 24					
III	III	**Core V**	Design and Analysis of Algorithm	19UBIT305	4	5	50	50	100
		Core VI	Data Analysis using Spread Sheet	20UBIT306	4	6	50	50	100
		Core VII	Practical - Data Analysis using Spread Sheet Lab	20UBIT307P	4	5	50	50	100
		Core VIII	Operating Systems	19UBIT308	4	6	50	50	100
		Allied III	Statistics - I	19UMAT341	5	6	50	50	100
	IV	**Soft Skill III**	Job-Oriented Skills	19UGSL403	3	2		100	100
				CREDIT TOTAL = 24					

Sem.	Part	Course	Title	Subject Code	Credits	Hours	Internal	External	Total
IV	III	**Core IX**	Web Technology	20UBIT309	4	6	50	50	100
		Core X	Relational Data Base Management Systems	20UBIT310	4	6	50	50	100
		Core XI	Practical - Web Application Lab	20UBIT311P	4	7	50	50	100
		Allied IV	Statistics - II	19UMAT346	5	6	50	50	100
	IV	**Soft Skill IV**	Digital Marketing Lab	20UGSL408	3	3		100	100
		EVS	Environmental Studies	19UEVS401	2	2		100	100
								CREDIT TOTAL = 22	
V	III	**Core XII**	Big Data Analytics	19UBIT312	4	6	50	50	100
		Core XIII	Python Programming	20UBIT313	4	6	50	50	100
		Core XIV	Practical – Python Lab	20UBIT314P	4	6	50	50	100
		Elective – I	Information Security / Software Project Management /Network Security & Cryptography	19UBIT315	5	6	50	50	100
		Elective – II	Inter Disciplinary Elective - Web Designing	19UIDE322	5	5	50	50	100
	IV	**Value Education**	Value Education	19UVED401	2	1		100	100
		Internship	Internship		2				
								CREDIT TOTAL = 26	
VI	III	**Core XV**	Mini project	19UBIT316	4	6	50	50	100
		Core XVI	Software Engineering	20UBIT317	4	6	50	50	100
		Core XVII	R Programming	20UBIT318	4	6	50	50	100
		Core XVIII	Practical –R Programming Lab	20UBIT319P	4	6	50	50	100
		Elective - III	Cloud Computing / Mobile Computing / Parallel Computing	19UBIT320	5	6	50	50	100
	V	**Extension Activity**		19UEXT501	1		-	-	-
								CREDIT TOTAL = 22	
							OVERALL CREDIT TOTAL = 142		

SEMESTER - I

CORE - I

PROBLEM SOLVING USING C PROGRAMMING

SUBJECT CODE :20UBIT301	THEORY	MARKS 100
SEMESTER: I	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:
- To develop the ability to analyze a problem and develop an algorithm to solve it using C Programming

UNIT I: (18 Hours)
Planning the Computer Program: 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 - commaoperator.

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 & Priti Sinha, "Computer Fundamentals", BPB Publications, 6th Edition.
2. Dr. Anita Goel, Computer Fundamentals, Pearson Education, 2010.
3. E. Balaguruswamy, 2016, 7th Edition, Programming in ANSI C, TMH Publishing CompanyLtd.
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, 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:

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

Question paper pattern:

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

PRACTICAL – PROBLEM SOLVING USING C LAB

SUBJECT CODE :20UBIT302P	PRACTICAL	MARKS 100
SEMESTER: I	CREDITS: 4	TOTAL HOURS: 60

COURSE OBJECTIVES:

- To Read, understand, develop and trace the execution of programs written in C language.

1. Write a program to add, subtract, multiply and divide two numbers.
2. Write a program to check if a number is even or odd.
3. Write a program to find the largest of three numbers.
4. Write a program to find the maximum and minimum of n numbers.
5. Write a program to check for prime number.
6. Write a program to check for Armstrong number.
7. Write a program to accept day number and print the day of the week.
8. Write a program for counting the number of vowels, consonants, words, white spaces in a line of text.

9. Write a program to arrange a set of numbers in ascending order.
10. Write a program to implement linear search.
11. Write a program to implement binary search.
12. Write a program to add two matrices.

13. Write a program to check whether a string is a palindrome or not.
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

ALLIED MATHEMATICS

SUBJECT CODE: 20UMAT333	THEORY	MARKS 100
SEMESTER: I	CREDITS: 5	TOTAL HOURS: 90

UNIT I: (18 HOURS)

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

UNIT 2:   (18 HOURS)
Theory ofEquations:Polynomial Equations,irrational roots,complex roots, Reciprocal equations-
Approximation of roots of a polynomial equation by Newton's Method.
Chapter 3, Section 3.1 to 3.4.1

UNIT 3:   (18 HOURS)

Algebraic Equations : Gauss elimination method - Inverse of a matrix - Gauss -Jordan
method- Gauss-Seidel method.
Chapter 4-Section 4.3,4.4,4.5,4.8

UNIT 4:   (18 HOURS)

Roots of Equations: Bisection Method – False-Position Method– Newton-Raphson Method.
Chapter 3- Section 3.3, 3.4,3.5

UNIT 5:   (18 HOURS)
Numerical Integration: Trapezoidal Rule - Simpson's 1/3 rule and 3/8 rule , Weddle's rule Romberg's
method.
Chapter 8-Section 8.5
Content and Treatment as in
1. Allied Mathematics-Volume I by P. Duraipandian and S. Udayabaskaran, S. Chand Publications
2. Numerical methods by S.Arumugam, A.Thangapandi Isaac and A.Somasundaram. Scitech
   Publications.

REFERENCE BOOKS :

1. Allied Mathematics,A.Singaravelu.
2. Ancillary Mathematics, A. ManickavasagamPillai and Narayanan.
3. Numerical Methods with Programming in C-T.Veerarajan and T.Ramachandran.

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

Question Paper Pattern:

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

Distribution of Questions:

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

NME – PRACTICAL – MULTIMEDIA LAB

SUBJECT CODE: 20UNME401B	PRACTICAL	MARKS 100
SEMESTER: I	CREDITS: 2	TOTAL HOURS: 30

COURSE OBJECTIVES:

- Learn and Implement the various Images editing features and animation techniques using GIMP Multimedia Tools

GIMP

1. Implementation of different Selection Tool.

2. Applying different View Options.

3. Implementation of Transforming and sizing.

4. Images adding, Deleting and Moving.

5. Layers-Implementation of Paint Tool.

6. Implementation of Transform Tool.

7. Implementation of different Filters.

8. Implementation of different Color Tools

SEMESTER - II

CORE – III

PROGRAMMING IN JAVA

SUBJECT CODE :20UBIT303	THEORY	MARKS 100
SEMESTER: II	CREDITS: 4	TOTAL HOURS: 75

COURSE OBJECTIVES:

- To gain knowledge of the structure and model of the Java programming language.

UNIT I   **(15 Hours)**
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   **(15 Hours)**
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   **(15 Hours)**
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   **(15 Hours)**
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   **(15 Hours)**
Introducing the AWT: Working with Windows, Graphics and Text- AWT Classes-
Working with Frames-Working with Graphics-Working with Color-Working with Fonts-Using AWT Controls, Layout Managers and Menus.

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

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

Question paper pattern:

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

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CORE – IV

PRACTICAL - PROGRAMMING IN JAVA LAB

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SUBJECT CODE :20UBIT304P	PRACTICAL	MARKS 100
SEMESTER: II	CREDITS: 4	TOTAL HOURS: 75

COURSE OBJECTIVES:
- To Implement Object Oriented programming concept and to build Java Application.

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 -OPERATIONS RESEARCH

SUBJECT CODE: 19UMAT338	THEORY	MARKS 100
SEMESTER: II	CREDITS: 5	TOTAL HOURS: 90

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, New York.
4. Introduction to Operations Research, P.R.Vittal
5. Gupta P.K. and HiraD.S. Problems in Operations Research, S.Chand& Co.

Question Paper Pattern:

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

Distribution of Questions:

Sections	Units	No. of Questions Theory	No. of Questions 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

NME – PRACTICAL – E-COMMERCE LAB

SUBJECT CODE: 20UNME402M	PRACTICAL	MARKS 100
SEMESTER: II	CREDITS: 2	TOTAL HOURS: 30

COURSE OBJECTIVES:

- To learn basic concepts of HTML, CSS and JavaScript and build an E Commerce Website

1. Implements basic HTML tags

2. Implementation of Table tag

3. Implementation of FRAMES

4. Design a FORM in HTML(Yahoo registration form)

5. Validation of FORM using Java Script.

6. Implementation of CSS(All 4 Types)

7. Develop a clock using Java Script

8. DHTML(Layer/DIV)

9. PROJECT- Develop a E-Commerce Web Site

SEMESTER - III

CORE - V

DESIGN AND ANALYSIS OF ALGORITHM

SUBJECT CODE: 19UBIT305	THEORY	MARKS 100
SEMESTER: III	CREDITS: 4	TOTAL HOURS: 75

COURSE OBJECTIVES:
- To learn and analyze the different Algorithm design techniques for problem solving.

Unit 1:   **(15 Hours)**
Introduction - Definition of Algorithm – pseudo code conventions – recursive algorithms – time and space complexity –big-"oh" notation – practical complexities.

Unit 2:-   **(15 Hours)**
Divide and Conquer: General Method - Finding maximum and minimum – merge sort -Quicksort, Stassen's matrix multiplication

Unit 3:   **(15 Hours)**
Greedy Method: General Method –knapsack problem - Tree vertex splitting - Job sequencing with dead lines – optimal storage on tapes.

Unit 4:   **(15 Hours)**
Dynamic Programming: General Method - multistage graphs – all pairs shortest paths – single source shortest paths - String Editing – 0/1 knapsack.

Unit 5:   **(15 Hours)**
Search techniques for graphs –DFS-BFS-connected components – biconnected components Back Tracking: General Method -Sum of subsets Branch and Bound: General Method - Traveling Salesperson problem.

Recommended Texts

1. Horowitz and Sahani, Fundamentals of Computer Algorithms, 2ND Edition, 2012

2. .S.K.Basu, "Design Methods and Analysis of Algorithms", Fourth edition, 2010

Reference Books

1. Alfred.V.Aho , Data Structures and Algorithms Pearson

2. Robert Sedgewick and Kevin Wayne, "Algorithms", Fourth Edition, Pearson Education, 2012

Question paper pattern:

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

DATA ANALYSIS USING SPREAD SHEET

SUBJECT CODE: 20UBIT306	THEORY	MARKS 100
SEMESTER: III	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:

- Learn Advance Excel Function and to Analyze and Protect the data using Data Validation Techniques.

Unit 1:   **(18 Hours)**
Cell Editing, Usage of Formulae and Built-in Functions, File Manipulations,
Data Sorting (both number and alphabets), Worksheet Preparation, Drawing Graphs, Usage
of Auto Formatting. Inserting Clip arts and Pictures, Frame movements of the above, Insertion
of new slides

Unit 2:   **(18 Hours)**
Uses of Advance Excel Formulas -VLOOKUP, HLOOKUP, SUMIF, SUMIFS, SUMPRODUCT,
DSUM, COUNTIF, COUNTIFS, IF, IFERROR, ISERROR, ISNA, ISNUMBER, ISNONTEXT, OR,
AND, SEARCH, INDEX, MATCH etc

Unit 3:   **(18 Hours)**
What-IF Analysis, Sorting, Data Forms, Adding Data Using the Data Form, Finding Records
Using Criteria: Filtering Data, AutoFilter, Pivot tables ,Totals and Subtotals Total, Row,
Various Methods of Filter Creating and Updating Subtotals .

Unit 4:   **(18 Hours)**
Introduction to VBA, Variables in VBA- Variable Data Types- Message Box and Input box functions –
Conditional Statements, Looping in VBA.

Unit 5:   **(18 Hours)**
Macro and VBA,Creating a Macro Using VBA Editor, Running Macros, Editing a Macro,
Debugging Macro Code, Recording a Macro, Storing a Macro, Saving a Macro Enabled File, Protect
Macro.

Recommended Texts

1. Jordan Goldmeler, "Advanced Excel Essentials" ,APress, 2015 edition.

Reference Books

1. John Walkenbach , "Microsoft Excel 2013 Bible" ,Wiley Publications ,2013

Question paper pattern:

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

Distribution of Questions:

Sections	Units	No. of Questions Theory	No. of Questions 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	

PRACTICAL - DATA ANALYSIS USING SPREAD SHEET LAB

SUBJECT CODE: 20UBIT307P	PRACTICAL	MARKS 100
SEMESTER: III	CREDITS: 4	TOTAL HOURS: 75

COURSE OBJECTIVES:

- Understand Excel Advanced Functions and Implement VBA Macros

1. Excel Basic Functions

2. Formatting and Proofing

3. Mathematical Functions

4. Text Functions

5. Data and Time Functions

6. Sorting

7. Filtering

8. Logical Functions

9. Data Validation

10. Pivot tables

11. Charts and Slicers

12. VBA Macros

CORE - VIII

OPERATING SYSTEMS

SUBJECT CODE: 19UBIT308	THEORY	MARKS 100
SEMESTER: III	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:

- To Understand and Evaluate the requirement for process synchronization and coordination handled by operating system.

Unit 1: (18 Hours)

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

Unit 2: (18 Hours)

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

Unit 3: (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

Unit 4: (18 Hours)

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

Unit 5: (18 Hours)

I/O Systems: Overview - I/O Hardware – Application I/O Interface – Kernel I/O subsystem – Transforming I/O Requests to Hardware Operations – Performance.

Recommended Texts

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts",
2. 9 th Edition, John Wiley and Sons Inc., 2012

Reference Books

1. H.M. Deitel ,, An Introduction to Operating System,- Second Edition, Addison Wesley.
2. Andrew S.Tanenbaum, Modern Operating Systems, Pearson Education, II Ed.

Question paper pattern:

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

Distribution of Questions:

Sections	Units	No. of Questions Theory	No. of Questions Problems
		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	

ALLIED- III

ALLIED STATISTICS – I

SUBJECT CODE: 19UMAT341	THEORY	MARKS 100
SEMESTER: III	CREDITS: 5	TOTAL HOURS: 90

Unit -I: **(18 hours)**

Collection of data and sampling – Primary and secondary data – limitations.
Chapter - 3 (Page Nos: 40-47, 57-60)
Chapter - 4 (Page Nos: 64-74)

Unit- II: **(18 hours)**

Classification and tabulation of data – Diagrammatic and graphical representation of data.
Chapter - 5 (Page Nos: 92-106, 109-113)
Chapter - 6 (Page Nos: 130-145, 165-175)

Unit -III: **(18 hours)**

Measures of Central value – Mean, median, mode, geometric and harmonic mean – properties,
merits and demerits – Measures of Dispersion – Range, Mean deviation, Quartile Deviation and
Standard Deviation.
Chapter - 7 (Page Nos: 180-226)
Chapter - 8 (Page Nos: 271-292)

Unit -IV: **(18 hours)**

Correlation – Types – Scatter diagram method – Karl Pearson's coefficient of correlation
– Rank Correlation – Regression for two lines.
Chapter - 10 (Page Nos: 383-394, 406-414)
Chapter – 11 (Page Nos: 441-451)

Unit -V: **(18 hours)**

Index Numbers – Simple Aggregative Method – Simple average of price relatives method –
Weighted Aggregative method –Laspayre's, Paasche's, Bowley's, Fisher's and Marshall-
Edgeworth method – Test of Adequacy – Time Reversal Test – Factor Reversal Test –
Chain Index Numbers – Conversion of Chain index to Fixed Index.
Chapter - 13 (Page Nos: 523-548)

Content and treatment as in
Business Statistics – S.P.Gupta and M.P.Gupta,Sultan Chand &Sons,Sixteenth Edition

Reference Books
1. Fundamental of Mathematical Statistics - S.C. Gupta & V.K. Kapoor - Sultan Chand
2. Statistical methods by S.P. Gupta, thirty eighth edition(2009)-Sultan Chand

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

Question Paper Pattern:

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

Distribution of Questions:

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

SOFT SKILL III

PERSONALITY ENRICHMENT

SUBJECT CODE:19UGSL403	THEORY	MARKS 100
SEMESTER: III	CREDITS: 3	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//

SEMESTER - IV

CORE – IX

WEB TECHNOLOGY

SUBJECT CODE: 20UBIT309	THEORY	MARKS 100
SEMESTER: IV	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:

- Develop a dynamic web page using client side and server-side scripting languages and understand concept of Web Security.

UNIT I **(18 Hours)**

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 **(18 Hours)**

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 **(18 Hours)**

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 **(18 Hours)**

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 **(18 Hours)**

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

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

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

Question paper pattern:

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

RELATIONAL DATABASE MANAGEMENT SYSTEMS

SUBJECT CODE: 20UBIT310	THEORY	MARKS 100
SEMESTER: IV	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:

- Analyze the existing design of a database schema and Create database for real-life application, with constraints and keys, using SQL and PL/SQL

UNIT – I   **(18 Hours)**
Introduction to DBMS– Data and Information- Database – Database Management System – Objectives - Advantages – Components - Architecture. ER Model: Building blocks of ER Diagram – Relationship Degree – Classification – ER diagram to Tables – ISA relationship – Constraints – Aggregation and Composition – Advantages.

UNIT – II   **(18 Hours)**
Relational Model: CODD's Rule- Relational Data Model - Key - Integrity – Relational Algebra Operations – Advantages and limitations – Relational Calculus – Domain Relational Calculus - QBE.

UNIT – III   **(18 Hours)**
Structure of Relational Database. Introduction to Relational Database Design - Objectives – Tools – Redundancy and Data Anomaly – Functional Dependency - Normalization – 1NF – 2NF – 3NF – BCNF. Transaction Processing – Database Security.

UNIT – IV   **(18 Hours)**
SQL: Commands – Data types – DDL - Selection, Projection, Join and Set Operations – Aggregate Functions – DML – Modification - Truncation - Constraints – Subquery.

UNIT – V   **(18 Hours)**
PL/SQL: Structure - Elements – Operators Precedence – Control Structure – Iterative Control - Cursors - Procedure - Function - Packages – Exceptional Handling - Triggers.

TEXT BOOK:
1. S. Sumathi, S. Esakkirajan, "Fundamentals of Relational Database Management Systems ", Springer International Edition, 2007.

REFERENCE BOOKS:
1. Abraham Silberchatz, Henry F. Korth, S. Sudarshan, "Database System Concepts", 7th McGrawHill, 2019.
2. Alexis Leon & Mathews Leon, "Fundamentals of DBMS", 2nd Edition, Vijay Nicole Publications, 2014.

WEB REFERENCES:
- NPTEL & MOOC courses titled Relational Database Management Systems
- https://nptel.ac.in/courses/106106093/
- https://nptel.ac.in/courses/106106095/

Question paper pattern:

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

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CORE – XI

PRACTICAL – WEB APPLICATION LAB

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SUBJECT CODE: 20UBIT311P	PRACTICAL	MARKS 100
SEMESTER: IV	CREDITS: 4	TOTAL HOURS: 75

COURSE OBJECTIVES:

- Understand Internet Technology to develop dynamic webpages using web technology.

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 themiscellaneous
      (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, onDblclick 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.
6. Design an ASP application that describes books in the Online Bookshop. (Use AD Rotator Component, Content Rotator Component, Content Linking Component)
7. 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).
8. Create a document, which opens a new window without a toolbar, address bar, or a status bar that unloads itself after one minute.
9. 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.

ALLIED – IV

ALLIED STATISTICS – II

SUBJECT CODE: 19UMAT346	THEORY	MARKS 100
SEMESTER: IV	CREDITS: 5	TOTAL HOURS: 90

Unit - I: **(18 hours)**

Time Series – Components of Time series – Measurement of trend – Seasonal variations.
Chapter - 14 (Page Nos: 592-618, 628-641)

Unit -II: **(18 hours)**

Probability and expected value – Axiomatic approach to probability – Calculation of Probability
 – Theorems of probability – Conditional probability – Baye's theorem – Expectation.
Volume II Chapter – 1 (Page Nos: 753, 758-799)

Unit -III: **(18 hours)**

Theoretical distributions – Binomial, Poisson and Normal Distributions.
Volume II Chapter – 2 (Page Nos: 806-857)

Unit -IV: **(18 hours)**

Tests of hypothesis – Tests of Significance for small samples.
Volume II Chapter – 3 (Page Nos: 882-888, 910-926)
Volume II Chapter – 4 (Page Nos: 954-1000)

Unit -V: **(18 hours)**

F – test and Analysis of Variance.

Volume II Chapter – 3 (Page Nos: 1006-1038)

Content and treatment as in
Business Statistics – S.P.Gupta and M.P.Gupta,Sultan Chand &Sons, Sixteenth Edition

Reference Books

1. Fundamental of Mathematical Statistics - S.C. Gupta & V.K. Kapoor - Sultan Chand
2. Statistical methods by S.P. Gupta, thirty eighth edition(2009)-Sultan Chand

WEBSITES:

1. www.e-booksdirectory.com
2.www.bookboon.com/en/statistics-and mathematics-ebooks
3.www.freebookcentre.net

Question Paper Pattern:

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

Distribution of Questions:

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

SOFT SKILL - IV

PRACTICAL - Digital Marketing Lab

SUBJECT CODE: 20UGSL408	PRACTICAL	MARKS 100
SEMESTER: IV	CREDITS: 3	TOTAL HOURS: 45

COURSE OBJECTIVES:
- To Create and manage functional multi-page website using Word Press on a remote server

1. Word press Dashboard

2. Creating WordPress Site

3. Creating WordPress Themes

4. Wordpress Post

5. Wordpress Pages

6. Media Settings

7. Design and build Digital Marketing WordPress theme.

8. Organizing word press Content

9. Wordpress text Formatting

10. Creating Menus in WordPress.

11. Create pages using Digital Marketing Plugins.

EVS

ENVIRONMENTAL STUDIES

SUBJECT CODE:19UEVS401	THEORY	MARKS 100
SEMESTER: IV	CREDITS: 2	TOTAL HOURS: 30

COURSE OBJECTIVES:

- To explore, understand, appreciate and value their environment and solve environmental problems.

Unit-1: **(6 Hours)**
Multidisciplinary nature of environmental studies Definition, scope and importance.

Unit-2: **(6 Hours)**
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-3: **(6 Hours)**
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-4: **(6 Hours)**
 Biodiversity and its conservation
• Introduction – Definition : genetic, species and ecosystem diversity. – Bio geographical 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-sports 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-5 **:**   **(6 Hours)**
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 urbanand
industrial wastes.
• Role of an individual in prevention of pollution.
• Pollution case studies.
• Disaster management : floods, earthquake, cyclone and landslides.

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

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

SEMESTER - V

CORE –XII

BIG DATA ANALYTICS

SUBJECT CODE: 19UBIT312	THEORY	MARKS:100
SEMESTER: V	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:
- Understand the key issues in big data management and its associated applications in intelligent business and scientific computing.

Unit-1 :   **(18 Hours)**
Basicnomenclature-Analyticsprocessmodel–Analyticsmodelrequirements – Job Profiles in Analytics – Types of Data Sources- Sampling – Sampling - Types of Data Elements

Unit-2:   **(18 Hours)**
Missing Values–Outlier Detection and Treatments– Weight of Evidence Coding. Predictive Analytics basics – Linear Regression-Logistic Regression - Decision Trees

Unit-3 :   **(18 Hours)**
Descriptive Analytics: Association Rules- Support and Confidence- Applications of Association Rule – Sequence Rules – Segmentation.

Unit-4 :   **(18 Hours)**
Hierarchical clustering -Social Network Analytics: Social Network Definitions – Social Network Metrics - Social Network Learning -Relational Neighbor Classifier

Unit-5 :   **(18 Hours)**
Data Quality - Software–Privacy - Model Design and Documentation - Corporate Governance. Example applications: Credit Risk Modeling

Recommended Text:

1. Baesens,2014,Analyticsina Big Data World :The Essential Guide to Data Science
2. and Its applications, Wiley India PrivateLimited.

Reference Books

1. Anand Rajaraman and Jeffrey David Ullman, "Mining of MassiveDatasets", Cambridge University Press, 2012.

2. Kim H. Pries and Robert Dunnigan, "Big Data Analytics: A Practical Guidefor Managers " CRC Press, 2015.

Question paper pattern:

Section	Question Component	Numbers	Marks	Total
Section A	**Definition / Principles** Answer any 10 out of 12 questions	1 – 12	3	**30**
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Section C	**Essay** Answer any 4 out of 6 questions	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 – XIII

PYTHON PROGRAMMING

SUBJECT CODE: 20UBIT313	THEORY	MARKS 100
SEMESTER: V	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:

- To explore the mechanism of python programming using modules and package.

UNIT I **(18 Hours)**

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 **(18 Hours)**

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 Hours)**

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 Hours)**

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 **(18 Hours)**

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

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

2. Reference

  i. Prentice Hall of India, 2014.
  ii. MarkLutz,―LearningPython:PowerfulObject-OrientedProgramming‖,FifthEdition, O'Reilly, Shroff Publishers and Distributors, 2013.

Question paper pattern:

Section	Question Component	Numbers	Marks	Total
Section A	**Definition / Principles** Answer any 10 out of 12 questions	1 – 12	3	**30**
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Section C	**Essay** Answer any 4 out of 6 questions	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	

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CORE – XIV

PRACTICAL – PYTHON LAB

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SUBJECT CODE: 20UBIT314P	PRACTICAL	MARKS 100
SEMESTER: V	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:

- To learn how to design and program complex and numeric Python applications.

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.

ELECTIVE I
INFORMATION SECURITY

SUBJECT CODE: 19UBIT315	THEORY	MARKS 100
SEMESTER: V	CREDITS: 5	TOTAL HOURS: 90

COURSE OBJECTIVES:

- To Learn Database and Network Threats and how to Implement Reliable Network Security

Unit-1: (18 Hours)

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-2: (18 Hours)

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-3 : (18 Hours)

Database Security: Security Requirements-Reliability and integrity-Sensitive data-Interface-Multilevel Database-Proposals for multilevel security.

Unit-4: (18 Hours)

Security in Networks: Threats in networks –Network security control-Firewalls-Intrusion detection systems-Secure e-mail-Networks and cryptography-Example protocols: PEM-SSL-IPSec.

Unit-5 : (18 Hours)

Administrating Security: Security planning- Risk Analysis-Organizational security policies-Physical security-Legal-Privacy-and 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.

Recommended Texts:

1. C.P.Pfleeger,and S.L.Pfleeger, Security in Computing, PearsonEducation,4thEdition, 2003

2. Matt Bishop, Computer Security: Art and Science, Pearson Education,2003.

Reference Books:

1. Stallings, Cryptography/w Security: Principlesandpractice, 4thEdition,2006.

2. Kaufman, Perlman, Spincer, Network Security, Prentice Hall, 2nd Edition, 2003

3. Eric Maiwald, Network Security: A BeginnersGuide,TMH, 1999

4. MacroPistoia,Java Network Security, Pearson Education, 2ndEdition,1999

5. Whitman, Mattord,Principles of Information Security, Thomson, 2ndEdition, 2005

Question paper pattern:

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

ELECTIVE - I

SOFTWARE PROJECT MANAGEMENT

SUBJECT CODE: 19UBIT315	THEORY	MARKS 100
SEMESTER: V	CREDITS: 5	TOTAL HOURS: 90

COURSE OBJECTIVES:

- Understand suitable project organization structure, leadership, decision and motivation styles, proper safety and ethical practices and be responsible to the society.

UNIT I: **(18 Hours)**

Introduction to Software Project Management- Software project versus other types of project-problems- management control- Stakeholders- Requirement Specification – Information and control in organizations Introduction to step wise project planning- Select-identify scope and objectives identify project infrastructure- Analyse project characteristics- products and activities- Estimate effort for each activity- Identify activity risks- Allocate resources- Review/ publicize plan- Execute plan and lower levels of planning. Project evaluation- Introduction – Strategic assessment-technical assessment - cost benefit analysis- cash flow forecasting- cost- benefit evaluation techniques- risk evaluation

UNIT II: **(18 Hours)**

Selection of an appropriate project approach- choosing technologies-technical plan contents list- choice of process models- structured methods-rapid application development- waterfall model-process model-spiral model - software prototyping- ways of categorizing prototypes- incremental delivery- selecting process model.

UNIT III: **(18 Hours)**

Software effort estimation- introduction where- problems with over and under estimates-basis for software estimating software effort estimation technique- expert judgement- Albercht function point analysis- COCOMO -Activity Planning- Objectives- Project schedules projects and activities- sequencing and scheduling activities

UNIT IV: **(18 Hours)**

Network planning models- formulating a network model- using dummy activities-representing lagged activities- adding time dimension- forward pass- backward pass - identifying the critical path- Activity float- shortening project duration – identifying critical activities-precedence networks.

UNIT V: **(18 Hours)**

Risk Management- nature of risk- managing- identification-analysis reducing risks.

Prescribed Text:

1. Software Project Management – ByBob Huges, Mike Cottrell – 5th Edition-2011-TMH

Reference Books:

1. Neil Whitten - Managing software development projects for success, John Wiley and sons
2. Roger S Pressman - Software engineering - McGrawHill
3. Watts Humphrey - Managing Software Process, Addison Wesley

Question paper pattern:

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Section C	**Essay** Answer any 4 out of 6 questions	20– 25	10	**40**
TOTAL MARKS				**100**

Distribution of Questions:

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

NETWORK SECURITY & CRYPTOGRAPHY

SUBJECT CODE: 19UBIT315	THEORY	MARKS 100
SEMESTER: V	CREDITS: 5	TOTAL HOURS: 90

COURSE OBJECTIVES:

- Understand suitable project organization structure, leadership, decision and motivation styles, proper safety and ethical practices and be responsible to the society.

Unit 1: INTRODUCTION   (18 Hours)

Types of Physical Medium-Topologies-Wireless Networking: Wireless Protocols. Data Link Layer: Layered Data Link Protocols-SLIP and PPP-MAC and ARP. Network Layer: Routing Risks-Addressing - Fragmentation-Security.

Unit 2: INTERNET PROTOCOL   (18 Hours)

IP Addressing – ICMP - Security options. Transport Layer: Common Protocols- Transport Layer Functions-Gateways. TCP: Connection Oriented Protocols-TCP Connections-UDP. Session Layer: Session State Machine-Session and Stacks. SSL: SSL Functionality-Certificates. SSH: SSH and Security-SSH Protocols. STMP: Email Goals-Common servers. HTTP: HTTP Goals-URL.

Unit 3: CRYPTOGRAPHY   (18 Hours)

Importance - Threat Models - Concepts-Common Mitigation Methods. Network theory: Standards Bodies-Network Stacks-Multiple Stacks-Layers and Protocols-Common Tools. Cryptography: Securing Information-Necessary Elements-Authentication and Keys-cryptography and Randomness-Hashes-Ciphers-Encryption-Steganography.

Unit 4: TECHNIQUES   (18 Hours)

Data Encryption Techniques-Data Encryption Standards-Symmetric ciphers. Public key Cryptosystems-Key Management.

Unit 5: SECURITY   (18 Hours)

Authentication - Digital Signatures - E-Mail Security - Web Security – Intrusion - Firewall.

Recommended Texts

1. Neal Krawetz, Introduction Network Security, India Edition, Thomson Delmar Learning. 2007
2. V.K.Pachghare, Cryptography and Information Security, PHI Learning Private Limited 2009.

Reference Books :

1. William Stallings, Cryptography and Network Security, Prentice –Hall of India, 2008

Question paper pattern:

Section	Question Component	Numbers	Marks	Total
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Section C	**Essay** Answer any 4 out of 6 questions	20– 25	10	**40**
TOTAL MARKS				**100**

Distribution of Questions:

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	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	

INTER DISCLIPINARY ELECTIVE

WEB DESIGNING

SUBJECT CODE: 19UIDE322	THEORY	MARKS 100
SEMESTER: V	CREDITS: 5	TOTAL HOURS: 75

COURSE OBJECTIVES:

- Understand basic concepts in HTML, distinguish, and practice markup languages.

UNIT I (**15 Hours**)
BASIC INTERNET CONCEPTS: What is Internet – History – Host Machines and Host Names-
Client / Server Model – Domain Names – Protocols- IP Address.

UNIT II: (**15 Hours**)
ADVANCED INTERNET CONCEPTS: Anatomy of an Email Message – Viewing - Sending –
Replying - Search Engines – Meta Search Engine

UNIT III: (**15 Hours**)
HTML INTRODUCTION: History of HTML – HTML Document – Anchor Tags – Hyper Links-
Sample HTML Documents.

UNIT IV: (**15 Hours**)
HEAD AND BODY SECTIONS: Header Section – Title – Prologue – Links – Comment – Heading –
Horizontal Rule – Paragraph – Images and Pictures - Ordered and Unordered List.

UNIT V: (**15 Hours**)
TABLES: Table Creation – Cols pan, Row Span – Cell Spacing, Cell Padding – Nested Tables.
FRAMES: Frameset Definition – Frame Definition – Nested Frames. FORMS: Action Attribute –
Method Attribute – Drop Down List – Sample Forms.

TEXT BOOKS :

1. Wendy G. Lehnert, "Internet 101 - A Beginners Guide to Internet and the World Wide Web",
   Addison Wesley. UNITS I & II .

2. Xavier.C, World , "Wide Web design with HTML", Tata McGraw Hill Publishing Limited,
   New Delhi. UNITS III, IV & V

Question paper pattern:

Section	Question Component	Numbers	Marks	Total
Section A	**Definition / Principles** Answer any 10 out of 12 questions	1 – 12	3	**30**
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Section C	**Essay** Answer any 4 out of 6 questions	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	
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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	

VALUE EDUCATION

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

COURSE OBJECTIVES:

- To teach the philosophy of Life, personal value, social value, mind cultural value and personal health - To teach professional ethical values, codes of ethics, responsibilities, safety, rights and related global issues.

Unit 1: Education and Values   (3 Hours)

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   (3 Hours)

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   (3 Hours)

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   (3 Hours)

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:   **(3 Hours)**

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)*, FreePress, 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

SEMESTER - VI

CORE – XV

MINI PROJECT

SUBJECT CODE: 19UBIT316	PRACTICAL	MARKS 100
SEMESTER: VI	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:

- To Enable Students with knowledge to develop a Project within the chosen area of technology

   A mini-project should be done by the students based on concepts they have already learnt in the first two years of the programme. It may be based on database concepts, object oriented concepts, image processing, data Science, optimization tools, Big Data, etc.

   Objectives of the mini project : Working on Mini project is to get used to the larger project, which will be handled in Industry. The project work constitutes an important component of the B.Sc(IT) programme and it is to be carried out with due care and should be executed with seriousness by the students. The objective of this mini project is to help the student develop the ability to apply theoretical and practical tools/ techniques to solve real life problems related to industry, academic institutions and research laboratories.

   Guidelines: A student is expected to devote about 3 months in planning, analyzing, designing and implementing the project. The initiation of project should be with the project proposal that is to be treated as an assignment:

   Mini-project evaluation: The evaluation of the mini-project will be based on the project reports submitted by the student, a presentation and a demonstration.

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CORE –XVI

SOFTWARE ENGINEERING

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SUBJECT CODE: 20UBIT317	THEORY	MARKS 100
SEMESTER: VI	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:

- Understand and demonstrate basic knowledge in software engineering.
- Identify risks; manage the change to assure quality in software projects.

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 – 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, 5th Edition - Tata McGraw-Hill book Company.

REFERENCE BOOKS:
1. Richard E.Fairley,Software Engineering Concepts,McGraw-Hill,1985
   2. Ian Sommerville,Software Engineering-9th Edition,Darling Kindersley,2011

3. Roger S.Pressman,Software Engineering A Practitioner's Approach-6th Edition, McGraw-Hill,2005
4. R.S.Pressman, 1997, Software Engineering – 1997 - Fourth Ed., McGraw Hill.

5. RajibMall ,2004,Fundamentals of Software Engineering,2nd Edition, PHI.

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

Question paper pattern:

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Section A	**Definition / Principles** Answer any 10 out of 12 questions	1 – 12	3	**30**
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Section C	**Essay** Answer any 4 out of 6 questions	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 – XVII

R PROGRAMMING

SUBJECT CODE: 20UBIT318	THEORY	MARKS 100
SEMESTER: VI	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:

- Understand R Programming Environment and to explore Mathematical and Statistical Functions.

UNIT-I   **(18 Hours)**

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.

UNIT-II   **(18 Hours)**

R Programming Structures - Control Statements – Loops – Looping Over Non-vector Sets – 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.

UNIT-III   **(18 Hours)**

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.

UNIT-IV   **(18 Hours)**

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

UNIT-V   **(18 Hours)**

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

1. Recommended Texts

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

2. Reference Books

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

Question paper pattern:

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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 - XVIII

PRACTICAL – R-PROGRAMMING LAB

SUBJECT CODE: 20UBIT319P	PRACTICAL	MARKS 100
SEMESTER: VI	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:

- Understand and apply the basics in R Programming from Statistical Perspective

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.

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Elective – III

CLOUD COMPUTING

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SUBJECT CODE: 19UBIT320	THEORY	MARKS 100
SEMESTER: VI	CREDITS: 5	TOTAL HOURS: 90

COURSE OBJECTIVES:

- To enable students to understand the Cloud Computing concepts and services.

Unit-1:   **(18 Hours)**

   Understanding Cloud Computing: Cloud Computing –History of Cloud Computing – Cloud Architecture –Cloud Storage –Why Cloud Computing Matters –Advantages of Cloud Computing – Disadvantages of Cloud Computing –Companies in the Cloud Today – Cloud Services.

Unit-2:   **(18 Hours)**

   Developing Cloud Services: Web-Based Application –Pros and Cons of Cloud Service Development –Types of Cloud Service Development –Software as a Service –Platform as a Service-Infrastructure as a service –Web Services –On-Demand Computing –Discovering Cloud Services Development Services
 and Tools –Amazon Ec2 –Google App Engine –IBM Clouds.

Unit-3:   **(18 Hours)**

   Cloud Computing For Everyone: Centralizing Email Communications –Collaborating on Schedules –Collaborating on To-Do Lists –Collaborating Contact Lists –Cloud Computing for the Community–Collaborating on Group Projects and Events –Cloud Computing for the Corporation.

Unit-4:   **(18 Hours)**

   Using Cloud Services: Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications –Exploring Online Planning and Task Management–Collaborating on Event Management –Collaborating on Contact Management –Collaborating on Project Management –Collaborating on Word Processing -Collaborating on Databases –Storing and Sharing Files.

Unit-5:   **(18 Hours)**

   Other Ways To Collaborate Online: Collaborating via Web-Based Communication Tools –Evaluating Web Mail Services –Evaluating Web Conference Tools –Collaborating via Social Networks and Groupware –Collaborating via Blogs and Wikis.

Recommended Texts:

1. MichaelMiller, Cloud Computing: Web-BasedApplicationsThatChange the WayYou Work and Collaborate Online, QuePublishing, August2008.
2. KumarSaurabh, "CloudComputing–Insights into New EraInfrastructure",Wiley IndianEdition, 2011.

3. HaleyBeard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo PtyLimited, July2008.

Question paper pattern:

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TOTAL MARKS				**100**

Distribution of Questions:

Sections	Units	No. of Questions	
		Theory	**Problems**
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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	

Elective – III

MOBILE COMPUTING

SUBJECT CODE: 19UBIT320	THEORY	MARKS 100
SEMESTER: VI	CREDITS: 5	TOTAL HOURS: 90

COURSE OBJECTIVES:

- To Understand Working of Wireless devices and interconnectivity

Unit-1: (18 Hours)
Introduction - Mobile and Wireless Devices – Simplified Reference Model – Need for Mobile Computing –Wireless Transmissions –Multiplexing – Spread Spectrum and Cellular Systems- Medium Access Control – Comparisons.

Unit-2: (18 Hours)
Telecommunication Systems – GSM – Architecture – Sessions – Protocols – Hand Over and Security – UMTS and IMT – 2000 – Satellite Systems.

Unit-3: (18 Hours)
Wireless Lan - IEEE S02.11 – Hiper LAN – Bluetooth – Security and Link Management.

Unit-4: (18 Hours)
Mobile network layer - Mobile IP – Goals – Packet Delivery – Strategies – Registration – Tunneling and Reverse Tunneling – Adhoc Networks – Routing Strategies.

Unit-5: (18 Hours)
Mobile transport layer - Congestion Control – Implication of TCP Improvement – Mobility – Indirect – Snooping – Mobile – Transaction oriented TCP - TCP over wireless – Performance.

Recommended Texts:

1. J.Schiller, 2003, Mobile Communications,2ndedition, Pearson Education,Delhi.

Reference Books:

1. Hansmann, Merk, Nicklous, Stober, 2004, Principles of Mobile Computing, 2nd Edition, Springer (India).
2. Pahlavan, Krishnamurthy, 2003(2002), Principle of wireless Networks: A unified Approach, Pearson Education, Delhi.
3. MartynMallick, 2004, Mobile and Wireless Design Essentials, Wiley Dreamtech India Pvt. Ltd., NewDelhi.
4. W.Stallings, 2004, Wireless Communications and Networks, 2nd Edition, Pearson Education, Delhi.

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TOTAL MARKS				**100**

Distribution of Questions:

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	Unit – 4	2	
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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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Elective – III

PARALLEL COMPUTING

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SUBJECT CODE: 19UBIT320	THEORY	MARKS 100
SEMESTER: VI	CREDITS: 5	TOTAL HOURS: 90

COURSE OBJECTIVES:

- To learn the major concepts and ideas in parallel computing and its applications and to understand various models of parallelism

Unit-1: (18 Hours)
Introduction To Parallel Computing- History of Parallel Computers - Problem Solving in Parallel - Performance Evaluation - Elementary Concepts -The Need of Parallel Computation – Levels of Parallel Processing - Dataflow Computing - Applications of Parallel Processing.

Unit-2: (18 Hours)
Introduction to Classification of Parallel Computers -Types of Classification - Flynn's Classification -Handler's Classification -Structural Classification - Classification Based on Grain Size.

Unit-3: (18 Hours)
Introduction to Interconnection Networks - Network Properties- Design issues of Interconnection Network- Various Interconnection Networks-Concept of Permutation Network -Performance Metrics.

Unit-4: (18 Hours)
Introduction to Parallel Computer Architecture - Pipeline Processing - Vector Processing – Array Processing - Superscalar Processors - VLIW Architecture - Multi-threaded Processors.
Introduction to Operating System For Parallel Computer - Parallel Programming Environment Characteristics- Synchronization Principles- Multitasking Environment.

Unit-5: (18 Hours)
Introduction Performance Evaluations - Metrics for Performance Evaluation - Factors Causing Parallel Overheads- Laws For Measuring Speedup Performance - Tools For Performance Measurement - Performance Analysis- Performance Instrumentations.
Introduction to Recent Trends In Parallel Computing- Recent Parallel Programming Models – Parallel Virtual Machine.

Recommended Texts:

1. Rajaraman V. and Siva Ram Murthy C. *Parallel Computers –Architecture and Programming*, Second Edition, Prentice Hall of India .
2. SelimG.Akl*Parallel Computation, Models and Methods*: Prentice Hall of India.
3. Kai Hwang: *Advanced Computer Architecture*: Parallelism, Scalability, Programmability (2001), Tata McGraw Hill, 2001.

Reference Books:

1. Henessy J. L. and Patterson D. A. *Computer Architecture*: A Qualititative Approach, Morgan Kaufman (1990)
2. Thomas L. Casavant, PavelTvrdik, FrantisckPlasil, *Parallel Computers: Theory and Practice*,

Question paper pattern:

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

SOFT SKILLS -UG

DEPARTMENT OF ENGLISH
UG Part IV SOFT SKILLS
2019 Batch onwards

2020-21

FIRST YEAR

FIRST SEMESTER: Introduction to Study Skills

CREDITS:2   **30 hrs.**

Objectives

- 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

Books for Reference:

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.

5.   Syamala. 2002. Effective English Communication for You. Emerald Publishers, Chennai.

6.   Harishankar, Bharathi. Ed. Essentials of Language and Communication. University of

Madras.

7.   Swan, Michael and Catherine Walter. 1990. The Cambridge English Course-2.

Cambridge University Press.

DEPARTMENT OF ENGLISH
UG Part IV SOFT SKILLS
2019 Batch onwards

2020-21

FIRST YEAR

SECOND SEMESTER: Life Skills

CREDITS:2   **30 hrs.**

Objectives

- 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

Books for Reference:

1. *Pease, Allen. 1998. Body Language: How to read other's thoughts by theirgestures. Sudha Publications. New Delhi.*
2. *Powell. In Company. MacMillan*
3. *http://www.essentiallifeskills.net//*

DEPARTMENT OF ENGLISH
UG Part IV SOFT SKILLS
2019 Batch onwards

2020-21

SECOND YEAR

THIRD SEMESTER: Job-oriented Skills

CREDITS:2   **30 hrs.**

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

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)