P.G. AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE
B.C.A. (2021 - 2022Onwards)

S. NO	SEM	PAPER	SUB.CODE	SUBJECT	Hrs./ WEEK	CREDIT	EXAM HOURS	MARKS		
								IE	EX	TOT
1	I	LC-I	21ULT1 / 21ULH1	Language Paper - I	6	3	3	25	75	100
2	I	ELC-I	21ULE1	English for Communication - I	6	3	3	25	75	100
3	I	CC-I	21UCA1	Programming in C++	6	5	3	25	75	100
4	I	CP-II	21UCA2P	Programming in C++ - Practical	3	3	3	40	60	100
5	I	AC-I	21UCAA1	Digital Computer Fundamentals	5	5	3	25	75	100
6	I	SBE-I	21USBE1	Soft Skills - Paper - I	2		-	-	-	-
7	I	EVS	21UES	Environmental Studies	2	2	3	25	75	100
					30	**21**				**600**
8	II	LC-II	21ULT2 / 21ULH2	Language Paper - II	6	3	3	25	75	100
9	II	ELC-II	21ULE2	English for Communication - II	6	3	3	25	75	100
10	II	CC-III	21UCA3	Programming in Java	6	5	3	25	75	100
11	II	CP-IV	21UCA4P	Programming in Java - Practical	3	3	3	40	60	100
12	II	AC-II	21UCAA2	Operations Research	5	5	3	25	75	100
13	II	VE	21UVE	Value Education	2	2	3	25	75	100
14	II	SBE-I	21USBE1	Soft Skills - Paper - I	2	4	3	25	75	100
					30	**25**				**700**
15	III	LC-III	21ULT3 / 21ULH3	Language Paper - III	6	3	3	25	75	100
16	III	ELC-III	21ULE3	Poetry, Fiction & English for Competitive Examination	6	3	3	25	75	100
17	III	CC-V	21UCA5	Web Technology	6	5	3	25	75	100
18	III	CP-VI	21UCA6P	Web Technology – Practical	4	3	3	40	60	100
19	III	AC-III	21UCAA3	Financial Accounting	3	-	-	-	-	-
20	III	AP-IV	21UCAA4P	Accounting Packages – Practical	3	-	-	-	-	-
21	III	NME-I	21UELN1	Advanced Skills For Communication in English	2	2	3	25	75	100
					30	**16**				**500**
22	IV	LC-IV	21ULT4 / 21ULH4	Language Paper - IV	6	3	3	25	75	100
23	IV	ELC-IV	21ULE4	Drama& English for Competitive Examination	6	3	3	25	75	100

24	IV	CC-VII	21UCA7	Relational Database Management Systems	5	5	3	25	75	100
25	IV	CP-VIII	21UCA8P	RDBMS - Practical	3	3	3	40	60	100
26	IV	AC-III	21UCAA3	Financial Accounting	3	5	3	25	75	100
27	IV	AP-IV	21UCAA4P	Accounting Packages – Practical	3	5	3	40	60	100
28	IV	SBE-II	21USBE2	Soft Skills - Paper - II	4	4	3	25	75	100
					30	**28**				**700**
29	V	CC-IX	21UCA9	Programming in PHP	6	5	3	25	75	100
30	V	CP-X	21UCA10P	Programming in PHP – Practical	6	5	3	40	60	100
31	V	CC-XI	21UCA11	Data Structures	6	4	3	25	75	100
32	V	EC-I	21UCAE1A	Operating Systems	6	5	3	25	75	100
			21UCAE1B	Data Mining						
			21UCAE1C	Working Principles of Internet						
33	V	NME-II	21UCON2	Investment Basics (From Commerce dept)	2	2	3	25	75	100
34	V	SBE-III	21USBE3	Soft Skills - Paper - III	4	4	3	25	75	100
					30	**25**				**600**
35	VI	CC-XII	21UCA12	Programming in VB.Net	6	5	3	25	75	100
36	VI	CP-XIII	21UCA13P	Programming in VB.Net -Practical	6	5	3	40	60	100
37	VI	CC-XIV	21UCA14	Data Communication and Networks	4	4	3	25	75	100
38	VI	EC-II	21UCAE2A	Software Engineering	6	5	3	25	75	100
			21UCAE2B	Software Project Management						
			21UCAE2C	System Analysis and Design						
39	VI	EC-III	21UCAE3A	E-commerce and Its Applications	6	4	3	25	75	100
			21UCAE3B	Introduction to IOT						
			21UCAE3C	Introduction to System Programming						
40	VI	GS	21UGS	Gender Studies	2	1	3	25	75	100
41	VI			Extension Activity		1				
					30	**24**				**600**
Total					**180**	**140**				**3700**

P.G. AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

VALUE ADDED COURSE (2021 – 2022 Onwards)

Sl. No.	PAPER	SUBJECT CODE	SUBJECT TITLE	Hrs./ WEEK
1	VA-I	21UCAV1	INTRODUCTION TO ERP	30
2	VA-II	21UCAV1	TRENDS IN SOCIAL NETWORKS	30

B.C.A. - Course Structure under CBCS (For the Candidates Admitted from the academic year 2021 - 2022 onwards)				
Core Courses (14)				
Sl. No	Sub. Code	Code	Title of the Paper	Credit
1	21UCA1	CC-I	Programming in C++	5
2	21UCA2P	CP-II	Programming in C++ Practical	3
3	21UCA3	CC-III	Programming in JAVA	5
4	21UCA4P	CP-IV	Programming in JAVA Practical	3
5	21UCA5	CC-V	Web Technology	5
6	21UCA6P	CP-VI	Web Technology Practical	3
7	21UCA7	CC-VII	Relational Database Management Systems	5
8	21UCA8P	CP-VIII	RDBMS Practical	3
9	21UCA9	CC-IX	Programming in PHP	5
10	21UCA10P	CP-X	Programming in PHP Practical	4
11	21UCA11	CC-XI	Data Structures	5
12	21UCA12	CC-XII	Programming in VB.Net	5
13	21UCA13P	CP-XIII	Programming in VB.Net Practical	4
14	21UCA14	CC-XIV	Data Communication and Networks	5
				60
Elective Courses (3)				
1	21UCAE1A	EC-I	Operating Systems (or)	5
	21UCAE1B		Data Mining	
	21UCAE1C		Working Principles of Internet	
2	21UCAE2A	EC-II	Software Engineering (or)	5
	21UCAE2B		Software Project Management	
	21UCAE2C		System Analysis and Design	
3	21UCAE3A	EC-III	E-commerce and Its Applications(or)	4
	21UCAE3B		Introduction to IOT	
	21UCAE3C		Introduction to System Programming	
				14
Skill Based Elective Courses (3)				
1	21USBE1	SBE-I	Soft Skills - Paper – I	4
2	21USBE2	SBE-II	Soft Skills - Paper – II	4
3	21USBE3	SBE-III	Soft Skills - Paper – III	4
				12
Allied Courses (4)				
1	21UCAA1	AC-I	Digital Computer Fundamentals	5
2	21UCAA2	AC-II	Operations Research	5
3	21UCAA3	AC-III	Financial Accounting	5
4	21UCAA4P	AP-IV	Accounting Packages Practical	5
				20
Non-Major Elective Courses (2)				
1	21UELN1	NMEC1	Advanced Skills For Communication In English	2
2	21UCON2	NMEC2	Commerce : Investment Basics	2
				4
1	21UES	EVS	Environmental Studies	2
2	21UVE	VE	Value Education	2
3	21UGS	GS	Gender Studies	1
Total Credits				**115**
Part - V : Extra Curicular Activity				1
Part - I & Part – II				24
Over all Credits				**140**

P.G. AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

B.C.A. (2021 - 2022 Onwards)

S.NO	SEM	PAPER	SUB.CODE	SUBJECT	PAPER		
					NEW	REVISED	RETAINED
1	I	CC-I	21UCA1	Programming in C++			✓
2	I	CP-II	21UCA2P	Programming in C++ Practical			✓
3	I	AC-I	21UCAA1	Digital Computer Fundamentals		✓	
4	II	CC-III	21UCA3	Programming in Java		✓	
5	II	CP-IV	21UCA4P	Programming in Java Practical		✓	
6	II	AC-II	21UCAA2	Operations Research		✓	
7	III	CC-V	21UCA5	Web Technology	✓		▪
8	III	CP-VI	21UCA6P	Web Technology Practical	✓		▪
9	IV	AC-III	21UCAA3	Financial Accounting		✓	
10	IV	AP-IV	21UCAA4P	Accounting Packages lab.		✓	
11	III	NME-I	21UELN1	Advanced Skills For Communication in English	✓		
12	IV	CC-VII	21UCA7	Relational Database Management Systems		✓	
13	IV	CP-VIII	21UCA8P	RDBMS Practical		✓	
14	V	CC-IX	21UCA9	Programming in PHP		✓	
15	V	CP-X	21UCA10P	Programming in PHP Practical			✓
16	V	CC-XI	21UCA11	Data Structures		✓	
17	V	EC-I	21UCAE1A	Operating Systems		✓	
			21UCAE1B	Data Mining	✓		
			21UCAE1C	Working Principles of Internet	✓		
18	V	NME-II	21UCON2	Commerce : Investment Basics	✓		
19	VI	CC-XII	21UCA12	Programming in VB.Net		✓	
20	VI	CP-XIII	21UCA13P	Programming in VB.Net Practical		✓	
21	VI	CC-XIV	21UCA14	Data Communication and Networks		✓	
22	VI	EC-II	21UCAE2A	Software Engineering		✓	
			21UCAE2B	Software Project Management	✓		
			21UCAE2C	System Analysis and Design	✓		
23	VI	EC-III	21UCAE3A	E-commerce and Its Applications		✓	
			21UCAE3B	Introduction to IOT	✓		
			21UCAE3C	Introduction to System Programming	✓		
% of Change					**32**	**52**	**16**

PROGRAMME OUTCOMES (POs):

On successful completion of B.Sc. Computer Science Programme, the students would be able to

PO1: Demonstrate professionally with social, cultural and ethical responsibility as an individual as well as in multifaceted teams with positive attitude

PO2: Adapt to sustain in emerging era and constantly upgrade skills towards independent and lifelong learning.

PO3: Communicate complex concepts with professionalism by adapting appropriate recourses and modern tools.

PO4: Explore technical knowledge in diverse areas of computer applications and experience an environment conducive in cultivating skills for successful career, entrepreneurship and higher studies.

PO5: Professionally design innovative solutions for solving IT business application problems and address research and development issues with a passion for quality, competency and holistic approach.

Course Code	21UCA1	PROGRAMMING IN C++	TOTAL HOURS	CREDITS
			6	5
Core/~~Elective/Supportive~~		Core Course - I	Syllabus Version	2021-2022

Course Objectives:

- To impart basic knowledge of programming skills in C++.
- To Understand the OOPs Concept
- To Visualize the OOPs Concepts using C++

Unit:1

Introduction to C++: Applications of C++ -Structure of C++ Program - Tokens: Keywords – Identifiers – Constants. Data types- Variables -Operators and expressions.

Unit:2

Control Structures: Decision making, looping and branching - Jumps in Loops – Managing input and output Operations . Array: One dimensional array-Two dimensional array.

Unit:3

Functions: The Main Function –Function Prototyping- Call by value- call by reference- String handling functions- Inline Function.

Unit:4

Basic concepts of object oriented programming - Benefits of oops - Applications of oops –- Classes and object- Access Specifier -Member function- Function Overloading.

Unit:5

Constructor :parameterized constructor –Constructor Overloading - **Inheritance:** Types of Inheritance – Single Inheritance – Multiple Inheritance – Multilevel Inheritance – Hierarchical and Hybrid Inheritance.

Course Outcomes:

On the successful completion of the course, student will be able to:

CO-1: Understood the programming techniques
CO-2: Acquired the basics of the C++ Programming
CO-3: Acquired knowledge about Applications of C++
CO-4: Would have learnt the various OOPs Concept using C++
CO-5: Apply OOPs techniques in programming

Text Book	
1	Object Oriented Programming With C++ By E. Balagurusamy, Tata McGraw Hill
Reference Book	
1	Herbert Schildt, "Teach Yourself C++", Third edition, Tata Mcgraw Hill, 2000.
Online Web Reference	
1	https://www.programiz.com/c-programming

Part – A Answer all the Questions 10 X 2 = 20 Marks	Part – B Internal Choice Type 5 X 5 = 25 Marks	Part – C Answer any 3 Questions 3 X 10 = 30 Marks
Question 1,2 – 1 Unit 3,4 – II Unit 5,6 – III Unit 7,8 – IV Unit 9,10 – V Unit	11a (or) 11b – 1 Unit 12a (or) 12b – II Unit 13a (or) 13b – III Unit 14a (or) 14b – IV Unit 15a (or) 15b – V Unit	16 – I Unit 17 – II Unit 18 – III Unit 19 – IV Unit 20 – V Unit

Mapping Course Outcomes with Programme Outcomes:

CO/PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	9	9	3	9	1
CO2	9	3	9	9	3
CO3	3	1	9	3	9
CO4	1	1	1	9	9
CO5	3	3	3	1	9
Weightage	25	17	25	31	31
Weightage Percentage of Course Contribution of PO's	4.92	3.41	6.22	7.05	6.89

1 – Low; 3 - Medium; 9 - Strong

Course Code	21UCA2P	PROGRAMMING IN C++Practical	TOTAL HOURS	CREDITS
			3	3
Core/~~Elective/Supportive~~		Core Course – Practical-II	Syllabus Version	2021-2022

LIST OF LAB PROGRAMS

1. Simple C++ Program – 1
2. Simple C++ Program - 2
3. Simple C++ Program - 3
4. Program Using Decision Making Statements
5. Program Using Looping Statements
6. Program Using Arrays
7. Program Using Function with No arguments and No Return Values
8. Program Using Function with Arguments with Return values
9. Program Using String Functions
10. Program Using Class And Objects
11. Program Using Function Overloading
12. Program Using Constructors
13. Program Using Single Inheritance
14. Program Using Multiple Inheritance
15. Program Using Multi Level Inheritance

Course Outcomes:

On the successful completion of the course, student will be able to:

- Illustrate basic features of C++ in various programs
- Illustrate Code reusability using functions and Inheritance
- Apply the knowledge of object and class to design programming paradigm
- Apply Object Oriented Concepts in developing simple and advanced applications

Course Code	21UCAA1	DIGITAL COMPUTER FUNDAMENTALS	TOTAL HOURS	CREDITS
			5	5
~~Core~~/Elective/~~Supportive~~		Allied Course - I	Syllabus Version	2021-2022

Course Objectives:

- Able to Understand the Number Systems
- Able to Visualize the Logic Gates and Circuits

Unit:1

Number Systems: Decimal - Binary - Octal – Hexadecimal - Conversion From One Another - Binary Addition - Subtraction - Multiplication - Division - BCD Addition and subtraction - Complements - 2's Complement Addition - 9's Complement Addition - Codes : BCD Weighted - Excess – Gray

Unit:2

Basic Logic Gates – Truth Tables - Boolean Algebra: Laws and Theorems- Simplification using theorems - The Universal Building Blocks - Karnaugh Map Simplification -Sum of Products - Product of Sums.

Unit:3

Combinational Logic Circuits: Adder : Half Adder- Full Adder - Subtractor : Half Subtractor - Full Subtractor - Multiplexers – Demultiplexers – Decoders – Encoders.

Unit:4

Flip – Flops : RS - Clocked RS – D Flip – Flop – JK Flip – Flop – T Flip – Flop - Master/Slave Flip – Flop.

Unit:5

Counters and Registers: Counters - Synchronous and Asynchronous Counters - Ripple Counter – Ring Counter - Registers - Shift Registers.

Course Outcomes:

On the successful completion of the course, student will be able to:

CO-1: Able to get exposure to Number Systems
CO-2: Able to Design Various Circuits with Logic Gates
CO-3: Utilize Boolean algebra to minimize the combinational circuits.
CO-4: Differentiate various components and devices.
CO-5: Design and analyze combinational and sequential circuits.

Text Book

1	"Principles Digital Electronics" – K. Meena, PHI. UNIT I: Chapter 1 UNIT II: Chapter 2(2.1 - 2.7, 2.9), 3(3.1, 3.3, 3.5 – 3.9, 3.13, 3.14) UNIT III: Chapter 4(4.1 – 4.5, 4.7 – 4.10) UNIT IV: Chapter 5(5.1 – 5.8) UNIT V: Chapter 6(6.1 – 6.3, 6.8)
Reference Book	
1	● Digital Computers Fundamentals", Bartee, Tata McGraw Hill, 1996.

Part – A Answer all the Questions 10 X 2 = 20 Marks	Part – B Internal Choice Type 5 X 5 = 25 Marks	Part – C Answer any 3 Questions 3 X 10 = 30 Marks
Question 1,2 – 1 Unit 3,4 – II Unit 5,6 – III Unit 7,8 – IV Unit 9,10 – V Unit	11a (or) 11b – 1 Unit 12a (or) 12b – II Unit 13a (or) 13b – III Unit 14a (or) 14b – IV Unit 15a (or) 15b – V Unit	16 – I Unit 17 – II Unit 18 – III Unit 19 – IV Unit 20 – V Unit

Mapping Course Outcomes with Programme Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	1	3	3	3	1
CO2	9	1	3	1	1
CO3	3	9	3	1	9
CO4	3	9	1	3	1
CO5	1	3	9	3	9
Weightage	17	25	19	11	21
Weightage Percentage of Course Contribution of PO's	3.35	5.02	4.73	2.50	4.67

1 – Low; 3 - Medium; 9 – Strong

Course Code	21UCA3	PROGRAMMING IN JAVA	TOTAL HOURS	CREDITS
			6	5
Core/~~Elective/Supportive~~		Core Course - III	Syllabus Version	2021-2022

Course Objectives:

- To give basic knowledge of Object Oriented Programming paradigm and to impart the programming skills in JAVA.

Unit:1

Fundamentals Of Object Oriented Programming– Java Evolution – Overview Of Java Language – Data Types , Variables , Arrays – Operators – Control Statements.

Unit:2

Introduction to Classes – Class Fundamentals – Declaring Objects – Constructors – Methods – Overloading Methods – Nested and Inner Classes - String Handling.

Unit:3

Inheritance – Method Overriding – Abstract Class - Packages – Interfaces - Exception Handling – Types Of Exception – Try And Catch – Nested Try Statements.

Unit:4

Multithreaded Programming - Stream I/O And Files: Java I/O Classes And Interfaces – File – The Stream Classes – The Byte Streams – Character Streams – Using Stream I/O – Serialization – Stream Benefits.

Unit:5

Applets: The Life Cycle of Applet – The Applet Class – Development and Execution of a Simple Applet – Syntax of Applet Tag. **Abstract Windowing Toolkit:** AWT controls, Events – Listeners – Event Handling Methods – Inheritance Hierarchy of Control Classes.

Course Outcomes:

On the successful completion of the course, student will be able to:

CO1: Would have learnt the fundamentals of Object Oriented Programming
CO2: Would have learnt the Classes fundamentals
CO3: Implementing the inheritance concepts and overloading of operators
CO4: Apply the I/O operations to handle backup system using files.
CO5: Would have learnt Applets and Graphics.

Text Book	
1	Herbert Schildt, Complete Reference Java 2, Tata MeGraw-Hill Publishing Company Limited, Fifth Edition, 2009. (UNIT I,II,III,IV)
2	C. Muthu, "Programming with JAVA", Vijay Nicole Imprints Private Limited, Chennai, Second Edition, 2011. (UNIT V)
Reference Book	
1	E.Balagurusamy, "Programming with JAVA", Tata McGraw Hill, New Delhi, 4th edition.
Online Web Reference	
1	http://www.learnjavaonline.org/

Part – A Answer all the Questions 10 X 2 = 20 Marks	Part – B Internal Choice Type 5 X 5 = 25 Marks	Part – C Answer any 3 Questions 3 X 10 = 30 Marks
Question 1,2 – 1 Unit 3,4 – II Unit 5,6 – III Unit 7,8 – IV Unit 9,10 – V Unit	11a (or) 11b – 1 Unit 12a (or) 12b – II Unit 13a (or) 13b – III Unit 14a (or) 14b – IV Unit 15a (or) 15b – V Unit	16 – I Unit 17 – II Unit 18 – III Unit 19 – IV Unit 20 – V Unit

Mapping Course Outcomes with Programme Outcomes:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	9	3	3	9	1
CO2	9	3	9	1	3
CO3	3	9	3	1	9
CO4	1	9	3	9	9
CO5	3	3	3	1	9
Weightage	25	27	21	21	31
Weightage Percentage of Course Contribution of PO's	4.92	5.42	5.22	4.77	6.89

1 – Low; 3 - Medium; 9 – Strong

Course Code	21UCA4P	PROGRAMMING IN JAVA PRACTICAL	TOTAL HOURS	CREDITS
			3	3
Core/~~Elective/Supportive~~		Core Course – Practical-IV	Syllabus Version	2021-2022

LIST OF LAB PROGRAMS

1. Classes and Objects
2. Control Statement
3. Arrays
4. Constructors
5. Constructor overloading
6. Method Overloading
7. String Handling
8. Inheritance
9. Method Overriding
10. Abstract class
11. Packages and Interfaces
12. Exception Handling
13. Graphics Methods
14. AWT controls
15. AWT Event Handling

Course Outcomes:

On the successful completion of the course, student will be able to:

- Would have learnt the fundamentals of Java
- Would have learnt the usage of Exception handling
- Implement polymorphism and overloading of operators
- Apply the I/O operations to handle backup system using files.
- Would have learnt Applets and Graphics.

Course Code	21UCAA2	OPERATIONS RESEARCH	TOTAL HOURS	CREDITS
			5	5
~~Core~~/Elective/~~Supportive~~		Allied Course - II	Syllabus Version	2021-2022

Course Objectives:

- To Understand the Fundamentals of Operation Research
- To Understand the Various Problems in OR.
- To Visualize the Network Scheduling and PERT.

Unit:1

Introduction To O.R. – Elementary Treatment Of L.P.P- Methodology Of Or – Mathematical Formation Of The Problem – Graphical And Solution Method – Un Balanced Graphical And Solution - Slack And Surplus Variables- Artificial Variable - Matrix Formulation Of L.P.P-Simplex Algorithm –Simplex Method

Unit:2

Application Of Transportation Problem- North West Corner – Least Cost Method – Row Minima Method – Column Minima Method - Vogel's Approximation Method - Transportation Algorithm - Moving Towards Optimality

Unit:3

Assignment Problem- Assignment Model – Assignment Algorithm – HUNGARIAN Method - Impossible Assignment Problem – Unbalanced Assignment Problem .

Unit:4

Network Scheduling: CPM – Introduction – Network and Basic Components – Rules for Network Construction – Time Calculation in Network - Critical Path Method

Unit:5

PERT: Introduction - PERT - PERT Calculation – Float and Negative Slack – Advantages of Network: PERT and CPM

Course Outcomes:

On the successful completion of the course, student will be able to:

CO-1: Would have learnt the various concepts of OR.
CO-2: Would have learnt the various types of OR.
CO-3: List the methods of solving assignment problem.
CO-4: Learn the formulation of CPM network concepts.
CO-5: Learn the formulation of PERT and solving the real life projects.

Text Book	
1	Operations Research by Kantiswarup, P.K. Gupta And Manmohan. UNIT I: Chapter 1(1.1 - 1.9), 2(2.1 – 2.3, 2.5, 2.6), 3(3.1 – 3.5) UNIT II: Chapter 6(6.1 – 6.9) UNIT III: Chapter 7(7.1 – 7.4) UNIT IV: Chapter 21(21.1 – 21.5) UNIT V: Chapter 21(21.6 – 21.9)
Reference Book	
1	Operations Research by P. Mariyappan

Part – A Answer all the Questions 10 X 2 = 20 Marks	Part – B Internal Choice Type 5 X 5 = 25 Marks	Part – C Answer any 3 Questions 3 X 10 = 30 Marks
Question 1,2 – 1 Unit 3,4 – II Unit 5,6 – III Unit 7,8 – IV Unit 9,10 – V Unit	11a (or) 11b – 1 Unit 12a (or) 12b – II Unit 13a (or) 13b – III Unit 14a (or) 14b – IV Unit 15a (or) 15b – V Unit	16 – I Unit 17 – II Unit 18 – III Unit 19 – IV Unit 20 – V Unit

Mapping Course Outcomes with Programme Outcomes:

CO/PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	9	9	3	3	1
CO2	9	3	3	9	3
CO3	9	9	1	3	3
CO4	9	9	3	3	3
CO5	3	9	3	3	1
Weightage	39	39	13	21	11
Weightage Percentage of Course Contribution of PO's	7.68	7.83	3.23	4.77	2.44

1 – Low; 3 - Medium; 9 – Strong

Course Code	21UCA5	WEB TECHNOLOGY	TOTAL HOURS	CREDITS
			6	5
Core/~~Elective/Supportive~~		Core Course - V	Syllabus Version	2021-2022

Course Objectives:

- Able to explain the fundamental concepts of internet
- Able to explain the various tags of HTML
- Able to explain java script.

Unit:1

Introduction to the IIS: Client and server architecture. **Introduction to HTML:** Header Section : Title – Heading - Body Section – Anchor tag – Hyperlink.-Paragraph – Colorful webpages.

Unit:2

Font tag -- Formatting Characters- **Images and Pictures – List** : Ordered List – Unordered List- Table Handling- **Frames :** Frame set Definition – Frame Definition – Nested Frame Sets

Unit:3

Forms – Form Elements.**Database Basics :**Database Tables-Records and Fields- Creating a Table-Setting Field Properties-Setting the Key and saving the table- Modifying the table-Adding the field-Deleting the Field.

Unit:4

Overview of Java Script –Advantages of Java Script – Using SCRIPT tag- Syntax and Command Blocks-output-Dialogs and Prompts. **Working with data and Information:** Data Types-Variables-Expressions- Operators and Comparison Expressions. Functions and Objects : Defining Functions-Building objects in JavaScript.

Unit:5

Events in JavaScript : Events-Event Handlers-this Keyword-Events and Forms-Common Form Events.**Creating Interactive Forms :**Form Object and its Properties- Form Elements – More Form Elements.

Course Outcomes:

On the successful completion of the course, student will be able to:

CO-1: Define the fundamentals of web designing and impart knowledge in HTML
CO-2: Design and develop valid standards-conformant HTML document involving a variety of element types,including hyperlinks, images, lists, tables, and forms
CO-3: Understand VB script and Java script functionalities to work with client side scripts
CO-4: Develop a dynamic webpage by the use of java script and DHTML
CO-5: Impart knowledge on AJAX, XML, DHTML to design and develop interactive web pages.

Text Book	
1	"World Wide Web Design with HTML", C.Xavier, TMH, 2000. For UNIT I & UNIT II
2	"Microsoft Access 2000 Programming" Paul kimmel. For UNIT III
3	"Java Script Interactive Course ",Danesh,TechMedia For UNIT IV & UNIT V
Reference Book	
1	Programming the World Wide Web – Robert W. Sebesta Fourth Edition Pearson

Mapping Course Outcomes with Programme Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	9	9	3	9	1
CO2	9	3	9	9	3
CO3	3	1	9	3	9
CO4	1	1	1	9	9
CO5	3	3	3	1	9
Weightage	25	17	25	31	31
Weightage Percentage of Course Contribution of PO's	4.92	3.41	6.22	7.05	6.89

1 – Low; 3 - Medium; 9 – Strong

Course Code	21UCA6P	WEB TECHNOLOGY PRACTICAL	TOTAL HOURS	CREDITS
			4	3
Core/~~Elective/Supportive~~		Core Course Practical-VI	Syllabus Version	2021-2022

LIST OF LAB PROGRAMS

1. Simple HTML using basic tags.
2. Anchor Tag
3. Hyper Link
4. Ordered List
5. Unordered List.
6. Table Creation
7. Frames
8. Forms
9. Simple Table creation using MS-Access
10. Addition of two numbers using Java Script.
11. Simple Program-1 using Java Script.
12. Simple Program-2 using Java Script.
13. Java Script Program using Functions.
14. Java Script Program using Events.
15. Java Script Program using Form Elements.

Course Outcomes:

On the successful completion of the course, student will be able to:

- Develop web pages using XML and HTML
- Explore Photoshop skills and concepts to develop effective graphics for web and print media
- Build dynamic web pages using JavaScript.

Course Code	21UCAA3	FINANCIAL ACCOUNTING	TOTAL HOURS	CREDITS
			3	-
~~Core~~/Elective/~~Supportive~~		Allied Course – III	Syllabus Version	2021-2022

Course Objectives:

- To Understand the Types of Accounting.
- To Visualize the Ledgers, Balance Sheets and Errors

Unit:1

Fundamentals of Book-Keeping: Accounting, Objectives, Classifications, Concepts and Conventions. Double Entry Systems and Single Entry Systems: Advantages, Difference between Single and Double Entry System, Rules of Double Entry System, Types of Accounts: Personal Account, Real Account, Nominal Account. Journal: Narration, Advantages, Limitations, Exercises.

Unit:2

Ledgers: Meaning, Methods, Advantages, Differentiate between Journal and Ledger, Exercises. Subsidiary Books: Objectives, Types, Advantages, Exercises. Trial Balance: Definition, Objects/Advantages, Specimen Format, Preparation of Trial Methods: Balance / Total methods. Solved Problems.

Unit:3

Rectification of Errors: Definition, Types, Suspense Account, Exercises. Trading Accounting: Specimen form, Direct and Indirect Expenses, Important of Gross and Net Profits. Profit and Loss Account: Specimen, Difference between Trading and Profit & Loss Account. Exercises.

Unit:4

Balance Sheet: Terms of Assets and Liabilities, Classification, Limitations, Procedure, Exercises. Final Account: With Adjustments and Without Adjustment, Exercises.

Unit:5

Depreciation: Definition, Objects, Factors. Methods of Depreciations: Straight line Method, Return down Value Method, Annuity Method, Sinking Fund Method.

Course Outcomes:

On the successful completion of the course, student will be able to:

CO-1: Would have learnt the Basics of Accounting.
CO-2: Would have learnt various methods of Financial Accountings.
CO-3: Students will be know the knowledge of accounting and how to apply same in real time business world.
CO-4: Students will be able to understand the accounting principle and standard and its application.
CO-5: Students are able to prepare Financial Statements and interpret the results there off.

Text Book	
1	Financial Account – T.S. Reddy and A. Murthy – MarghamPubications. Advanced Accounting- Volume I [Financial Accounting] – Dr. S. Peer Mohamed, Dr. S.A.N. Shazuli Ibrahim – Pass Publications. UNIT I : 1.01 - 2.27 UNIT II : 2.01 - 3.12 UNIT III : 4.01 - 6.32 UNIT IV : 7.01- 7.58 UNIT V : 10.01 - 10.47
Reference Book	
1	Advance accounting – M.C.Shukla, T.S. Grewal &S.C.Gupta – S.Chand And Co.,
2	A.Murthy -Financial Accounting – Margham Publishers.

Part – A Answer all the Questions 10 X 2 = 20 Marks	Part – B Internal Choice Type 5 X 5 = 25 Marks	Part – C Answer any 3 Questions 3 X 10 = 30 Marks
Question 1,2 – 1 Unit	11a (or) 11b – 1 Unit	16 – I Unit
3,4 – II Unit	12a (or) 12b – II Unit	17 – II Unit
5,6 – III Unit	13a (or) 13b – III Unit	18 – III Unit
7,8 – IV Unit	14a (or) 14b – IV Unit	19 – IV Unit
9,10 – V Unit	15a (or) 15b – V Unit	20 – V Unit

Mapping Course Outcomes with Programme Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	1	3	1	3	9
CO2	3	9	3	9	1
CO3	9	3	9	1	9
CO4	9	3	3	9	9
CO5	9	9	3	1	3
Weightage	31	27	19	23	31
Weightage Percentage of Course Contribution of PO's	6.10	5.42	4.73	5.23	6.89

1 – Low; 3 - Medium; 9 – Strong

Course Code	21UCAA4P	ACCOUNTING PACKAGES PRACTICAL	TOTAL HOURS	CREDITS
			3	-
~~Core~~/Elective/~~Supportive~~		Allied Course – Practical-IV	Syllabus Version	2021-2022

LIST OF LAB PROGRAMS

1. Company Creations

2. Vouchers - Journals (Day Book)

3. Ledger Creation – Editing and Deleting.

4. Trial Balance - List of Ledgers Creation

5. Trading Account -Gross Profit or Gross Loss

6. Profit And Loss Account – Net Profit or Net Loss

7. Balance Sheet for Final Account, Identify the Items of Liabilities and Assets

8. Final Account with Adjustment

9. Final with Adjustment Calculation – Depreciation

Course Outcomes:

On the successful completion of the course, student will be able to:

- Would have learnt the Basics of Accounting.
- Would have learnt various methods of Financial Accountings.
- Student will know the principles to implement the financial accounts.
- Sudent will be able to understand the various methods.
- Students are able to prepare Financial Statements and interpret the results there off.

Course Code	21UELN1	ADVANCED SKILLS FOR COMMUNICAION IN ENGLISH	TOTAL HOURS	CREDITS
			2	2
~~Core~~/Elective/~~Supportive~~		NON MAJOR ELECTIVE COURSE- I	Syllabus Version	2021-2022

Course Objectives:

- To understand and develop techniques and skills involved in speaking English.
- To remember and apply the nuance of communicative language and to develop the L.S.R.W skills and integrate them.
- To understand and employ the idiomatic expressions learnt while speaking English.
- To understand and apply grammar involved while speaking effective English.
- To recall and use English for writing dialogues, E-mail and Bio-Data.

Unit:1

Grammar–Tenses–voices–concord-clauses-types of sentences.

Unit:2

English for Etiquette-Greeting-Introducing Congratulating-Requesting-Accepting/Declining an Invitation-Expressing gratitude-Apologising-Seeking,Granting,Refusing Permission.

Unit:3

Group Discussion & Interview Facing Skill.

Unit:4

Personality Development Soft Skills-international body language setting-positive attitude-emotional interlligence-leadership qualities problem solving-human values.

Unit:5

Communication for career: preparing a CV-group discussion, interviews,standard,panel,walk-in,group,stress,mock interviews(Practice).

Course Outcomes:

On the successful completion of the course, student will be able to:

CO1: recognize and relate idioms and grammar and employ for Speaking and Writing English.

CO2 : apply the vocabulary and grammar learnt while speaking and writing. CO3 : analyse and interpret the meaning from the context given. CO4 : analyse types of sentences. CO5 : develop Employability Skills and help in preparation for Competitive Examinations.	
References:	
1. 2.	Dr.T.M.Fartharthullah: A HandBook of GRE. Dr.R.M.Fartharthullah: Communication Skills for Under Graduates.

Mapping with Programme Outcomes

PO / CO	PO1	PO2	PO3	PO 4	PO5	PO6	PO7
CO1	9	6	3	3	6	6	3
CO2	9	9	6	6	9	9	6
CO3	9	6	3	3	6	6	3
CO4	9	6	3	3	6	6	3
CO5	9	9	6	6	9	9	6
Weightage	9	7.2	4.6	4.2	7.2	7.2	4.2
Weightage Percentage of Course Contribution of PO's	1.8	1.44	0.92	0.84	1.44	1.44	0.84

Level of Correlation 3-**Low** 6-**Medium** 9-**High**

Course Code	21UCA7	RELATIONAL DATABASE MANAGEMENT SYSTEMS	TOTAL HOURS	CREDITS
			5	5
Core/~~Elective/Supportive~~		Core Course –VII	Syllabus Version	2021-2022

Course Objectives:

- To provide the basic concepts of the database systems including data models, storage structure, normalization
- To learn the fundamentals RDBMS
- To visualize the various RDBMS Techniques

Unit:1

Introduction – File and Database System – Data Abstraction – Instances and Schemas – Database Languages – Database System Structure – Database Administrator

Unit:2

Data Models – E-R- Diagram – Mapping Cardinalities - Key Constraints: Primary, Candidate, Foreign, Alternate, Super key, Composite, Compound – Extended ER Features – ER Diagram with Relationships.

Unit:3

SQL – Data Definition – Data Definition Language – Data Manipulation Languages-Transaction Control Language– Queries in SQL – Nested Sub Queries – Views – Joined Relations – Aggregate Functions – Relational Algebra: Fundamental Operations.

Unit:4

Normalization: 1NF - 2NF - 3NF – BCNF– File Organization – Organization of Records in Files – Hashing Techniques: Static Hashing – Dynamic Hashing

Unit:5

Concurrency Control - Lock Based Protocols : Locks, Granting of Locks, The Two-Phase Locking Protocols - Time Stamp Based Protocols - Validation-Based Protocols - Deadlock handling: Prevention - Detection and handling.

Course Outcomes:

On the successful completion of the course, student will be able to:

CO-1: Define the basic concept of database management system.

CO-2: Design entity relationship model and convert into entity relationship diagram.

CO-3: Formulate various SQL queries.

CO-4: Apply normalization technique for schema refinement.

CO-5: Demonstrate transaction processing and concurrency control.	
Text Book	
1	Henry F. Korth Abraham Silberschatz , Database System Concepts , Fourth Edition McGraw Hill International Editions 2002 UNIT I: Chapter 1 UNIT II: Chapter 2, 3 UNIT III: Chapter 4 UNIT IV: Chapter 7, 10, 11 UNIT V: Chapter 14, 8
Reference Book	
1	James Martin , "Computer Data Base Organization" , Second Edition Prentice Hall
2	C.J. Date, "An Introduction to Database System", Seventh Edition, Pearson Education, New Delhi, 2002.

Part – A Answer all the Questions 10 X 2 = 20 Marks	Part – B Internal Choice Type 5 X 5 = 25 Marks	Part – C Answer any 3 Questions 3 X 10 = 30 Marks
Question 1,2 – 1 Unit 3,4 – II Unit 5,6 – III Unit 7,8 – IV Unit 9,10 – V Unit	11a (or) 11b – 1 Unit 12a (or) 12b – II Unit 13a (or) 13b – III Unit 14a (or) 14b – IV Unit 15a (or) 15b – V Unit	16 – I Unit 17 – II Unit 18 – III Unit 19 – IV Unit 20 – V Unit

Mapping Course Outcomes with Programme Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	9	3	9
CO2	3	9	3	3	1
CO3	9	9	3	1	3
CO4	3	9	1	1	3
CO5	9	9	3	9	1
Weightage	27	39	19	17	17
Weightage Percentage of Course Contribution of PO's	5.31	7.83	4.73	3.86	3.78

1 – Low; 3 - Medium; 9 – Strong

Course Code	21UCA8P	RDBMS PRACTICAL	TOTAL HOURS	CREDITS
			3	3
Core/~~Elective/Supportive~~		Core Course – Practical-VIII	Syllabus Version	2021-2022

LIST OF LAB PROGRAMS

1. To Implement Data Definition Language

   A) Create, B) Alter, C) Drop, D) Truncate

2. To Implement On DML

   A) Insert B) Update C) Delete D) Select

3. To Implement On TCL

   A) Save point B) Roll back C) Commit

4. To Implement Constraints.

   (A) Primary Key, (B) Foreign Key, (C) Check, (D) Unique, (E) Null, (F) Not Null, (G) Enable Constraints, (H) Drop Constraints.

5. To Implement Operators

   A) Arithmetic B) Relational C) Logical

6. To Implement Built-in Function

   A) String Function B) Number Function C) Date Function

7. To Implement Nested Queries

8. To Implement Join Queries

   A) Inner Join, (B) Left Join, (C) Right Join (D) Full Join

9. To Implement Views

   A) View (B) View With Check Option (C) Delete View

10. Control Structure

    10.1. To Write a PL/SQL Block for Addition of Two Numbers

    10.2. To Write a PL/SQL Block for If Condition

    10.3. To Write a PL/SQL Block for If and Else Condition

    10.4. To Write a PL/SQL Block for Greatest of Three Numbers Using If and Elseif

    10.5. To Write a PL/SQL Block for Summation of Odd Numbers Using For Loop

    10.6. To Write a PL/SQL Block for Go To Statement

Course Outcomes:

On the successful completion of the course, student will be able to:

• Design database table using Oracle. • Apply various SQL statements on table. • Know various operators and built in functions. • Identify the uses of join, views and nested queries. • Understanding the concept of PL / SQL.

Course Code	21UCA9	PROGRAMMING IN PHP	TOTAL HOURS	CREDITS
			6	5
Core/~~Elective/Supportive~~		Core Course –IX	Syllabus Version	2021-2022

Course Objectives:

- To Understand the Basics of PHP
- To Visualize the fundamentals of PHP Programming.

Unit:1

Essential PHP: Development Environment – Creating and Running PHP Page – Mixing HTML and PHP – Printing – Echo Power – Command Line PHP – Variables – Strings – Constants – Internal Data Types. **Operator and Flow Control:** Operator - If Statements – Switch Statement – Looping Statement: While, do....While, for each loops.

Unit:2

Strings and Arrays: String Functions – Arrays – Array with Functions and Loops - Multidimensional Arrays. **Creating Functions:** Function – Passing Variables – Returning Data - Returning Array – Returning List- Returning Reference – Variable Scope: local,static,global- Global Keyword - PHP Function.

Unit:3

Form Handling – Form Validation -$-GET variable - $-POST variable - $-REQUEST Variable – Creating the Form. Reading data with PHP : Setting up web Page – Handling text fields – Tool Box Controls - Password Controls - File Uploads.

Unit:4

File Handling: Opening File – Reading text and Character – Reading a whole file – Reading a file into array - Getting file information – Setting file pointer – Copying, Deleting, Reading and Writing files - Appending and locking files

Unit:5

Working with Database: Database – Essential SQL- Creating MYSQL Database – Creating a new table – Putting data – Accessing data – Updating – Inserting – Deleting Records – Creating new Database – Sorting Data.

Course Outcomes:

On the successful completion of the course, student will be able to:

CO-1: Would have learnt the basics of PHP
CO-2: Would have learnt the Programming using PHP.
CO-3: To illustrate the form validation techniques. and
CO-4: Create a program using classes and files handling concept
CO-5: Apply the concept to capture, retrieve and display information via database.

Text Book	
1	"THE COMPLETE REFERENCE: PHP", Steven Holzner, McGraw Hill Education (India) Edition 2008 Unit I: Chapter 1, 2 Unit II: Chapter 3, 4 Unit III: Chapter 5 Unit IV: Chapter 9 Unit V: Chapter 10
Reference Book	
1	"Setting Up LAMP: Getting Linux, Apache, MySQL, and PHP and Working Together", Eric Rosebrock, Eric Filson, Published by John Wiley and Sons, 2004.

Part – A Answer all the Questions 10 X 2 = 20 Marks	Part – B Internal Choice Type 5 X 5 = 25 Marks	Part – C Answer any 3 Questions 3 X 10 = 30 Marks
Question 1,2 – 1 Unit 3,4 – II Unit 5,6 – III Unit 7,8 – IV Unit 9,10 – V Unit	11a (or) 11b – 1 Unit 12a (or) 12b – II Unit 13a (or) 13b – III Unit 14a (or) 14b – IV Unit 15a (or) 15b – V Unit	16 – I Unit 17 – II Unit 18 – III Unit 19 – IV Unit 20 – V Unit

Mapping Course Outcomes with Programme Outcomes:

CO/PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	9	9	3	3	1
CO2	9	1	3	9	3
CO3	3	9	1	3	9
CO4	9	9	3	3	3
CO5	3	9	9	3	1
Weightage	33	37	19	21	17
Weightage Percentage of Course Contribution of PO's	6.50	7.43	4.73	4.77	3.78

1 – Low; 3 - Medium; 9 – Strong

Course Code	21UCA10P	PROGRAMMING IN PHP PRACTICAL	TOTAL HOURS	CREDITS
			6	5
Core/~~Elective/Supportive~~		Core Course – Practical-X	Syllabus Version	2021-2022

LIST OF LAB PROGRAMS

1. Sum of Digits
2. Biggest Number using Function
3. Display Book Details using For Each Loop
4. Controls and Functions
5. Passing Variables using HTML
6. String Functions and Arrays
7. Applications Form using MySql Table
8. File System Functions
9. Date and Time Functions
10. File Upload and Converting Image File Types

Course Outcomes:

On the successful completion of the course, student will be able to:

- Explore basic structure of web application and how the web browser interacts with the web server
- Implement session managing data and cookies in PHP
- Develop web application to connect My SQL using Portable Data Object(PDO)and issue SQL commands in PHP
- Apply the open COURSE technologies to develop impressive and dynamic website

Course Code	21UCA11	DATA STRUCTURES	TOTAL HOURS	CREDITS
			6	4
Core/~~Elective/Supportive~~		Core Course –XI	Syllabus Version	2021-2022

Course Objectives:

- To Learn the Basics of Data Structures
- To Visualize the various Data Structures

Unit:1

Basic Terminology – Data Structure Operations.Algorithms: Complexity, Time Space Tradeoff. Arrays: Linear Array – Representation of Linear Array –Operations of Array : Insertion - Deletion. Bubble Sort – Linear Search- Binary Search

Unit:2

Linked List- Representation of Linked List in Memory– **Traversing – searching – Insertion – Deletion.**

Unit:3

Stack: Array Representation of Stacks – Linked Representation of Stacks - Arithmetic Expression : Polish notation : Prefix, Infix, Postfix**– Quick Sort –** Queue - Linked Representation of Queue

Unit:4

Trees: Binary Tree - Representing Binary tree in Memory : Linked Representation of Binary tree- Sequential Reprentation of Binary tree– Traversing Binary Tree – Traversal Algorithms Using Stack - Binary Search Trees - Insertion – Deletion in Binary Search Trees – Heap Sort

Unit:5

Graph: Terminology – Sequential Representation of Graph : Adjacency Matrix - Path Matrix. Linked Representation of Graph - Operations on Graphs – Sorting: Insertion Sort – Selection Sort – Merge Sort

Course Outcomes:

On the successful completion of the course, student will be able to:

CO-1: Would have learnt the various Data Structure
CO-2: Learn linked list and its operations.
CO-3: Gain knowledge about stack and queue.
CO-4: Understand about tree concept and its operations.
CO-5: Understanding the concept of graph representation and its operations

Text Book

1	Data Structures – Lipschuta, Tata Mcgraw Hill, Schaum's Outline Series. UNIT I: Chapter 1.2, 1.4, 1.5, 4.2 – 4.8 UNIT II: Chapter 5.2 – 5.5, 5.7, 5.8, 5.10 UNIT III: Chapter 6.2 – 6.6, 6.10, 6.11 UNIT IV: Chapter 7.2 – 7.5, 7.7 – 7.9, 7.17 UNIT V: Chapter 8.2 – 8.3, 8.5, 8.6, 9.3-9.5
Reference Book	
1	Fundamentals of Data Structure – Ellis Horowitz And SartajSahini

Part – A Answer all the Questions 10 X 2 = 20 Marks	Part – B Internal Choice Type 5 X 5 = 25 Marks	Part – C Answer any 3 Questions 3 X 10 = 30 Marks
Question 1,2 – 1 Unit 3,4 – II Unit 5,6 – III Unit 7,8 – IV Unit 9,10 – V Unit	11a (or) 11b – 1 Unit 12a (or) 12b – II Unit 13a (or) 13b – III Unit 14a (or) 14b – IV Unit 15a (or) 15b – V Unit	16 – I Unit 17 – II Unit 18 – III Unit 19 – IV Unit 20 – V Unit

Mapping Course Outcomes with Programme Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	9	1	3	9	1
CO2	3	9	3	1	1
CO3	9	9	3	9	9
CO4	1	3	9	9	9
CO5	3	9	9	3	3
Weightage	25	31	27	31	23
Weightage Percentage of Course Contribution of PO's	4.92	6.22	6.72	7.05	5.11

1 – Low; 3 - Medium; 9 – Strong

Course Code	21UCAE1A	OPERATING SYSTEMS	TOTAL HOURS	CREDITS
			6	5
~~Core~~/Elective/~~Supportive~~		Elective Course – I	Syllabus Version	2021-2022

Course Objectives:

- To gain the basic knowledge about the operating systems and its various schemes and services.

Unit:1

Operating System Overview: Evolution of Operating Systems – Types of Operating System – Different Views of OS – Design and Implementation of Operating Systems – I/O Programming Concepts - Interrupt Structure and Processing.

Unit:2

Memory Management: Single Contiguous Allocation – Partitioned Allocation – Relocatable Partitioned Allocation – Paged and Demand Paged Memory Management – Segmented Memory Management – Segmented and Demand Paged Memory Management – Swapping – Overlays.

Unit:3

Processor Management: Process State Model – Job Scheduling – Process Scheduling – Functions And Policies – Evolution of Round Robin Multiprogramming Performance – Process Synchronisation – Race Condition – Synchronization Mechanism – Deadly Embrace – Synchronisation Performance Considerations.

Unit:4

Device Management: Techniques for Device Management – Device Characteristics - Channels and Control Units - Device Allocation Considerations – I/O Traffic Controller, I/O Scheduler, I/O Device Handlers – Virtual Devices – Spooling.

Unit:5

Information Management: A Simple File System – General Model of a File System – Symbolic File System – Basic File System – Access Control Verification - Logical File System – Physical File System – Allocation Strategy ,Device Strategy Modules.

Course Outcomes:

On the successful completion of the course, student will be able to:

CO-1: Understand Process concept and Process scheduling
CO-2: Describe System model for deadlock, Methods for handling deadlocks and memory management strategies
CO-3: Illustrate Scheduling algorithms and formulate solutions for critical section problem
CO-4: Analyze File ,directory and learn various Access methods and implementation
CO-5: Understand Device Management Techniques

Text Books

1	"Operating Systems" – E. Madnick& John J.Donavan, Tata McGraw Hill Publishing Co., Limited. UNIT I: Chapter 1, 2; UNIT II: Chapter 3; UNIT III: Chapter 4; UNIT IV: Chapter 5; UNIT V: Chapter 6
Reference Books	
1	"System Programming and Operating Systems" – D.M. Dhamdhere, Tata Mcgraw Hill Publishing Co., Limited.

Part – A Answer all the Questions 10 X 2 = 20 Marks	Part – B Internal Choice Type 5 X 5 = 25 Marks	Part – C Answer any 3 Questions 3 X 10 = 30 Marks
Question 1,2 – 1 Unit	11a (or) 11b – 1 Unit	16 – I Unit
3,4 – II Unit	12a (or) 12b – II Unit	17 – II Unit
5,6 – III Unit	13a (or) 13b – III Unit	18 – III Unit
7,8 – IV Unit	14a (or) 14b – IV Unit	19 – IV Unit
9,10 – V Unit	15a (or) 15b – V Unit	20 – V Unit

Mapping Course Outcomes with Programme Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	1	1	9	1
CO2	9	9	1	3	9
CO3	3	3	9	3	9
CO4	3	9	9	1	3
CO5	3	9	3	1	1
Weightage	21	31	23	17	23
Weightage Percentage of Course Contribution of PO's	4.13	6.22	5.72	3.86	5.11

1 – Low; 3 - Medium; 9 – Strong

Course Code	21UCAE1B	DATA MINING	TOTAL HOURS	CREDITS
			6	5
~~Core~~/Elective/~~Supportive~~		Elective Course – I	Syllabus Version	2021-2022

Course Objectives:

- To understand the basic concept of data mining process
- To understand the association rule mining,classification, cluster analysis and web data mining

Unit:1

Introduction: Data mining applications – Data mining techniques – Data mining case studies – The future of data mining – Data mining software

Unit:2

Classification: Introduction – Decision tree – Over fitting and pruning – Decision Tree rules – Naïve bayes method – Estimation predictive accuracy of classification methods

Unit:3

Cluster analysis: Cluster analysis – Types of data – Computing distances–Types of cluster analysis methods – Partitioned methods–Dealing with large databases – Quality and Validity of cluster analysis methods – Cluster analysis software.

Unit:4

Association rules mining: Introduction– Basics– Task and a naïve algorithm– Apriori algorithm – Mining frequent pattern without candidate generation (FP–growth) – Performance evaluation of algorithms.

Unit:5

Online Analytical Processing(OLAP): Introduction – OLAP – Characteristics of OLAP Systems – Motivations for Using OLAP – Multidimensional View and Data Cube – Data Cube Implementations – Data Cube Operations– Guidelines for OLAP Implementation – OLAP Software.

Course Outcomes:

On the successful completion of the course, student will be able to:

CO-1: Acquire the knowledge of Data mining concepts and Techniques
CO-2: Recall the concepts of Online Analytical Processing
CO-3: Recall the concepts involved in data and database Systems
CO-4: Understand various tools of Data Mining to solve the real time problems.
CO-5: Summarize the applications of Data Mining.

Text Books

1	"**Introduction to Data mining with case studies**", G.K. Gupta, PHI Private limited, New Delhi, 2008. UNIT I: Chapter 1 UNIT II: Chapter 3 UNIT III: Chapter 4 UNIT IV: Chapter 2 UNIT V: Chapter 8
Reference Books	
1	**"Data warehousing and Data Minin**g" - B.S. Charulatha, S. Poonkuzhali, C.Saravanakumar, Charulatha Publications.

Part – A Answer all the Questions 10 X 2 = 20 Marks	Part – B Internal Choice Type 5 X 5 = 25 Marks	Part – C Answer any 3 Questions 3 X 10 = 30 Marks
Question 1,2 – 1 Unit 3,4 – II Unit 5,6 – III Unit 7,8 – IV Unit 9,10 – V Unit	11a (or) 11b – 1 Unit 12a (or) 12b – II Unit 13a (or) 13b – III Unit 14a (or) 14b – IV Unit 15a (or) 15b – V Unit	16 – I Unit 17 – II Unit 18 – III Unit 19 – IV Unit 20 – V Unit

Mapping Course Outcomes with Programme Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	1	9	1
CO2	9	9	1	1	9
CO3	9	3	3	3	3
CO4	1	3	9	3	3
CO5	1	1	3	1	1
Weightage	23	19	17	17	17
Weightage Percentage of Course Contribution of PO's	4.53	3.82	4.23	3.86	3.78

1 – Low; 3 - Medium; 9 – Strong

Course Code	21UCAE1C	WORKING PRINCIPLES OF INTERNET	TOTAL HOURS	CREDITS
			6	5
~~Core~~/Elective/~~Supportive~~		Elective Course – I	Syllabus Version	2021-2022

Course Objectives:

- To understand the working principles of Internet
- To impart knowledge on safeguarding Internet

Unit:1	

What is Internet? The Internet's underlying Architecture

Unit:2	

Connecting to the Internet – Communicating on the Internet

Unit:3	

How the World Wide Web works. Common Internet tools

Unit:4	

Multimedia on the Internet – Intranet and shopping on the Internet

Unit:5	

Safeguarding the Internet

Course Outcomes:

On the successful completion of the course, student will be able to:

CO1: To understand the fundamentals of Internet.
CO2: To know the basics of communication protocols and the designing principles of Web connectivity
CO3: To gain the knowledge of Internet connectivity principles
CO4: Designing and develop smart city in Internet.
CO5: Analyzing and evaluate the data received through sensors in Internet.

Text Books

1	**How the Internet Works**, Preston Gralla, Pearson Education, Eighth Edition, 2006.
Reference Books	
1	Internet for Everyone, Alexis Leon, S. Chand (G/L) & Company Ltd; Second Edition 2012.

Mapping Course Outcomes with Programme Outcomes:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	9	1	1	1	1
CO2	9	1	1	1	1
CO3	9	3	9	9	1
CO4	1	9	9	9	1
CO5	1	9	3	1	1
Weightage	29	23	23	21	5
Weightage Percentage of Course Contribution of PO's	5.8	4.6	4.6	4.2	1

1 – Low; 3 - Medium; 9 – Strong

Course Code	21UCON2	INVESTMENT BASICS	TOTAL HOURS	CREDITS
			2	2
~~Core~~/Elective/~~Supportive~~		Non Major Elective Course– II	Syllabus Version	2021-2022

Course Objectives:

- Understand the deposits services offered by banks
- Understand Mutual funds and investing in New fund offers

Unit:1

Introduction to Investments: Savings Vs Investment – Importance of savings and investment – Factors determining interest rates, Simple interest and Compound interest – Assets available for investment – Financial Vs Non-financial assets – Important attributes of various asset classes - Safety, Risk, Liquidity and Yield.

Unit:2

Bank& Post office deposits and certificates: Introduction to Bank Deposits, Types of Deposit Accounts, Strategies of mobilizing deposits, Common guidelines of opening and operating accounts, deposit related services, Deposit services offered to Non-Resident Indians, Deposit Insurance – Post office Investment Savings schemes – Advantages

Unit:3

Mutual Funds, Life Insurance and Provident Fund: Concept and structure of mutual funds in India; AMC; Types of funds. Life Insurance and Provident fund schemes**:** Type of life insurance policy. Provident Funds: Kinds of provident funds - Equity Linked Savings Schemes (ELSSs) - Pension Plan

Unit:4

Real assets: Real estate – Bullion market- Introduction of exchange traded funds, Market making by authorized Participants; Creation Units; Portfolio deposits and cash Component. Investments in commodities, real estate, agricultural land, machinery and oil.

Unit:5

Corporate Securities: Salient features of debt fund; Concept of interest rate and credit risk; Pricing of debt instrument. Liquid Funds Salient features of liquid fund; Floating rate scheme and portfolio churning in liquid funds.

Course Outcomes:

On the successful completion of the course, student will be able to:

CO-1: Compare investments in various bank deposits

CO-2: Outline Mutual funds and New fund offers

CO-3: Relate midcap and large cap funds

CO-4: Plan portfolio with gold ETFs and other investment avenues

CO-5: Infer investments in liquid funds

Text Books	
1 2	Natarajan L, (2016), Investment Management, Security Analysis and Portfolio management, Margham Publications, Chennai. Avadhani VA, (2014), Investment and Securities Market in India, Himalaya Publishing House, Mumbai.
Reference Books	
1 2	PunithavathiPandian, (2013), Security Analysis and Portfolio Management, Vikas Publishing House Pvt ltd, New Delhi. Bhalla VK, (2014), Investment Management, Security Analysis and Portfolio Management, S.Chand and Company Ltd, New Delhi.

Mapping with Programme Specific Outcomes

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	9	1	6	6	9
CO2	9	1	6	6	6
CO3	9	1	6	6	6
CO4	9	1	6	6	6
CO5	9	1	6	6	6
Weightage	9	1	6	6	6
Weightage Percentage of Course Contribution of PO's	1.8	0.2	1.2	1.2	1.2

1-Low 3-Medium 9-High

Course Code	21UCA12	PROGRAMMING IN VB.NET	TOTAL HOURS	CREDITS
			6	5
Core/~~Elective/Supportive~~		Core Course –XII	Syllabus Version	2021-2022

Course Objectives:

- To Understand Basics of DotNet Framework.
- To Understand the various Programming Concepts of VB.Net

Unit:1

NET Framework and VB.NET: Introduction to Microsoft.Net Framework: Component of VB.Net Framework – VB.Net Language. Features in VB.NET: – Start Page – IDE Main Window – Class View Window – Object Browser – Code Window – Compiling the Code – Code Debugging - Developing a Simple VB.NET Console Application – Developing Simple VB.NET Project through Visual Studio IDE

Unit:2

Variables Constants and Expressions: Value Types and Reference Types – variable Declaration and Initialization – Value Data Types – Reference Data Types - Boxing and Unboxing – Operators and expressions - Text Box Control - Label Control - Button Control – Control Statements – IF Statement - Radio Buttons - Check Box – Group Box - List Box – Checked Listbox - Combo Box Control – InputBox – MsgBox . Control Statements: Decision making: IF Statement – IF-Else Statement – Select – Case. Looping Statement: – While – Do – For Statements.

Unit:3

Methods and Arrays - Types of Methods - Arrays – One Dimensional – Multidimensional Arrays – Jagged Arrays - Classes Properties and Indexes: Definition and Usage of Class - Constructor Overloading - Copy Constructor – Instance and Shared Class Members – Shared Constructor - Properties - Indexes Inheritance and Polymorphism

Unit:4

Definition and Usage of Interfaces – Namespaces– Events – Default Exception Handling Mechanism – User Defined Exception Handling Mechanism – Back Tracking – Throw Statement - Custom Exception – Usage of Thread – Thread Class – Start() , Abort(), Join(), Sleep(), Suspend() and Resume Methods

Unit:5

Database Connectivity:ADO.NET Object Model - Advantages of ADO.NET – Managed Data Providers – Developing Simple Application – Creation of a Data Table – Retrieving Data from Tables – Table Updating

Course Outcomes:

On the successful completion of the course, student will be able to:

CO-1: Would have learnt the fundamentals of VB.Net
CO-2: Would have learnt the Various Techniques of Data Communication Networks.
CO-3: Define the structure and fundamental concept of windows programming

CO-4: Demonstrate various control statements ,arrays, menus and tool bars CO-5: Construct program using windows and web form controls.	
Text Book	
1	Visual Basic. Net, C. Muthu, Vijay Nicole Imprints Private Limited UNIT I: Chapter 2 , UNIT II: Chapter 3, 4 ; UNIT III: Chapter 5, 6, 7 UNIT IV: Chapter 8, 9, 10, 11 ;UNIT V: Chapter 12, 15
Reference Book	
1	The Complete Reference – Visual Basic . NET – Jefrey R. Shapiro , Tata McGraw Hill, 2002.

Part – A Answer all the Questions 10 X 2 = 20 Marks	Part – B Internal Choice Type 5 X 5 = 25 Marks	Part – C Answer any 3 Questions 3 X 10 = 30 Marks
Question 1,2 – 1 Unit 3,4 – II Unit 5,6 – III Unit 7,8 – IV Unit 9,10 – V Unit	11a (or) 11b – 1 Unit 12a (or) 12b – II Unit 13a (or) 13b – III Unit 14a (or) 14b – IV Unit 15a (or) 15b – V Unit	16 – I Unit 17 – II Unit 18 – III Unit 19 – IV Unit 20 – V Unit

Mapping Course Outcomes with Programme Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	9	1	1
CO2	9	3	3	1	9
CO3	3	9	3	9	3
CO4	3	9	1	1	3
CO5	9	3	1	9	3
Weightage	27	27	17	21	19
Weightage Percentage of Course Contribution of PO's	5.31	5.42	4.23	4.77	4.22

1 – Low; 3 - Medium; 9 – Strong

Course Code	21UCA13P	PROGRAMMING IN VB.NET PRACTICAL	TOTAL HOURS	CREDITS
			6	5
Core/~~Elective/Supportive~~		Core Course – Practical-XIII	Syllabus Version	2021-2022

LIST OF LAB PROGRAMS

1. Develop a simple VB.NET application using controls.
   a. Finding factorial Value
   b. Money Conversion
2. Write a VB.NET Program to perform the case conversion
3. Write a VB.NET Program to create and validate login form using select case
4. Write a VB.NET Program that makes use of InputBox, MsgBox and ListBox.
5. Write a VB.NET Program that makes use of Picture Box control.
6. Develop a menu based VB.NET application to implement a text editor with cut, copy, paste,save and close operations.
7. Design a form to create calculator application
8. Write a VB.NET Program that makes use of check box, radio button and list boxes.

Console Applications.

9. Boxing and Unboxing
10. Constructor
11. Inheritance
12. Polymorphism.
13. Exception Handling
14. Thread
15. Database Connectivity

Course Outcomes:

On the successful completion of the course, student will be able to:

- Would have learnt the fundamentals of VB.Net
- Outline the sequence control and data control.
- Understand .NET Framework architecture, its components and basics of Visual Studio.
- Analyze the problem and create window based program with Visual Basic.
- Develop and implement window based application using Visual Basic.

Course Code	21UCA14	DATA COMMUNICATION AND NETWORKS	TOTAL HOURS	CREDITS
			4	4
Core/~~Elective/Supportive~~		Core Course –XIV	Syllabus Version	2021-2022

Course Objectives:

- To Learn the basics of Communication Networks.
- To Understand the various Techniques of Data Communication Networks.

Unit:1

Data Communication – Networks – Protocols And Standard – Line Configuration – Topology – Transmission Mode – Categories Of Networks – Internet Works.

Unit:2

The OSI Model – Functions Of The Layers – TCP/IP Protocols Suite – Signals – Analog And Digital Signal – Data Transmission– Modems.

Unit:3

Transmission Of Media – Guided Media – Unguided Media – Transmission Impairments – Media Comparison - Error Detection – Types of Errors – Detection – Vertical Redundancy Check (VRC) – Longitudinal Redundancy Check (LRC) – Cyclic Redundancy Check (CRC) - Check Sum.

Unit:4

Switching – Circuit Switching – Packet Switching – Message Switching - Networking And Internetworking Devices – Repeaters – Bridges – Routers – Gateways. Routing Algorithm – Distance Vector Routing – Link State Routing.

Unit:5

Internet Working: TCP/IP Protocol Suite – Client Server Model – Domain Name System – File Transfer Protocol (FTP) – Simple Mail Transfer Protocol (SMTP) – World Wide Web (WWW) – Hyper Text Transfer Protocol (HTTP).

Course Outcomes:

On the successful completion of the course, student will be able to:

CO-1: Would have learnt the fundamentals of Communication Networks
CO-2: Would have learnt the Various Techniques of Data Communication Networks.
CO-3: Have a good understanding of the OSI Reference Model& Information security.
CO-4: Ability to analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies.
CO-5: Students understands the concepts in the areas of Information Security

Text Book	
1	"Data Communications and Networking" –2nd Edition- Behrouz A Forouzan. UNIT I: Chapter 1, 2(2.1 To 2.4) UNIT I: Chapter 3(3.1to3.3), 4(4.1 To 4.6) UNIT III: Chapter 7(7.1 To 7.3), 9(9.1 To 9.6) UNIT IV: Chapter 14(14.1 To 14.3), 21(21.1 To 21.8) UNIT V: Chapter 25(25.1, 25.3, 25.5, 25.7, 25.9, 25.10)
Reference Book	
1 2	Computer Networks- Tanenbaum Computer Networks –William Stallings

Part – A Answer all the Questions 10 X 2 = 20 Marks	Part – B Internal Choice Type 5 X 5 = 25 Marks	Part – C Answer any 3 Questions 3 X 10 = 30 Marks
Question 1,2 – 1 Unit 3,4 – II Unit 5,6 – III Unit 7,8 – IV Unit 9,10 – V Unit	11a (or) 11b – 1 Unit 12a (or) 12b – II Unit 13a (or) 13b – III Unit 14a (or) 14b – IV Unit 15a (or) 15b – V Unit	16 – I Unit 17 – II Unit 18 – III Unit 19 – IV Unit 20 – V Unit

Mapping Course Outcomes with Programme Outcomes:

CO/PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	1	3	3	9	1
CO2	3	9	9	3	1
CO3	3	9	1	3	3
CO4	1	3	3	1	3
CO5	3	9	9	1	3
Weightage	11	33	25	17	11
Weightage Percentage of Course Contribution of PO's	2.17	6.63	6.22	3.86	2.44

1 – Low; 3 - Medium; 9 – Strong

Course Code	21UCAE2A	SOFTWARE ENGINEERING	TOTAL HOURS	CREDITS
			6	5
~~Core~~/Elective/~~Supportive~~		Elective Course - II	Syllabus Version	2021-2022

Course Objectives:

- Understand the various phases of software development and software Engineering tools
- Know various Validation and Verification Techniques

Unit:1

Introduction – Definitions – Size Factors – Quality and Productivity Factors – Managerial Issues - Planning A Software Project – Introduction – Defining The Problem – Developing A Solution Strategy – Planning The Development Process – Planning An Organizational Structure.

Unit:2

Software Cost Estimation: Software Cost Factors – Software Cost Estimation Techniques – Specification Techniques Staffing – Level Estimation: Estimating Maintenance Costs.

Unit:3

Software Requirements: Definition – Software Requirement Specification – Formal Specification Techniques – Languages and Processors for Requirements

Unit:4

Software Design – Fundamental Design Concepts – Modules And Modularization Criteria – Design Notations – Design Techniques – Detailed Design Considerations – Real Time And Distributed System Design.

Unit:5

Verification and Validation Techniques – Quality Assurance – Walkthroughs and Inspections – Static Analysis – Symbolic Execution – Unit Testing and Debugging – System Testing – Formal Verification.

Course Outcomes:

On the successful completion of the course, student will be able to:

CO-1: Would have learnt the various phases of Software Engineering.
CO-2: Select the process model for different applications
CO-3: Understand the software requirements and describe various models. and architectural styles
CO-4: Outline the approaches involved in software testing
CO-5: Apply the software engineering process in creating real time applications

Text Books	
1	Software Engineering Concepts – Richard Fairley. UNIT I: Chapter 1, 2 UNIT II: Chapter 3 UNIT III: Chapter 4 UNIT IV: Chapter 5 UNIT V: Chapter 7
Reference Books	
1	"Software Engineering: A Practitioners Approach" by Roger, S. Pressman McGraw Hill International Book Company.

Part – A Answer all the Questions 10 X 2 = 20 Marks	Part – B Internal Choice Type 5 X 5 = 25 Marks	Part – C Answer any 3 Questions 3 X 10 = 30 Marks
Question 1,2 – 1 Unit 3,4 – II Unit 5,6 – III Unit 7,8 – IV Unit 9,10 – V Unit	11a (or) 11b – 1 Unit 12a (or) 12b – II Unit 13a (or) 13b – III Unit 14a (or) 14b – IV Unit 15a (or) 15b – V Unit	16 – I Unit 17 – II Unit 18 – III Unit 19 – IV Unit 20 – V Unit

Mapping Course Outcomes with Programme Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	9	3	1	1	9
CO2	3	9	9	3	1
CO3	3	9	1	9	3
CO4	9	3	9	1	3
CO5	3	9	9	1	3
Weightage	27	33	29	15	19
Weightage Percentage of Course Contribution of PO's	5.31	6.63	7.21	3.41	4.22

1 – Low; 3 - Medium; 9 – Strong

Course Code	21UCAE2B	SOFTWARE PROJECT MANAGEMENT	TOTAL HOURS	CREDITS
			6	5
~~Core~~/Elective/~~Supportive~~		Elective Course - II	Syllabus Version	2021-2022

Course Objectives:

- To Understand the Concepts of Project Management
- To Understand the Planning aspects of a Software Project

Unit:1

Introduction to software management: Introduction- why is SPM important? –Project- Software project Vs other type of project – Contract and technical project management – Activities- plan, methods And methodologies – categorizing software projects – stakeholders – Setting objectives – project success and failures –Managements.

Unit:2

Project Evaluation and Programme Management: Introduction-Business case- Project portfolio management- Evaluation of individual Projects-Cost benefit Evaluation Techniques - Risk Evaluation - Programme Management – managing the allocation of reCOURSEs – Strategic programme management – Creating a programme and aids –Benefits management.

Unit:3

Overview of Project Planning: Introduction- Stepwise Project Planning- steps. Selection of An Appropriate Project Approach: Introduction-Build or buy- Choosing methodologies and technologies--software Processes and models-choice of Process models- Structure Vs speed of delivery – Waterfall model - spiral model – software prototyping - Rapid application development – Agile methods- Extreme programming.

Unit:4

Software Effort Estimation: Introduction-Where are estimates done? – Problems with over and under estimates – Basis for estimating and its Techniques – Bottom up estimating-Top down approach and parametric models- Expert judgment-Estimating by analogy Function point analysis-FP markII-COSMIC full FP-COCOMO II-cost estimation and staffing patterns.

Unit:5

Activity Planning: Introduction-objectives-when to plan?-project schedules-Projects activities-network Planning models-sequencing and scheduling activities-Formulating a network model-Risk management: Introduction-Risk-Categories of Risk-a framework for dealing with risk-Risk identification-Risk assessment

Course Outcomes:

On the successful completion of the course, student will be able to:

CO-1: Would have learnt about Software Project Planning
CO-2: Would have learnt about Software Activity Planning.
CO-3: Define the SDLC and basics of testing.

CO-4: Outline the types of testing in sample project. CO-5: Compare and review the quality of the project with SQL plan.	
Text Books	
1	"Software Project Management" – Bob Hughes, Mike Cotterell and Rajib Mall- Fifth Edition UNIT I: Chapter 1 UNIT II: Chapter , 2 UNIT III: Chapter 3 UNIT V: Chapter 5,6 UNIT IV: Chapter 4
Reference Books	
1	Software Project Management –Walker Royce-Pearson Education

Part – A Answer all the Questions 10 X 2 = 20 Marks	Part – B Internal Choice Type 5 X 5 = 25 Marks	Part – C Answer any 3 Questions 3 X 10 = 30 Marks
Question 1,2 – 1 Unit 3,4 – II Unit 5,6 – III Unit 7,8 – IV Unit 9,10 – V Unit	11a (or) 11b – 1 Unit 12a (or) 12b – II Unit 13a (or) 13b – III Unit 14a (or) 14b – IV Unit 15a (or) 15b – V Unit	16 – I Unit 17 – II Unit 18 – III Unit 19 – IV Unit 20 – V Unit

Mapping Course Outcomes with Programme Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	1	3	1	9	9
CO2	3	1	1	3	9
CO3	3	9	1	9	3
CO4	9	9	3	1	3
CO5	3	1	9	1	9
Weightage	19	23	15	23	33
Weightage Percentage of Course Contribution of PO's	3.74	4.62	3.73	5.23	7.33

1 – Low; 3 - Medium; 9 – Strong

Course Code	21UCAE2C	SYSTEM ANALYSIS AND DESIGN	TOTAL HOURS	CREDITS
			6	5
~~Core~~/Elective/~~Supportive~~		Elective Course - II	Syllabus Version	2021-2022

Course Objectives:

- To impart the concepts of system analysis.
- To impart the concepts of MIS.

Unit:1

Overview: Introduction - The System Development Life Cycle (SDLC) - System Development - Methodologies - Project Team Roles and Skills - Planning Phase: Identifying business value - Feasibility Analysis - Creating the work plan, staffing the project, Controlling and directing the project.

Unit:2

Analysis Phase: System Analysis - analysis process, business process automation, business process improvement, business process reengineering, developing the analysis plan. Gathering Information – interviews, joint application design, questionnaires, document analysis, observation, selecting the appropriate technique. Process Modelling – data flow diagrams, use cases. Data Modelling – ER diagram.

Unit:3

Design Phase: System Design – design strategies, developing the design plan, moving from logical to physical model. Architecture Design – computing architectures, infrastructure design, global issues, security, User Interface (UI) – principles of UI design, UI design process, navigation design, input design, output design. Data Storage Design – data storage formats, optimizing data storage. Program Design – structure chart, program specification.

Unit:4

Implementation Phase: Construction - managing programming, system testing, developing documentation. Installation – conversion, change management, post implementation activities & maintenance, concept of PERT and GANTT Charts.

Unit:5

Management Information System: Concept of Management, organization & System approach to management, MIS Planning, Designing and implementation, Role of DSS, Decision making & MIS, DSS and Knowledge Management System.

Course Outcomes:

On the successful completion of the course, student will be able to:

CO1: Demonstrate The Need Of Programming Language In Numerical Methods
CO2: Make use of programming elements to the algebraic problems
CO3: Analyze the variety of syntax in C
CO4: Evaluate the techniques of numerical methods
CO5: Construct the programs for finding the solution of algebraic, transcendental and simultaneous equations

Text Books

1	System Analysis and Design**,** Kenneth E Kendall Julie, PHI, 2012

Reference Books

1	Modern Systems Analysis and Design, Jeffrey A. Hoffer, Pearson India, 2011.

Mapping with Programme Specific Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	9	9	1	1	1
CO2	1	1	3	9	1
CO3	1	1	1	1	1
CO4	1	9	1	1	1
CO5	1	1	9	9	9
Weightage	13	21	15	21	13
Weightage Percentage of Course Contribution of PO's	2.53	5.90	4.25	5.32	2.66

1-Low 3-Medium 9-High

Course Code	21UCAE3A	E - COMMERCE AND ITS APPLICATIONS	TOTAL HOURS	CREDITS
			6	4
~~Core~~/Elective/~~Supportive~~		Elective Course - III	Syllabus Version	2021-2022

Course Objectives:

- To know the concepts of Internet and E-Commerce and their applications
- To Learn the Advertising and Marketing Techniques on the Internet.

Unit:1

INTRODUCTION: Electronic Commerce Frame Work: The Anatomy of E-Commerce Applications- Electronic Commerce Consumer Applications – Electronic Commerce Organisation Applications – The Network Infrastructure for E-Commerce: Components of Highway – Network Access Equipment – Global Information Distribution Networks

Unit:2

The Internet as Network Infrastructure: The Internet Terminology/Chronological History Of The Internet- The Business Of Internet Commercialization: Telco/Cable/Online Companies –National Independents ISPs – Regional Level ISPs – Local Level ISPs

Unit:3

Network Security And Firewalls: Client Server Network Security – Firewalls And Network Security – Data And Message Security – Challenge Response System -Architectural Framework For E-Commerce- Technology Behind The Web.

Unit:4

Inter Organisational Commerce and EDI: Electronic Data Interchange – EDI Application in Business – EDI Implementation, MIME and Value Added Networks: EDI Software Implementation – EDI Envelope for Message Transport- Value-Added Networks (VANs) .

Unit:5

Advertising And Marketing On The Internet: The New Age Of Information Based Marketing – Advertising On The Internet – Software Agents – Characteristics And Properties Of Agents – The Technology Behind Software Agents.

Course Outcomes:

On the successful completion of the course, student will be able to:

CO-1: Would have learnt the Concepts of E-Commerce.
CO-2: Understand the concept of internet and e-commerce applications.
CO-3: Learn about history of internet and internet providers.
CO-4: Understand and apply the security systems on e-commerce.
CO-5: Know about EDI concept.

Text Books

1	Ravikalakota& Andrew Whinston, "Frontiers of Electronic Commerce", Addison Wesley, 2000. UNIT I: Chapter 1, 2; UNIT II: Chapter 3, 4; UNIT III: Chapter 5, 6 UNIT IV: Chapter 9, 10; UNIT V: Chapter 13, 16
Reference Books	
1	Electronic Commerce – Rary P. Schneider and James T. Parry.

Part – A Answer all the Questions 10 X 2 = 20 Marks	Part – B Internal Choice Type 5 X 5 = 25 Marks	Part – C Answer any 3 Questions 3 X 10 = 30 Marks
Question 1,2 – 1 Unit 3,4 – II Unit 5,6 – III Unit 7,8 – IV Unit 9,10 – V Unit	11a (or) 11b – 1 Unit 12a (or) 12b – II Unit 13a (or) 13b – III Unit 14a (or) 14b – IV Unit 15a (or) 15b – V Unit	16 – I Unit 17 – II Unit 18 – III Unit 19 – IV Unit 20 – V Unit

Mapping Course Outcomes with Programme Outcomes:

CO/PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	3	3	1	3	9
CO2	3	1	3	9	1
CO3	9	3	9	3	1
CO4	9	3	1	9	3
CO5	9	3	9	3	1
Weightage	33	13	23	25	15
Weightage Percentage of Course Contribution of PO's	6.50	2.61	5.72	5.68	3.33

1 – Low; 3 - Medium; 9 – Strong

Course Code	21UCAE3B	INTRODUCTION TO IOT	TOTAL HOURS	CREDITS
			6	4
~~Core~~/Elective/~~Supportive~~		Elective Course – III	Syllabus Version	2021-2022

Course Objectives:

- Understand the communication technologies inIoT
- Know the IoT protocols and web ofthings
- Know the various applications ofIoT

Unit:1

Introduction : IOT Definitions and Functional Requirements – Web 3.0 View of IoT- Ubiquitous IoT Applications : A Panoramic View of IoT Applications - Important Vertical IoT Applications – Four Pillars of IoT: The Horizontal, Verticals, and Four Pillars- M2M: The Internet of Devices- RFID: The Internet of Objects- WSN: The Internet of Transducers- SCADA: The Internet of Controllers.

Unit:2

DNA of IoT:- DCM: Device, Connect, and Manage- Device: Things That Talk -Connect: Via Pervasive Networks- Manage: To Create New Business Value- Middleware for IoT: An Overview of Middleware - Communication Middleware for IoT - IoT protocols : Protocol Standardization for IoT - IoT Protocol Standardization Efforts: M2M and WSN Protocols- SCADA and RFID Protocols – Issues with IoT Standardization – Unified Data Standards: A Challenging Task.

Unit:3

Web of Things: Web of Things versus Internet of Things: Two Pillars of the Web – Architecture Standardization for WoT: Platform Middleware for WoT – Unified Multitier WoT Architecture – WoT Portals and Business Intelligence-Challenges of IoT Information Security.

Unit:4

Cloud of Things: Cloud Computing – Grid/SOA and Cloud Computing - Cloud Middleware - NIST's SPI Architecture and Cloud Standards- Cloud Providers and Systems - The Cloud of Things : The Internet of Things and Cloud Computing- Mobile Cloud Computing - Cloud of ThingsArchitecture.

Unit:5

IoT Applications for Value Creations: Asset Management :Introduction -Expected benefits-e-Maintenance in the M2M Era - Industrial Automation : Service-oriented architecture-based device integration- SOCRADES: realizing the enterprise integrated Web of Things-IMC-AESOP: from the Web of Things to the Cloud of Things-The Smart Grid : Smart metering-Commercial Building Automation: commercial building automation today.

Course Outcomes:

On the successful completion of the course, student will be able to:

CO-1: Understand the concept of IoT
CO-2: Thinking and analyze Prototyping;
CO-3: Able to realize the revolution of Internet in Sensor Networks
CO-4: Understand the concept of Cloud Computing
CO-5: Understand the Communications done through internet

Text Books	
1	The Internet of Things in the Cloud:A Middleware Perspective-Honbo Zhou–CRC Press2012. UnitI - Chapter 1.3,1.4, Chapter 22.1,2.2, Chapter 3, UnitII - Chapter 4 , Chapter 5 , Chapter6.2,6.3 UnitIII - Chapter 6.1, Chapter7 UnitIV - Chapter 8, Chapter9
2	From Machine-to-Machine to the Internet of Things Introduction to a New Age of Intelligence Jan Holler, VlasiosTsiatsis, Catherine Mulligan,StamatisKarnouskos,StefanAvesand,David Boyle, Academic Press is an imprint of Elsevier2014 UnitV - Chapter 10,11,12,13,14
Reference Books	
1	Architecting the Internet of Things - Dieter Uckelmann; Mark Harrison; Florian Michahelles- (Eds.) – Springer –2011
2	Networks, Crowds, and Markets: Reasoning About a Highly Connected World - David Easley and Jon Kleinberg, Cambridge University Press -2010.

Mapping Course Outcomes with Programme Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	9	1	9	1	3
CO2	3	9	1	3	3
CO3	1	1	1	9	9
CO4	3	1	3	9	9
CO5	9	9	3	1	1
Weightage	25	21	17	23	25
Weightage Percentage of Course Contribution of PO's	4.92	4.22	4.23	5.23	5.56

1 – Low; 3 - Medium; 9 – Strong

Course Code	21UCAE3C	INTRODUCTION TO SYSTEM PROGRAMMING	TOTAL HOURS	CREDITS
			6	4
~~Core~~/Elective/~~Supportive~~		Elective Course – III	Syllabus Version	2021-2022

Course Objectives:

- To know about Hardware and Software.
- To understand the concept of Algorithm, flowcharts and Computer language.
- To understand components and performance of system programming.

Unit:1

Basic computer organization -Computer software: What is software – Relationship between H/W & S/W – types of S/W – Logical system Architecture – Acquiring S/W – S/W development steps – Firmware.

Unit:2

Planning the computer program: Purpose of program planning – Algorithm – Flowcharts – What is a flowchart? Computer languages: Machine language – Assembly language – High level language.

Unit:3

Operating system: What is an OS? – Measuring System Performance – Process Management – Some Popular Operating System.

Unit:4

Application S/W Packages: Word Processing Packages – Spreadsheet Package – Graphics Package – Personal Assistant Package.

Unit:5

Business Data programming: What is a data processing? – Data Storage Hierarchy – standard method of Organizing Data file Management System – file utilities*– Main Components of a DBMS.

Course Outcomes:

On the successful completion of the course, student will be able to:

CO1: Understand the working knowledge of hardware and software of computer.

CO2: Learn the use of flowchart and program planning.

CO3: Describe and explain the fundamental of a computer operating system and Process Management.

CO4: Learn the various features of MS-Office and apply it.

CO5: Get the knowledge on Business data processing and data Management.

Text Books	
1	Pradeep K.Sinha, PritiShinha, "*COMPUTER FUNDAMENTALS*" – BPB Publications – Third Edition – 2003.
Reference Books	
1	William Stallings (2009), *"*Operating Systems – Internals and Design Principles*"*, Sixth Edition, Pearson Education.
2	V.Rajaram (2006), "*Introduction to Information Technology*", Prentics Hall India.
3	Chanchal Mittal, Pragati (2006), "*Information Technology*", 6th Edition.

Mapping with Programme Specific Outcomes

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	1	1	9	3	3
CO2	1	1	1	1	1
CO3	1	1	9	3	3
CO4	9	1	9	9	9
CO5	1	9	1	1	9
Weightage	13	13	29	17	25
Weightage Percentage of Course Contribution of PO's	2.6	2.6	5.8	3.4	5

1-Low 3-Medium 9-High

Course Code	21UCAV1	TRENDS IN SOCIAL NETWORKS	TOTAL HOURS	CREDITS
			2	2
~~Core~~/~~Elective~~/Supportive		Value Added Course	Syllabus Version	2021-2022

Course Objectives:

- Understand the social networking services and uses.
- Enable the different Social Networking Sites.
- Acquire knowledge about various Social Networking Apps.

Unit:1

Social Networking Service –Meaning and Definition – History – Social Impact - Features – Emerging Trends – Professional, Curriculum and Learning - Uses - Niche Networks – Trading Network – Business Model – Social - Interaction – Issues - Psychological effects of Social Networking.

Unit:2

Social Networking Sites (SNS) -Meaning – Basic concepts – Risk and Benefits- Types – Facebook –YouTube – Instagram - Twitter – Reddit – Vine (shut down soon) – Ask.fm -Tumblr - Flickr- Google+ - LinkedIn – Pinterest –VK- ClassMates -Meetup

Unit:3

Social Networking Apps- Meaning – Functions – Features – Benefits – Types – Messenger – WhatsApp; Calls – Chats -Contacts – Group – Broadcasting – Status – Gallery – Document – Location – Settings – QQ Chat – WeChat – QZone – Instagram – Viber – LINE - Snapchat - YY

Course Outcomes:

On the successful completion of the course, student will be able to:

CO1: Gain knowledge on the social networking services and uses.

CO2: Know the different Social Networking Sites.

CO3: Deal with various Social Networking Apps.

Reference

1. https://en.wikipedia.org/wiki/Social_networking_service
2. http://www.slideshare.net/ShrutiArya10/introduction-to-socialnetworking-sites-and-websites?qid=16074485-0621-4c19-8c0b-5937c59e69dd&v=&b=&from_search=1
3. http://www.uws.edu.au/__data/assets/pdf_file/0003/476337/The-Benefits-of-Social-

4 5	Networking-Services.pdf https://www.dreamgrow.com/top-15-most-popular-socialnetworking-sites/ http://mashable.com/2012/05/16/facebook-for-beginners/#zt.hb.qTluqt

Mapping with Programme Specific Outcomes

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	9	1	6	6	9
CO2	9	1	6	6	6
CO3	9	1	6	6	6
Weightage	27	3	18	18	21
Weightage Percentage of Course Contribution of PO's	2.6	2.6	5.8	3.4	5

1-Low 3-Medium 9-High

Course Code	21UCAV1	INTRODUCTION TO ERP	TOTAL HOURS	CREDITS
			2	2
~~Core~~/~~Elective~~/Supportive		Value Added Course	Syllabus Version	2021-2022

Course Objectives:

- To provide Basic knowledge of ERP.
- To understanding of the concepts of ERP systems, their architecture, and working of different modules.
- To provide a contemporary and forward-looking on the theory and practice of ERP Technology.

Unit:1

Introduction to ERP: Introduction to computer – Parts of a Computer – Introduction to ERP – Evolution of ERP – What is ERP? – Reasons for the growth of the ERP market – The advantages of ERP – Why do many ERP implementations fail? Why are Packages being used now?

Unit:2

Enterprise – An Overview: Integrated Management Information – Business Modeling – Integrated Data model. ERP and Related Technologies: Introduction – Business Process Reengineering – Management Information System (MIS) – Decision Support System (DSS) – Executive Information System (EIS) – Data Warehousing – Data Mining – Online Analytical Processing (OLAP) –Supply Chain Management.

Unit:3

ERP Implementation Life Cycle: Introduction – Pre-evaluation Screening – Package Evaluation – Project Planning Phase – GAP analysis – Reengineering – Configuration – Implementation –*Team Training** – Post Implementation.

Course Outcomes:

On the successful completion of the course, student will be able to:

CO1: Gain knowledge on the social networking services and uses.

CO2: Know the different Social Networking Sites.

CO3: Deal with various Social Networking Apps.

TEXTBOOKS :

1	Ellen Monk, Bret Wagner, *"Concepts In Enterprise Resource Planning"*, CENGAGE Learning, Third Edition, 2012.
2	D.P. Goyal, *"Enterprise Resource Planning: A Managerial Perspective"*,Tata McGraw – Hill Education Private Limited, 2012.
3	N.Venkateswaran, *"Enterprise Resource Planning"*, SCITECH Publications (INDIA) Pvt Ltd, 2010.
4	Veena Bansal, *"Enterprise Resource Planning: A Managerial Perspective"*, Pearson Publications, 2013.

E-REFERENCE :	
1	https://en.wikipedia.org/wiki/Enterprise_resource_planning
2	https://www.inc.com/encyclopedia/enterprise-resource-planning-erp.html

Mapping with Programme Specific Outcomes

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	1	1	3	1	1
CO2	1	1	3	9	1
CO3	1	1	9	1	9
CO4	1	3	1	1	9
CO5	9	1	1	1	9
Weightage	13	7	17	13	29
Weightage Percentage of Course Contribution of PO's	2.6	1.4	3.4	2.6	5.8