SRI VIDYA MANDIR ARTS & SCIENCE COLLEGE

(Autonomous)

[An Autonomous College Affiliated to Periyar University, Salem, Tamil Nadu]

[Accredited by NAAC with 'A' Grade with CGPA of 3.27]

[Recognized 2(f) & 12(B) Status under UGC Act of 1956]

Katteri – 636 902, Uthangarai (Tk), Krishnagiri (Dt)

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DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE

CHOICE BASED CREDIT SYSTEM (CBCS)

REGULATIONS AND SYLLABUS FOR BSC COMPUTER SCIENCE PROGRAMME

(SEMESTER PATTERN)

(For Students Admitted in the College from the Academic Year 2021 - 2022 Onwards)

SRI VIDYA MANDIR ARTS & SCIENCE COLLEGE

(Autonomous)

Bachelor of Science (B.Sc.) in Computer Science

Programme Pattern and Syllabus (CBCS)

(For Students Admitted in the College from the Academic Year 2020-2021 Onwards)

Sl. No.	Part	Nature of Course	Course Code	Name of the Course	Hours/ Week	Credits	Marks		
							CIA	ESE	Total
SEMESTER I									
1	I	Language	21UTA1F01	Tamil – I	5	3	25	75	100
2	II	English	21UEN1CE01	Communicative English – I	5	3	25	75	100
3	III	Core – I	21UCS1C01	Programming in Python	5	4	25	75	100
4		Core Practical – I	21UCS1P01	Programming in Python Lab	3	3	40	60	100
5		Allied – I	21UMA1A01	Mathematics – I	6	4	25	75	100
6	IV	Value Education	21UVE101	Yoga	2	1	25	75	100
7		Add On Course	21UPS1AO01	Professional English - I	4	4	25	75	100
Total					**30**	**22**	**190**	**510**	**700**
SEMESTER II									
8	I	Language	21UTA2F02	Tamil – II	5	3	25	75	100
9	II	English	21UEN2CE02	Communicative English – II	5	3	25	75	100
10	III	Core – II	21UCS2C02	Digital Computer Fundamentals	5	4	25	75	100
11		Core – III	21UCS2C03	Programming in C	3	4	25	75	100
12		Core Practical – II	21UCS2P02	Programming in C Lab	3	3	40	60	100
13		Allied – II	21UMA2A02	Mathematics – II	4	4	25	75	100
14	IV	Common Course	21UES201	Environmental Studies	1	1	25	75	100
15		Add On Course	21UPS2AO02	Professional English - II	4	4	25	75	100
Total					**30**	**26**	**215**	**585**	**800**

SEMESTER III									
16	I	Language	21UTA3F03	Tamil – III	4	3	25	75	100
17	II	English	21UEN3F03	English – III	4	3	25	75	100
18	III	Core – IV	21UCS3C04	Data Structures & Algorithms	5	4	25	75	100
19		Core – V	21UCS3C05	Programming in C++	5	4	25	75	100
20		Core Practical – III	21UCS3P03	Data Structures & Algorithms Using C++	3	3	40	60	100
21		Allied – I	21UCM3A01	Principles of Accountancy	5	3	25	75	100
22	IV	SBEC – I	21UCS2SP01	Office Automation Lab	2	2	40	60	100
23		NMEC – I		Non Major Elective Course – I	2	2	25	75	100
Total					**30**	**24**	**230**	**570**	**800**
SEMESTER IV									
24	I	Language	21UTA4F04	Tamil – IV	5	3	25	75	100
25	II	English	21UEN4F04	English – IV	5	3	25	75	100
26	III	Core – VI	21UCS4C06	Software Engineering	4	4	25	75	100
27		Core – VII	21UCS4C07	Web Technology	4	4	25	75	100
28		Core Practical – IV	21UCS4P04	Web Technology Lab	2	3	40	60	100
29		Allied – II	21UCM4A02	Cost and Management Accounting	4	3	25	75	100
30		Allied – II Practical	21UCM4AP01	Allied Commerce Practical	2	2	40	60	100
31	IV	SBEC – II	21UCS4S01	Quantitative Aptitude – I	2	2	25	75	100
32		NMEC – II		Non Major Elective Course – II	2	2	25	75	100
Total					**30**	**26**	**255**	**645**	**900**
SEMESTER V									
33	III	Core – VIII	21UCS5C08	Operating Systems	6	4	25	75	100
34		Core – IX	21UCS5C09	Relational Database Management System	6	4	25	75	100
35		Core – X	21UCS5C10	.Net Programming	6	4	25	75	100
36		Core Practical – V	21UCS5P05	.Net Programming Lab	3	3	40	60	100

37		Elective – I		Elective – I	6	5	25	75	100
38	IV	SBEC – III	21UCS5SP02	Mobile App Development Lab	3	2	40	60	100
Total					**30**	**22**	**180**	**420**	**600**
SEMESTER VI									
39	III	Core – XI	21UCS6C11	Computer Networks	6	4	25	75	100
40		Core – XII	21UCS6C12	PHP With MySQL	5	4	25	75	100
41		Core – XIII	21UCS6C13	Java programming	5	4	25	75	100
42		Core Practical – VI	21UCS6P06	Java Programming Lab	3	3	40	60	100
43		Elective – II		Elective – II	6	5	25	75	100
44		Project	21UCS6PR1	Project	3	5	40	60	100
45	IV	SBEC – IV	21UCS6S02	Quantitative Aptitude – II	2	2	25	75	100
46	V		21UCS6EX01	Extension Activities	-	1	-	-	-
Total					**30**	**28**	**205**	**495**	**700**
Grand Total					**180**	**148**	**1275**	**3225**	**4500**

Note

CBCS – Choice Based Credit system

CIA – Continuous Internal Assessment

ESE – End of Semester Examinations

Elective Courses

Elective – I

Semester	Part	Course Code	Paper	Course Title
V	III	21UCS5E01	I	Mobile Computing
		21UCS5E02	II	Software Testing
		21UCS5E03	III	E-Commerce Technologies

Elective – II

Semester	Part	Course Code	Paper	Course Title
VI	III	21UCS6E04	I	Data Mining
		21UCS6E05	II	Cyber Safety
		21UCS6E06	III	Network Security

SBEC – Skill Based Elective Courses*								
Part	Semester	Title of the Paper	Hours		Credit	Maximum Marks		
			Lecture	Lab		CIA	ESE	Total
IV	III	Office Automation 21UCS2SP01	-	2	2	40	60	100
	IV	Quantitative Aptitude – I 21UCS4S01	2	-	2	25	75	100
	V	Mobile App Development 21UCS5SP02	-	2	2	40	60	100
	VI	Quantitative Aptitude – II 21UCS6S02	2	-	2	25	75	100

Non Major Elective Course – (NMEC)

Extra Disciplinary Subjects offered by the Department of Computer Science. The department can offer any one of the subjects to the other major subject students in each semester.

NMEC – Non-Major Elective Courses							
Part	**Semester**	**Title of the Paper**	**Hours**	**Credit**	**Maximum Marks**		
			Lect.		**CIA**	**ESE**	**Total**
IV	III	**NMEC I:** Basics of Computers 21UCS3N01	2	2	25	75	100
		NMEC I: System Administration and Maintenance - 21UCS3N02	2	2	25	75	100
	IV	**NMEC II:** Exploring on Word 21UCS4N03	2	2	25	75	100
		NMEC II: Basics of Internet 21UCS4N04	2	2	25	75	100

List of Extension Activities

1. Internship Programme
2. National Cade Corps (NCC)
3. National Service Scheme (NSS)
4. Youth Red Cross (YRC)
5. Physical Education (PYE)
6. Eco Club (ECC)
7. Red Ribbon Club (RRC)
8. Women Empowerment Cell (WEC)

PROGRAMME SYLLABUS

Programme: B.Sc. Computer Science				
Core – I	**Course Code:** 21UCS1C01		**Course Title:** Programming in Python	
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
I	5	75	4	100

Course Objectives

1. To understand the nature of Python programming.
2. To describe the core syntax and semantics of Python programming language.
3. To infer the object-oriented programming concepts in Python.
4. To understand why Python is a useful scripting language for developers.
5. To get practical knowledge of a popular programming language Python.

UNIT - I

Introduction to Computer and Python Programming: Introduction- What is a Computer? Overview of Programming Languages - History of python - Installation – commenting – Execution modes – Internal working of Python – Implementation. Basics of Python Programming: Python character set – Token – core data type – the printf() function – assigning value to a variable – multiple assignments – input(), eval() function – Formatting number and strings - inbuilt functions. Operator and Expression: Operators and Expressions- Arithmetic Operators- Operator Precedence and Associativity- Bitwise Operator- The Compound Assignment Operator.

UNIT - II

Decision Statements: Boolean Type- Boolean Operators- Using Numbers with Boolean Operators- Using String with Boolean Operators- Boolean Expressions and Relational Operators- Decision Making Statements: if, if – else, nested if , multi-way if-elif–else statements- Conditional Expressions. Loop Control Statements: While loop – range() Function – for loop- Nested Loops- The break Statement- The continue Statement. Functions: Syntax and basics of a function- Use of a Function –Parameters and Arguments in a function

- Local and Global scope of a variable –return statement – Recursive Functions –Lamda Function.

UNIT - III

Strings: The str class- Basic Inbuilt Python Functions For String- The index[] operator - Accessing Characters via Negative Index- Immutable Strings- The String Operators - Lists: Introduction - Creating Lists – Accessing the Elements of a list – Negative List Indices – List Slicing – Python Inbuilt Functions for List – List comprehensions – List methods – List and strings: Splitting a string in list - Passing List to a Functions – Returning List from a Function.

UNIT - IV

Object Oriented Programming: Introduction – Defining Classes – The Self-parameter and Adding Methods to a Class- Display Class Attributes and Methods – Special Class Attributes – Accessibility – The _init_Method (Constructor) – Passing on Object as Parameter to a Method – _del_() (Destructor Method) – Class membership Tests – Method Overloading - Operator Overloading – Inheritance: Types of Inheritance – The Object Class – Subclass accessing attributes of Parent Class – Multiple Inheritance – Multilevel Inheritance – Method Overriding.

UNIT - V

Tuples: Creating Tuples – tuple() function – Inbuilt functions for tuples – Indexing and Slicing – Passing variable length arguments to tuples – Sets: Creating sets – The Python set class – Set operations – Dictionaries: Basics of Dictionaries – Creating a Dictionary – Adding, Replacing and Retrieving Values – Methods of Dictionary Class.

TEXT BOOK

1. Ashok NamdevKamthane, Amit Ashok Kamthane, “Programming and Problem Solving with PYTHON”, McGraw Hill Education (India) Private Limited, Chennai, 2018.

REFERENCES

1. S. A. Kulkarni, “Problem Solving and Python Programming”, Yes Dee Publishing Pvt. Ltd, Chennai, 2017 (Anna University Regulation 2017).
2. Martin C Brown, “The Complete Reference Python”, McGraw Hill Education, Osborne.

Web Reference

- http://www.python.org
- http://www/python.org/doc/
- http://wiki.python.org/
- http://pypi.python.org/pypi
- http://www/mhhe.com/kamthane/python

Assignments

1. Write a Python program to search a name in given tuple of names.
2. Write a Python program using Dictionary to find maximum and minimum from a set of values.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand and explain Python Programming.	K1 & K2
CO2	Interpret the fundamental Python syntax and semantics.	K2 & K3
CO3	Understand the concept of scripting and the contributions of scripting languages.	K3 & K4
CO4	Articulate the Object-Oriented Programming concepts used in python.	K5
CO5	Write codes using Multiple level of organizational structures, functions, classes, modules and package.	K6

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	S
CO2	M	M	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Core Practical – I	**Course Code:** 21UCS1P01		**Course Title:** Programming in Python Lab	
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
I	3	45	3	100

Course Objectives

1. To train the students for the basics of coding and executing Python scripts.
2. To understand the various data structures available in Python programming language and apply them in solving computational problems.
3. To develop problem solving skills and their implementation through python.
4. To apply various constructs of the language for data analytics.

List of Programs

1. Program to read the length and breadth of a rectangle from a user and display the area of the rectangle
2. Programs using conditional branches and loops.
3. Programs using functions.
4. Program to print all the letters from word1 that also appear in word2.
5. Programs using Lists and List processing.
6. Programs using exception handling.
7. Programs using classes and objects.
8. Programs using Overloading.
9. Programs using inheritance.
10. Programs using polymorphism.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Learn to design and implement conditional branches and loops efficient programming using python.	K1 & K3
CO2	Learn working with functions, lists and list processing.	K2 & K3
CO3	Learn to work with exception handling, classes and objects.	K3 & K4
CO4	Learn to apply overloading concepts.	K3 & K5
CO5	Learn to use inheritance and polymorphism.	K6

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	S	S
CO2	M	M	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Core – II	**Course Code:** 21UCS2C02		**Course Title:** Digital Computer Fundamentals	
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
II	4	60	4	100

Course Objectives

1. Understand the Digital number system and their conversions.
2. Identify the operations of logic Gates and simplify the Boolean expressions using K-Map.
3. Comprehend the fundamental principles of simple Arithmetic Circuits.
4. Know the design and operations of Data Processing Circuits.
5. Realize the design of sequential logic circuits such as Flip Flops, Registers and Counters and its applications.
6. Gain the knowledge about the memory elements like RAM, ROM, and Magnetic Disk memories.

UNIT – I

Number Systems and Codes: Binary Number System – Binary-to-Decimal Conversion – Decimal-to-Binary Conversion – Octal Numbers – Hexadecimal Numbers – The ASCII Code – The Excess-3 Code – The Gray Code. Digital Computers.

UNIT – II

Digital Logic: The Basic Gates – NOT, OR, AND – Universal Logic Gates – NOR, NAND – AND-OR-Invert Gates. Combinational Logic Circuits: Boolean Laws and Theorems – Sum-of-Products Method – Truth Table to Karnaugh Map – Pairs, Quads, and Octets – Karnaugh Simplification – Don't-Care Conditions – Product-of-Sums Simplification.

UNIT – III

Data–Processing Circuits: 16-to-1 Multiplexer – 1-to-16 De-Multiplexer – BCD-to-Decimal Decoder – Decimal-to-BCD Encoder – Exclusive-or Gates. Arithmetic Circuits: Binary

Addition – Binary Subtraction – Unsigned Binary Numbers – Sign-Magnitude Numbers – 2'S Complement Representation – 2'S Compliment Arithmetic.

UNIT – IV

Arithmetic Circuits: Arithmetic Building Blocks – The Adder – Subtractor. Flip-Flops: RS Flip-Flops – Edge-Triggered D Flip-Flops – Edge triggered JK Flip-Flops – JK Master-Slave Flip-Flops.

UNIT – V

Registers: Serial-In Serial-Out – Serial-In Parallel-Out – Parallel-In Serial-Out – Parallel-In Parallel-Out (54/74174). Memory: Introduction – Magnetic Memory – Optical Memory.

Text Book

1. Donald P Leach, Albert Paul Malvino and Goutam Saha, "Digital Principles and Applications," 8th Edition, TMH, 2006.

Reference Books

1. Morris Mano, "Digital Logic and Computer Design," 4th Edition, Pearson, 2008.
2. Thomas C Bartee, "Digital Computer Fundamentals," 6th edition, McGraw-Hill, 1985.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the Number system and conversion from one system to another system.	K1 & K2
CO2	Understand the functional concepts of Logic gates.	K1, K2 & K3
CO3	Analyze the concept of Boolean Algebra and Simplifying the Boolean expression.	K3 & K4
CO4	Applying the knowledge to perform arithmetical operations using Logical circuit.	K4 & K5
CO5	Gain the Knowledge about memory Elements.	K5

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	S	M
CO2	S	M	S	S	M
CO3	S	S	S	S	M
CO4	S	M	S	S	S
CO5	M	S	S	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Core – III		**Course Code:** 21UCS2C03		**Course Title:** Programming in C
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
II	4	60	4	100

Course Objectives

1. To understand the nature of C programming.
2. To describe the core syntax and semantics of C programming language.
3. To develop logics which will help to create programs, applications in C.
4. To implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.
5. To help students to get the practical knowledge of a programming language C.

UNIT – I

Overview of C: History of C – Importance of C – Basic Structure of C Programs. Constants, Variables and Data Types: Character Set – C Tokens – Keywords and Identifiers – Constants – Variables – Declaration of Storage Classes – Assigning Values to Variables- Defining Symbolic Constants. Operators and Expression – Evaluation of Expressions – Precedence of Arithmetic Operators – Type Conversions in Expressions – Operator Precedence and Associatively – Mathematical Functions. Managing Input and Output Operations: Reading and Writing a Character – Formatted Input and Output.

UNIT – II

Decision Making and Branching: Simple IF, IF-ELSE, Nesting of IF-ELSE, ELSE-IF Ladder, Switch Statements – GOTO Statements. Decision Making and Looping: WHILE Statement – DO Statement – FOR Statement – Jumps in Loops. Arrays: Definition & Declaration – One Dimensional – Two Dimensional – Multi Dimensional Arrays – Dynamic Arrays.

UNIT – III

Character Arrays and Strings: Introduction – Declaring and Initializing String Variables – Reading Strings from Terminal – Writing Strings to Screen – String Handling Functions – Table of Strings. User – Defined Functions: Introduction – Need for User – Defined Function – A Multi- Function Program – Elements of User – Defined Function – Definition of Functions – Return Values and Their Types – Function Calls – Function Declaration – All Category of Functions – Nesting of Functions – Recursion – Passing Arrays to Functions – Passing Strings to Function.

UNIT – IV

Structures and Unions: Introduction – Defining a Structure – Declaring Structure Variables – Accessing Structure Members – Structure Initialization – Copying and Comparing Structure Variables – Arrays of Structures – Arrays within Structures – Structures within Structures – Structures and Functions – Unions – Size of Structures – Bit Fields.

Pointers: Introduction – Understanding Pointers – Accessing the Address of a Variable – Initializing of Pointer Variables. Chain of Pointers – Pointer Expressions –Pointers and Arrays – Pointers and Character Strings – Arrays of Pointers – Pointers as Function Arguments – Functions Returning Pointers– Pointers to Functions – Pointer and Structures.

UNIT – V

File Management: Introduction – Defining and Opening a File – Closing a File – Input/ Output Operation on Files – Error Handling During I/O Operations – Random Access Files – Command Line Arguments.

Text Book

1. E. Balgurusamy, “Programming in ANSI C”, 5th Edition, Tata McGraw Hill, New Delhi, 2010.

Reference Books

1. Herbert Schildt, “C: The Complete Reference”, 4th Edition, McGraw Hill, 2003.
2. B.L.Juneja, “Programming in C”, 1st Edition, Cengage Learning, 2012.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand and explain C Programming.	K1 & K2
CO2	Able to define data types and use them in simple data processing applications.	K2 & K3
CO3	Analyze programming problems to choose when regular loops should be used and when recursion will produce a better program.	K3 & K4
CO4	Design, implement, test and debug programs that use arrays for character strings and that use pointers for character strings.	K3, K4 & K5
CO5	Develop solutions to problems using C programming.	K6

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	S
CO2	S	M	S	S	S
CO3	S	S	S	S	S
CO4	M	S	S	S	S
CO5	S	S	M	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Core Practical – II	**Course Code:** 21UCS2P02		**Course Title:** Programming in C Lab	
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
II	3	45	3	100

Course Objectives

1. To train the students for the basics of coding and executing C Programming.
2. To understand how to implement various concepts in C Programming language and apply them in solving computational problems.
3. To implement the applications of arrays and pointer in C program.
4. To provide knowledge of working with files & functions.

List of Programs

1. Write a simple C program to check whether a given character is vowel or not using Switch – Case Statement.
2. Write a C program to convert the Decimal to Binary conversion
3. Write a C program to print the Fibonacci series.
4. Develop a C Program to perform matrix multiplication.
5. Write a C program to illustrate string handling functions
6. Write a C program to find the factorial of a number using recursion.
7. Write a C Program to show Call by Value and Call by Reference.
8. Write a C program to swap two numbers using pointers.
9. Write a C program using Structures with array elements
10. Write a C program to copy the contents of one file into another

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand and basics of coding and executing the C program.	K1 & K2
CO2	Understand the various concepts and looping statements using C program.	K2 & K3
CO3	Implement the applications of arrays and pointers and solving the problems in C.	K3 & K4
CO4	Choose the appropriate technique to solve the complex problems in C program	K5
CO5	Try to develop a solution to solve the real time problems using files, functions & structures.	K6

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	M	S	S	S	M

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Core – IV		**Course Code:** 21UCS3C04		**Course Title:** Data Structures & Algorithms
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
III	5	75	4	100

Course Objectives

1. To have fundamental knowledge about data and the way it is stored.
2. To educate the concepts of fundamentals of writing algorithms and approach in problem solving.
3. To understand the concepts like stacks, queues, lists and its structures.
4. To know the concepts of Trees, Tree Traversals and Graphs.
5. To develop some applications using data structures.

UNIT – I

Algorithms (Analysis and Design): Problem Solving – Top-Down and Bottom-Up Approaches to Algorithm Design – Use of Algorithms in Problem Solving – Design, Implementation, Verification of Algorithm – Efficiency Analysis of Algorithms: Space, Time Complexity, and Frequency Count – Sample Algorithms: Exchange the Value of Two Variables – Summation of Set of Numbers – Decimal to Binary Conversion – Sorting – Factorial – Fibonacci – Finding a Largest Number in an Array – Reverse the Order of Elements in Array.

UNIT – II

Introduction: Definitions – Concepts – Overview – Implementation of Data Structures. Arrays: Definition – Terminology – One Dimensional Array – Multi Dimensional Array. Stacks: Introduction – Definition – Representation of Stacks – Operations on Stacks – Applications of Stack: Evaluation of Arithmetic Expression – Implementation of Recursion-Factorial Calculation

UNIT – III

Queues: Introduction – Definition – Representation of Queues – Various Queue Structures: Circular Queue – De-Queue – Priority Queue – Applications of Queues: CPU Scheduling. Linked List: Definition – Single Linked List – Double Linked List – Circular Double Linked List – Applications: Sparse Matrix – Polynomial Representation – Dynamic Storage Management.

UNIT – IV

Trees: Terminologies – Definitions & Concepts – Representation of Binary Tree – Operations on Binary Tree – Types of Binary Trees: Expression Tree – Binary Search Tree – Heap Tree. Graphs: Introduction – Graph Terminologies – Representation of Graphs – Operations on Graphs. Applications of Graph: Shortest Path Problem – Topological Sorting – Minimum Spanning Tree: Kruskal and Prims Algorithm.

UNIT – V

Searching: Terminologies – Linear Search Techniques with – Array, Linked List, and Ordered List – Binary Search – Non Linear Search – Binary Tree Searching – Binary Search Tree Searching. Sorting: Terminologies – Sorting Techniques – Insertion Sort – Selection Sort – Bubble Sort – Quick Sort – Merge Sort.

Text Books

1. Sathish Jain, Shashi Singh, "Data Structure Made Simple", BPB Publications, 1st Edition, New Delhi, 2006. (Unit – I)
2. Debasis Samanta, "Classic Data Structures", PHI Learning, New Delhi, 2nd Edition, 2009. (Unit – II, III, IV, V)

Reference Books

1. Aprita Gopal, "Magnifying Data Structures", PHI Learning, New Delhi, 1st Edition, 2010.
2. Chitra A &Rajan PT, "Data Structures", Vijay Nicole Publications, 2nd Edition, 2016.
3. Ellis Horowitz and Sartaj Sahni, “Fundamentals of Data Structure”, Galgotia Publications, New Delhi,1985.
4. Ellis Horowitz and Sartaj Sahni, “Fundamentals of computer algorithms”, Galgotia Publications, New Delhi, 1985.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the representations of data and various algorithms.	K1 & K2
CO2	Analyze the complexity of different algorithms.	K2 & K3
CO3	Remember the concept of algorithms for searching, sorting and dynamic programming.	K1, K2 & K3
CO4	Adapting the algorithmic concepts and implement new ones.	K4 & K5
CO5	Apply appropriate algorithms and data structure for real time.	K6

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	S	S
CO2	S	M	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	M

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Core – V		**Course Code:** 21UCS3C05		**Course Title:** Programming in C++
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
III	6	90	4	100

Course Objectives

1. To understand how C++ improves C with object-oriented features.
2. To describe the core syntax and semantics of C++ programming language.
3. To develop logics which will help to create programs, applications in C++.
4. To implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.
5. To help students to get the practical knowledge of a programming language C++.

UNIT – I

Object-Oriented Programming: Principles – Benefits of OOP – Application of OOP – Tokens, Expression and Control Structures: Tokens – Keywords – Identifiers and Constants – Data Types – Constants – Variables – Operators – Manipulators – Expressions – Control Structure.

UNIT – II

Functions – Prototyping – Call by Reference – Return by Reference – Inline Functions – Default Arguments – const Arguments – Function Overloading – Friend and Virtual Functions, Classes and Objects – Class – Member Functions – Arrays with in a Class – Memory Allocation for Objects – Static data members – Static member functions – Arrays of Objects – Objects as Function Arguments – Friendly Functions – Returning Objects – const Member Functions – Pointers to Members, Constructors and Destructors.

UNIT – III

Operator Overloading and Type Conversions, Inheritance: Extending Classes – Derived Classes – Single Inheritance – Multilevel Inheritance – Multiple Inheritance – Hierarchical

Inheritance – Hybrid Inheritance – Virtual Base Classes – Abstract Classes, Pointers, Virtual Functions and Polymorphism: Pointers – Pointers to Objects – this Pointer – Pointers to Derived Classes – Virtual Functions – Pure Virtual Functions.

UNIT – IV

Managing I/O Operations: C++ Streams – C++ Stream Classes – Unformatted I/O and Formatted I/O Operations – Managing Output with Manipulators, Working with Files: Classes for File Stream Operations – Opening and Closing a File – Detecting end-of-file – File Pointers and Their Manipulators – Sequential I/O Operations – Updating a File – Error Handling during File Operations – Command Line Arguments

UNIT – V

Templates: Class Templates – Class Templates with Multiple Parameters – Function Templates – Function Templates with Multiple Parameters – Overloading of Template Functions – Member Function Templates – Non-Type Template Arguments, Exception Handling: Basics – Exception Handling Mechanism – Throwing Mechanism – Catching Mechanism – Re-throwing an Exception – Specifying Exceptions.

Text Book

1. E.Balagurusamy, "Object Oriented Programming with C++", Tata McGraw Hill Publications, 5th Edition, 2011.

Reference Books

1. M.T. Somashekara, "Object Oriented programming with C++", Prentice Hall of India Learning Limited, 2nd Edition, 2012.
2. Behrouz A.Forouzan, "A Structured Approach Using C++", Cengage Learning, 2nd Edition, 2003.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand basic object oriented programming concepts.	K1 & K2
CO2	Able to define data types and use them in simple data processing applications.	K2 & K3
CO3	To design, implement, debug and test programs using the fundamental elements of C++.	K3 & K4
CO4	Implement programming techniques to solve problems in the C++ programming language.	K3 & K5
CO5	Apply the concepts and principles of the programming language to the real-world problems.	K6

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	M	S	S	S
CO3	S	S	S	S	S
CO4	M	S	S	S	S
CO5	S	S	M	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Core Practical – III		**Course Code:** 21UCS3P03		**Course Title:** Data Structures & Algorithms Using C++
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
III	3	45	3	100

Course Objectives

1. To learn the fundamental C++ programming concepts
2. To train the students for the basics of coding and executing C++
3. To qualify the students working with Data Structure & Algorithms using C++.
4. To improve creative thinking in Searching and Sorting.

List of Programs

1. Write a C++ Program to create a class ARITHMETIC which consists of a FLOAT and an INTEGER variable. Write member functions ADD( ), SUB( ), MUL( ), DIV( ) to perform addition, subtraction, multiplication, division respectively. Write a member function to get and display values.
2. Write a C++ Program to create a class that contains one float data member. Overload all the four Arithmetic operators so that they operate on the object FLOAT.
3. Write a C++ Program to create a class for STRING. Write a Member Function to initialize, get and display stings. Overload the operators ++ and == to concatenate two Strings and to compare two strings respectively.
4. Write a C++ Program to check whether the given string is a palindrome or not using Pointers.
5. Write a C++ Program to create a class to implement the data structure STACK. Write a constructor to initialize the TOP of the STACK. Write a member function PUSH() to insert an element and member function POP() to delete an element. Check for overflow and underflow conditions.
6. Write a C++ Program to implement Add and Delete Operation on Queue.
7. Write a C++ Program to Convert Infix to Postfix Expression.

8. Write a C++ Program to perform Binary Search.
9. Write a C++ Program to Sort the given list of Number Using Quick Sort.
10. Write a C++ Program to sort an array using Bubble Sort.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To design, implement, debug and test programs using the fundamental elements of C++.	K1 & K3
CO2	Analyze the given problem statements to create basic program designs.	K2 & K3
CO3	Implement different functions for input and output, various data types, basic operators, files and functions.	K3 & K4
CO4	Implement data structures & algorithms using C++ programming language.	K3, K4 & K5
CO5	To learn how to design C++ classes for code reuse.	K6

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	S	S
CO2	M	M	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Core – VI		**Course Code:** 21UCS4C06		**Course Title:** Software Engineering
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
IV	5	75	4	100

Course Objectives

1. Understanding of software requirements and the SRS documents.
2. Understanding of the role of project management including planning, scheduling, risk management, etc.
3. Describe different models and understanding of different software architectural styles.
4. Understanding on quality control and how to ensure good quality software.
5. Be successful professionals in the field with firm fundamental knowledge of software engineering.
6. Apply their foundations in software engineering to adapt to readily changing environments using the appropriate theory, principles and processes.

UNIT – I

Introduction – Software Engineering Discipline – Evolution and Impact – Programs Vs Software Products. Software Life Cycle Models: Use of a Life Cycle Models – Classical Waterfall Model – Iterative Waterfall Model – Prototyping Model – Evolutionary Model – Spiral Model. Software Project Management: Responsibilities of a Software Project Manager – Project Planning – Metrics for Project Size Estimation – Project Estimation Techniques – Risk Management.

UNIT – II

Requirements Analysis and Specification: Requirements Gathering and Analysis – Software Requirements Specification (SRS) – Formal System Development Techniques. Software Design: Characteristics of a Good Software Design – Cohesion and Coupling – Neat Arrangement – Software Design Approaches.

UNIT – III

Function-Oriented Software Design: Overview of SA/SD Methodology – Structured Analysis – Data Flow Diagrams (DFDs). Object Modeling Using UML: Overview of Object-Oriented Concepts – UML Diagrams – Use Case Model – Class Diagrams – Interaction Diagrams – Activity Diagrams – State Chart Diagram.

UNIT – IV

User Interface Design: Characteristics of a Good User Interface – Basic Concepts – Types of User Interfaces – Component-Based GUI Development; Coding and Testing: Coding – Testing – UNIT Testing – Black-Box Testing – White-Box Testing – Debugging – Integration Testing – System Testing.

UNIT – V

Software Reliability and Quality Management: Software Reliability – Statistical Testing – Software Quality – Software Quality Management System – ISO 9000. Computer Aided Software Engineering: CASE Environment – CASE support in Software Life Cycle – Characteristics of CASE Tools – Architecture of a CASE Environment. Software Maintenance: Characteristics of Software Maintenance – Software Reverse Engineering – Software Maintenance Process Models – Estimation of Maintenance Cost. Software Reuse: Issues in any Reuse Program – Reuse Approach.

Text Book

1. Rajib Mall, “Fundamentals of Software Engineering”, 3rd Edition, Prentice Hall of India Private Limited, 2008.

Reference Books

1. Roger S.Pressman and Bruce R.Maxim, “Software Engineering: A Practitioner's Approach”, 8th Edition, McGraw Hill Higher Education, 2015.
2. Rajib Mall, “Fundamentals of Software Engineering”, 4th Edition, Prentice Hall of India Private Limited, 2014.
3. Richard Fairley, “Software Engineering Concepts”, TMGH Publications, 2004.

4. Hans van Vliet, "Software Engineering: Principles and Practice", Third Edition, Wiley, 2010.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Apply the software engineering life cycle by demonstrating competence in communication, planning, analysis, design, construction, and deployment.	K3 & K4
CO2	Ability to work in one or more significant application domains.	K3 & K4
CO3	Work as an individual and as part of a multidisciplinary team to develop and deliver quality software.	K4, K5 & K6
CO4	Ability to work as an effective member or leader of software engineering teams.	K4
CO5	Ability to understand and meet ethical standards and legal responsibilities.	K5 & K6

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	M
CO2	S	S	S	S	M
CO3	S	S	S	M	S
CO4	S	M	S	S	S
CO5	S	S	S	M	M

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Core – VII		**Course Code:** 21UCS4C07		**Course Title:** Web Technology
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
IV	4	60	4	100

Course Objectives

1. To understand the structuring documents for the web.
2. To understand website development in a user friendly manner.
3. To improve the visual design and content structuring.
4. To gain the skills and project-based experience needed for entry into web application and development careers.

UNIT – I

Structuring Documents for the Web: Introducing HTML and XHTML, Basic Text Formatting, Presentational Elements, Phrase Elements, Lists, Editing Text, Core Elements and Attributes, Attribute Groups. Links and Navigation: Basic Links, Creating Links with the <a> Element, Advanced E- mail Links. Images, Audio, and Video: Adding Images Using the <img> Element, Using Images as Links Image Maps, Choosing the Right Image Format, Adding Flash, Video and Audio to your Webpages.

UNIT – II

Tables: Introducing Tables, Grouping Section of a Table, Nested Tables, Accessing Tables. Forms: Introducing Forms, Form Controls, Sending Form Data to the Server. Frames: Introducing Frameset, <frame> Element, Creating Links Between Frames, Setting a Default Target Frame Using <base> Element, Nested Framesets, Inline or Floating Frames with <iframe>.

UNIT – III

Cascading Style Sheets: Introducing CSS, Where you can Add CSS Rules. CSS Properties: Controlling Text, Text Formatting, Text Pseudo Classes, Selectors, Lengths, Introducing the

Box Model. More Cascading Style Sheets: Links, Lists, Tables, Outlines, The :focus and :activate Pseudo classes Generated Content, Miscellaneous Properties, Additional Rules, Positioning and Layout wit, Page Layout CSS , Design Issues.

UNIT – IV

Java Script: How to Add Script to Your Pages, Variables and Data Types – Statements and Operators, Control Structures, Conditional Statements, Loop Statements – Functions – Message box, Dialog Boxes, Alert Boxes, Confirm Boxes, Prompt Boxes.

UNIT – V

Working with JavaScript: Practical Tips for Writing Scripts, JavaScript Objects: Window Object – Document Object – Browser Object – Form Object – Navigator Object Screen object – Events, Event Handlers, Forms – Validations, Form Enhancements, JavaScript Libraries.

Text Book

1. Jon Duckett, Beginning HTML, XTML, CSS and JavaScript, Wiley Publishing, 2009.

References Books

1. Chris Bates, "Web Programming", Wiley Publishing, 3rd Edition, 2007.
2. M. Srinivasan, "Web Technology: Theory and Practice", Pearson Publication, 2012.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the uses of HTML Tags.	K1 & K2
CO2	Learning and implementing CSS.	K2 & K3
CO3	Understanding the concepts of scripting languages.	K1, K2 & K3
CO4	Make the web pages more dynamic and interactive.	K2, K3, K4 & K5
CO5	Designing and developing web pages.	K5 & K6

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	S	S
CO2	M	S	S	S	S
CO3	S	S	S	S	S
CO4	S	M	S	S	S
CO5	S	M	S	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Core Practical – IV	**Course Code:** 21UCS4P04		**Course Title:** Web Technology Lab	
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
IV	3	45	3	100

Course Objectives

1. To understand the structuring documents for the web.
2. To understand website development in a user friendly manner.
3. To improve the visual design and content structuring.
4. To gain the skills and project-based experience needed for entry into web application and development careers.

List of Programs

1. Create a form having number of elements (Textboxes, Radio buttons, Checkboxes, and so on). Write JavaScript code to count the number of elements in a form.
2. Create a HTML form that has number of Textboxes. When the form runs in the Browser fill the textboxes with data. Write JavaScript code that verifies that all textboxes has been filled. If a textboxes has been left empty, popup an alert indicating which textbox has been left empty.
3. Develop a HTML Form, which accepts any Mathematical expression. Write JavaScript code to Evaluates the expression and Displays the result.
4. Create a page with dynamic effects. Write the code to include layers and basic animation.
5. Write a JavaScript code to find the sum of N natural Numbers. (Use user defined function)
6. Write a JavaScript code block using arrays and generate the current date in words, this should include the day, month and year.
7. Create a form for Student information. Write JavaScript code to find Total, Average, Result and Grade.
8. Create a form for Employee information. Write JavaScript code to find DA, HRA, PF, TAX, Gross pay, Deduction and Net pay.

9. Create a form consists of a two Multiple choice lists and one single choice list
   (a)The first multiple choice list, displays the Major dishes available
   (b)The second multiple choice list, displays the Starters available.
   (c)The single choice list, displays the Soft drinks available.
10. Create a web page using two image files, which switch between one another as the mouse pointer moves over the image. Use the on Mouse Over and on Mouse Out event handlers.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the uses of HTML Tags.	K1 & K2
CO2	Learning and implementing CSS.	K2 & K3
CO3	Understanding the concepts of scripting languages.	K1, K2 & K3
CO4	Make the web pages more dynamic and interactive.	K2, K3, K4 & K5
CO5	Designing and developing web pages.	K5 & K6

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	S	S
CO2	M	S	S	S	S
CO3	S	S	S	S	S
CO4	S	M	S	S	S
CO5	S	M	S	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Core – VIII		**Course Code:** 21UCS5C08		**Course Title:** Operating Systems
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
V	6	90	4	100

Course Objectives

1. To obtain knowledge about Operating System overview.
2. To impart the basic commands in shell programming.
3. To know about process and threads.
4. To understand the concepts of Deadlock, Concurrency and Semaphores.
5. To understand the basic concepts in file management.

UNIT – I

Introduction – History of Operating System – Different Kinds of Operating System – Operation System Concepts – System Calls – Operating System Structure.

UNIT – II

Processes and Threads: Processes – Threads – Thread Model and Usage – Inter Process Communication.

UNIT – III

Scheduling – Memory Management: Memory Abstraction – Virtual Memory – Page Replacement Algorithms.

UNIT – IV

Deadlocks: Resources – Introduction to Deadlocks – Deadlock Detection and Recovery – Deadlocks Avoidance – Deadlock Prevention. Multiple Processor System: Multiprocessors – Multi-Computers.

UNIT – V

Input/Output: Principles of I/O Hardware – Principles of I/O Software. Files Systems: Files – Directories – Files Systems Implementation – File System Management and Optimization.

Text Book

1. Andrew S. Tanenbaum, "Modern Operating Systems", PHI Private Limited, New Delhi, 2nd Edition, 2008.

Reference Books

1. William Stallings, "Operating Systems – Internals & Design Principles", Prentice – Hall of India Private Ltd., New Delhi, 5th Edition, 2004.
2. Sridhar Vaidyanathan, "Operating System", Vijay Nicole Publications, 1st Edition, 2014.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the structure of OS and basic architectural components involved in OS design.	K1 & K2
CO2	Understand what a process is and how process are synchronized and schedule.	K2 & K3
CO3	Understand the concepts like deadlock, memory management and file management.	K2, K3 & K4
CO4	Analyze the need for scheduling algorithms.	K4 & K5
CO5	Demonstrate an understanding of different I/O technique in OS.	K5

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	M	S
CO2	M	M	S	S	S
CO3	M	S	S	S	S
CO4	M	S	S	S	S
CO5	S	S	S	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Core – IX		**Course Code:** 21UCS5C09		**Course Title:** Relational Database Management System
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
V	6	90	4	100

Course Objectives

1. To understand the concepts of Database concepts.
2. To understand the concepts of Relational Calculus.
3. To develop the logical design of the database using data modeling concepts such as entity-relationship diagrams.
4. To develop programming skills in PL/SQL.
5. To create a relational database using a relational database package, function and trigger.

UNIT – I

Introduction: Database System Applications – DBMS Vs. File System – View of Data – Data Model – Database Languages – Database users and Administrators – Transaction Management – Database System Structure – Application Architecture. Data Models: Basic Concepts – Constraint – Keys – ER Diagram – Weak Entity – Extended ER Features - Design of an ER Schema.

UNIT – II

Relational Model: Structure of Relational Databases – Relational Algebra. SQL: Background – Basic Structure – Set Operation – Aggregate Function – Null Values – Nested Sub Queries – Views – Modification of the Database – Data Definition Language – Embedded SQL – Dynamic SQL.

UNIT – III

Data Normalization: Pitfalls in Relational Database Design – Decomposition – Functional Dependencies – Normalization – First Normal Form – Second Normal Form – Third Normal

Form – Boyce-Codd Normal Form – Fourth Normal Form – Fifth Normal Form – Denormalization – Database Security: Data Security Requirements – Protecting the Data within the Database – Granting and Revoking Privileges – Data Encryption.

UNIT – IV

PL/SQL: A Programming Language: History – Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Declaration – Assignment Operation – Bind Variables – Substitution Variables – Printing – Arithmetic Operators. Control Structures and Embedded SQL: Control Structures – Nested Blocks – SQL in PL/SQL – Data Manipulation – Transaction Control Statements. PL/SQL Cursors and Exceptions: Cursors – Implicit & Explicit Cursors and Attributes – Cursor FOR loops – SELECT…FOR UPDATE – WHERE CURRENT OF Clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions.

UNIT – V

PL/SQL Composite Data Types: Records – Tables – Varrays. Named Blocks: Procedures – Functions – Packages – Triggers – Data Dictionary Views. .

Text Books

1. A Silberschatz, H Korth, S Sudarshan, “Database System and Concepts”, McGraw-Hill, 5th Edition, 2005.
2. Alexis Leon & Mathews Leon, “Fundamentals of DBMS”, Vijay Nicole Publications, 2nd Edition, 2014.
3. Nilesh Shah, “Database Systems Using Oracle”, PHI, 2nd edition, 2004

Reference Book

1. Alexis Leon & Mathews Leon, “Essential of DBMS”, Vijay Nicole Publications, 2nd Reprint, 2009.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand database concepts, structures and E-R Model.	K1 & K2
CO2	Understand the relational model and relational algebra operations.	K2
CO3	Normalize the relational tables applying normalization rules.	K2 & K3
CO4	Perform PL/SQL programming using concept of Cursor Management, Error Handling, Package and Trigger.	K2, K3 & K4
CO5	Apply PL/SQL procedural interfaces statement on relational tables as per requirements.	K4, K5 & K6

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	S	S
CO2	M	M	S	S	S
CO3	M	M	S	S	S
CO4	M	S	S	S	S
CO5	M	S	S	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Core – X		**Course Code:** 21UCS5C10		**Course Title:** .Net Programming
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
V	6	60	4	100

Course Objectives

1. Creates web based applications using . net frameworks.
2. Use different server controls to create rich user interactive websites.
3. Access data from the database in data bound controls on the web page.
4. Apply master page to different pages in the website.

UNIT – I

The .NET Framework – Learning the .NET languages – Introduction – .Net Revolution – .Net Framework and its Architecture – CLR – What is Assembly – Components of Assembly – DLL Hell and Assembly Versioning – Objects and Namespaces – Setting Up ASP.NET and IIS.

UNIT – II

Developing VB.NET Applications – Introduction to VB.Net, The .Net Frame Work and Common Language Runtime, Building VB. Net Application, VB IDE, Forms, Properties, Events, VB Language - Console Application and 46 Windows Application, Data Type, Declaring Variable, Scope of Variable, Operators and Statements.

UNIT – III

Windows Applications - Forms, Adding Controls to Forms, Handling Events, MsgBox, Input Box, Multiple Forms, Handling Mouse and Keyboard Events, Object Oriented Programming Creating and Using Classes and Objects, Handling Exceptions – On Error Goto.

UNIT – IV

Developing ASP.NET Applications – ASP.NET Applications – Understanding ASP.NET Controls – Overview of ASP.NET Framework, Web Form Fundamentals – Web Control Classes – Using Visual Stdio.NET – Validation and Rich Controls – State Management – Tracing, Logging, and Error Handling.

UNIT – V

ADO.NET – Overview of ADO.NET – ADO.NET Data Access – Connected and Disconnected Database, Create Connection using ADO.NET Object Model, Connection Class, Command Class. Data binding – Data List – Data Grid – Repeater – Files, Streams and Email.

Text Books

1. James Holmes, "Struts: The Complete Reference", McGraw Hill Professional, 2nd Edition, 2007
2. Mathew Mac Donald, "ASP.NET Complete Reference", TMH, 2005.
3. Steven Holzner, "Visual Basic. NET Black Book", Wiley Publisher, 1st Edition, 2000.

Reference Books

1. J.Liberty, D.Hurwitz, "Programming ASP.NET", O'REILLY, 3rd Edition, 2006.
2. Tim Anderson, "Visual Basic. Net Programming in Easy Steps", Dreamtech Press.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Describes .NET Framework and Common Language Runtime.	K1 & K2
CO2	Understand the development and deployment of enterprise applications.	K2
CO3	Develop ASP.Net web services, secure web services and .Net remoting applications.	K2 & K3
CO4	Interpret concepts of constructors , inheritance and interface.	K4 & K5
CO5	Ability to handle data access technologies in ADO.NET for data manipulations.	K5 & K6

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	M	S	S	S	S
CO2	S	S	S	S	S
CO3	M	S	S	S	S
CO4	M	S	S	S	S
CO5	M	M	S	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Core Practical – V	**Course Code:** 21UCS5P05		**Course Title:** .Net Programming Lab	
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
V	3	45	3	100

Course Objectives

1. Creates web based applications using . net frameworks.
2. Use different server controls to create rich user interactive websites.
3. Access data from the database in data bound controls on the web page.
4. Apply master page to different pages in the website.

List of Programs

1. Develop a Program for simple calculator.
2. Develop an application to create, save, update, delete and search employee profile in employee database system (with database connectivity).
3. Develop an application to create inventory management system (with database connectivity).
4. Develop an application to create student mark entry system (with database connectivity).
5. Design an ASP.Net Web Forms using the Applications.
6. Develop an ASP.Net Program to illustrate Validation Controls.
7. Develop an ASP.Net Program using Web User controls.
8. Develop an ASP.Net Program using Data Binding with Server controls.
9. Develop an ASP.Net Program using Database Programming concepts in ADO.Net.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Describes .NET Framework and Common Language Runtime.	K1 & K2
CO2	Understand the development and deployment of enterprise applications.	K2
CO3	Develop ASP.Net web services, secure web services and .Net remoting applications.	K2 & K3
CO4	Interpret concepts of constructors, inheritance and interface.	K4 & K5
CO5	Ability to handle data access technologies in ADO.NET for data manipulations.	K5 & K6

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	M	S	S	S	S
CO2	S	S	S	S	S
CO3	M	S	S	S	S
CO4	M	S	S	S	S
CO5	M	M	S	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Core – XI	**Course Code:** 21UCS6C11		**Course Title:** Computer Networks	
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
VI	6	90	4	100

Course Objectives

1. To deal with basic ideas of networking domain.
2. To understand the principles and concepts on computer networks.
3. To describe the various communication networks and their main components.
4. To identify some of the factors driving the need for network security.

UNIT – I

Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP Models – Example Networks: Internet, 3G Mobile Phone Networks, Wireless LANs – RFID and Sensor Networks – Physical Layer – Theoretical Basis for Data Communication – Guided Transmission Media.

UNIT – II

Wireless Transmission – Communication Satellites – Digital Modulation and Multiplexing – Telephones Network Structure – Local Loop, Trunks and Multiplexing, Switching. Data Link Layer: Design Issues – Error Detection and Correction.

UNIT – III

Elementary Data Link Protocols – Sliding Window Protocols – Example Data Link Protocols – Packet Over SONET, ADSL – Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols.

UNIT – IV

Network Layer – Design Issues – Routing Algorithms – Congestion Control Algorithms – Quality of 25 Service – Network Layer of Internet – IP Protocol – IP Address – Internet Control Protocol.

UNIT – V

Transport Layer – Transport Service – Elements of Transport Protocol – Addressing, Establishing & Releasing a Connection – Error Control, Flow Control, Multiplexing and Crash Recovery – Internet Transport Protocol – TCP – Network Security: Cryptography.

Textbook

1. A. S. Tanenbaum, "Computer Networks", Pearson Education, 5th Edition, 2011

Reference Books

1. B. Forouzan, "Introduction to Data Communications in Networking", Tata McGraw Hill, New Delhi, 1998,
2. F. Halsall, "Data Communications, Computer Networks and Open Systems", Addison Wessley, 1995.
3. D. Bertsekas and R. Gallagher, "Data Networks", Prentice Hall of India, New Delhi, 1992.
4. Lamarca, "Communication Networks", Tata McGraw Hill, New Delhi, 2002.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Visualize the different aspects of networks, protocols and network design models.	K1 & K2
CO2	Examine various layer design issues protocols.	K1 & K2
CO3	Analyze and compare different LAN protocols.	K2 & K3
CO4	Compare and select appropriate routing algorithms for a network.	K4 & K5
CO5	Compare and select appropriate routing algorithms for a network applets.	K4 & K5

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	S	S
CO2	S	S	S	S	S
CO3	M	M	S	S	S
CO4	M	S	S	M	S
CO5	M	S	S	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Core – XII	**Course Code:** 21UCS6C12		**Course Title:** PHP with MySQL	
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
VI	5	75	4	100

Course Objectives

1. To understand basics of PHP.
2. To elaborate the core syntax of PHP Language.
3. To make the students to get practical knowledge of PHP with MYSQL lab.

UNIT – I

Introducing PHP – Basic Development Concepts – Creating First PHP Scripts – Using Variable and Operators – Storing Data in Variable – Understanding Data Types – Setting and Checking Variables Data Types – Using Constants – Manipulating Variables with Operators.

UNIT – II

Controlling Program Flow: Writing Simple Conditional Statements – Writing More Complex Conditional Statements – Repeating Action with Loops – Working with String and Numeric Functions.

UNIT – III

Working with Arrays: Storing Data in Arrays – Processing Arrays with Loops and Iterations – Using Arrays with Forms - Working with Array Functions – Working with Dates and Times.

UNIT – IV

Using Functions and Classes: Creating User-Defined Functions – Creating Classes – Using Advanced OOP Concepts. Working with Files and Directories: Reading Files-Writing Files – Processing Directories.

UNIT – V

Working with Database and SQL: Introducing Database and SQL – Using MySQL – Adding and modifying Data – Handling Errors – Using SQLite Extension and PDO Extension. Introduction XML – Simple XML and DOM Extension.

Text Book

1. Vikram VASWANI, "PHP A Beginner's Guide", Tata McGraw-Hill, 2008.

Reference Books

1. Steven Holzner. "The PHP Complete Reference", Tata McGraw-Hill, 2007.
2. Steven Holzer, "Spring into PHP5", Tata McGraw Hill Edition, 2011.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Create small programs using basic PHP concepts.	K1 & K2
CO2	Apply In-Built and Create User defined functions in PHP programming.	K2 & K3
CO3	Design and develop a Web site using form controls for presenting web based content.	K3 & K4
CO4	Debug the Programs by applying concepts and error handling techniques of PHP.	K3, K4 & K5
CO5	Create dynamic Website/ Web based Applications, using PHP, MySQL database.	K5 & K6

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	M	S	S	S
CO3	S	M	S	S	S
CO4	M	M	S	S	S
CO5	S	S	S	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Core – XIII	**Course Code:** 21UCS6C13		**Course Title:** Java Programming	
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
VI	5	75	4	100

Course Objectives

1. To understand the nature of Java programming.
2. To describe the core syntax and semantics of Java programming language.
3. To understand Object oriented concepts like data abstraction, encapsulation, etc.
4. To solve the real world scenarios using top down approach.
5. To understand various Java programming constructs.

UNIT – I

Java Overview: Introduction – Simple Java Program – Java Program Structure – Java Tokens – Java Statements – JVM – Command Line Arguments – Constants, Variables, and Data Types – Operators and Expressions.

UNIT – II

Decision Making and Branching: Introduction – Decision Making with if Statement – Simple if Statement – The if…else Statement – Nesting of if…else Statement – The else if Ladder – The Switch Statement – The ?: Operator. Decision Making and Looping: Introduction – The While Statement – The Do Statement – The For Statement – Jumps in Loops – Labelled Loops. Classes, Objects and Methods: Introduction – Defining a Class – Fields Declaration – Methods Declaration – Creating Objects – Accessing Class Members – Constructors – Methods Overloading – Static Members – Nesting of Methods – Inheritance – Overriding Methods – Final Variables and Methods – Final Classes – Finalizer Methods – Abstract Methods and Classes – Methods with Var args –Visibility Control.

UNIT – III

Arrays, Strings and Vectors: Introduction – One-Dimensional Arrays – Creating an Array – Two Dimensional Arrays – Strings – Vectors – Wrapper Classes – Enumerated Types – Annotations.

Interfaces: Introduction – Defining Interfaces – Extending Interfaces – Implementing Interfaces – Accessing Interface Variables – Packages: Introduction – Java API Packages – Using System Packages – Naming Conventions – Creating Packages – Accessing a Package – Using a Package –Adding a Class to a Package – Hiding Classes – Static Import.

UNIT – IV

Multithreaded Programming: Introduction – Creating Threads – Extending the Thread class – Stopping and Blocking a Thread - Life cycle of a Thread – Using Thread Methods – Thread Exceptions – Thread Priority – Implementing the Runnable Interface. Managing Errors and Exceptions: Introduction – Types of Errors – Exceptions – Syntax of Exception Handling Code – Multiple Catch Statements – Using Finally Statement – Throwing Our Own Exceptions. Applet Programming: Introduction – Difference Between Applets and Applications – Write Applets – Building Applet Code – Applet Life Cycle – Creating an Executable Applet – Designing a Web Page – Applet Tag – Adding Applet to HTML File– Running the applet – Applet Tags – Passing Parameters to Applets – Aligning the Display – Displaying Numerical Values – Getting Input from the User – Event Handling.

UNIT – V

Graphics Programming: Introduction – The Graphics Class - Lines and Rectangles – Circles and Ellipses – Drawing Arcs – Drawing polygons – Line Graphs – Using Control Loops in Applets – Drawing Bar Charts. Managing I/O Files in Java: Introduction – Concept of Stream – Stream Classes – Byte Stream Classes – Character Stream Classes.

Text Book

1. E. Balagurusamy, “Programming with Java,” Tata McGraw Hill Pub. Ltd., New Delhi, 4th Edition, 2009.

Reference Books

1. Herbert Schild, "Java: The Complete Reference," Ninth Edition, Oracle Press, 2014
2. Rohit Khurana, "Programming with JAVA", VIKAS Publisher., 2014

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the need of object oriented programming, fundamental concepts.	K1 & K2
CO2	Implement relationships between classes.	K2 & K3
CO3	Apply concepts for various programming applications.	K3, K4 & K5
CO4	Implement applets for GUI concepts.	K4, K5 & K6
CO5	Developed skills in graphics programming.	K4, K5 & K6

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	M	M	S	M	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Core Practical – VI	**Course Code:** 21UCS6P06		**Course Title:** Java Programming Lab	
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
VI	3	45	3	100

Course Objectives

1. To understand the nature of Java programming.
2. To describe the core syntax and semantics of Java programming language.
3. To understand Object oriented concepts like data abstraction, encapsulation, etc.
4. To solve the real world scenarios using top down approach.
5. To understand various Java programming constructs.

Practical Lists

1. Write a program to find the Area of Square, Rectangle and Circle using Method Overloading.
2. Write a program to sort the list of numbers using Command Line Arguments.
3. Write a program to multiply the given two matrices.
4. Write a program to design a class to represent a bank account. Include the following:

   Data Members: Name of the depositor, Account number, Type of account, and Balance amount in the account.

   Methods: To assign initial values, To deposit an amount, To withdraw an amount after checking balance, and To display the name and balance.
5. Write a program that import the user defined package and access the Member variable of classes that contained by Package.
6. Write a program to handle the Exception using try and multiple catch blocks.
7. Write a program to illustrate the use of multi threads.
8. Write a program to create student registration form using applet with Name, Address, Sex, Class, Email-id.
9. Write a program to draw the line, rectangle, oval, text using the graphics method.

10. Write a program to create a sequential file that could store details about five products. Details include product code, cost, and number of items available and are provided through the keyboard. Compute and print the total value of all the five products.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the need of object oriented programming, fundamental concepts.	K1 & K2
CO2	Implement relationships between classes.	K2 & K3
CO3	Apply concepts for various programming applications.	K3, K4 & K5
CO4	Implement applets for GUI concepts.	K4, K5 & K6
CO5	Developed skills in graphics programming.	K4, K5 & K6

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	M	M	S	M	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S – Strong **M – Medium** **L – Low**

Program: B.Sc. Computer Science				
Project	**Course Code:** 21UCS6PR1		**Course Title:** Project	
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
VI	3	45	5	100

Course Objectives

1. To implement the concepts of SDLC.
2. To experience development of real time applications.
3. To practice the students rapid application development.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Develop knowledge in Software project.	K1
CO2	Understand the concept and challenges in Software Project Management	K1
CO3	To analyses the issues in developing applications.	K2
CO4	Gain hands-on experience on systematic approach in project development.	K3
CO5	Can experience the bottlenecks of various languages and solve it.	K4

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	M	M	M	S	S
CO2	S	M	S	S	S
CO3	S	S	S	M	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S – Strong **M – Medium** **L – Low**

ELECTIVE COURSES

Programme: B.Sc. Computer Science				
Elective – I	**Course Code:** 21UCS5E01		**Course Title:** Mobile Computing	
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
V	6	90	5	100

Course Objectives

1. To learn the basic concepts of mobile computing and its applications.
2. To provide various emerging technologies in Mobile computing services.
3. To gain knowledge about telecommunication systems.
4. To understand various mobile network layers.

UNIT – I

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 – II

Telecommunication Systems – GSM – Architecture – Sessions – Protocols – Hand Over and Security – UMTS and IMT – 2000 – Satellite Systems.

UNIT – III

Wireless Lan – IEEE S02.11 – Hiper LAN – Bluetooth – Security and Link Management.

UNIT – IV

Mobile Network Layer – Mobile IP – Goals – Packet Delivery – Strategies – Registration – Tunneling and Reverse Tunneling – Adhoc Networks – Routing Strategies

UNIT – V

Mobile Transport Layer – Congestion Control – Implication of TCP Improvement – Mobility – Indirect – Snooping – Mobile – Transaction Oriented TCP – TCP Over Wireless – Performance.

Text Book

1. J. Schiller, "Mobile Communications", Pearson Education, Delhi, 2nd Edition, 2003.

Reference Books

1. Hansmann, Merk, Nicklous, Stober, "Principles of Mobile Computing", Springer (India), 2nd Edition, 2004.
2. Pahlavan, Krishnamurthy, "Principle of wireless Networks: A unified Approach", Pearson Education, Delhi, 2003.
3. Martyn Mallick, "Mobile and Wireless Design Essentials", Wiley Dreamtech India Pvt. Ltd., New Delhi, 2004.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamentals of mobile computing.	K1 & K2
CO2	Analyze the unique characteristics in mobile communication.	K2, K3 & K4
CO3	Compare and contasts multiple divison techniques, mobile communication systems and existing wirelessnetworks.	K3 & K4
CO4	Demonstrate the basic skills for cellular network design.	K4 & K5
CO5	Apply knowledge of TCP/IP extensions for mobile and wireless networking.	K4, K5 & K6

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	S
CO2	M	M	S	S	S
CO3	M	M	S	S	S
CO4	S	M	S	S	S
CO5	S	S	S	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Elective – I		**Course Code:** 21UCS5E02		**Course Title:** Software Testing
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
V	6	90	5	100

Course Objectives

1. Understand testing process and types of bugs occurred.
2. Recognize flow and graphing methods.
3. Accomplished to domain and knowledge of interfaces.
4. Familiar with metrics and syntax of testing paths.
5. Know all the testing types and launches everything without bugs.

UNIT – I

Introduction: Purpose – Productivity and Quality in Software – Testing vs Debugging – Model for Testing – Bugs – Types of Bugs – Testing and Design Style.

UNIT – II

Flow / Graphs and Path Testing – Achievable Paths – Path Instrumentation – Application – Transaction Flow Testing Techniques.

UNIT – III

Data Flow Testing Strategies – Domain Testing: Domains and Paths – Domains and Interface Testing.

UNIT – IV

Linguistic – Metrics – Structural Metric – Path Products and Path Expressions. Syntax Testing – Formats – Test Cases.

UNIT – V

Logic Based Testing – Decision Tables – Transition Testing – States, State Graph, State Testing.

Text Books

1. B. Beizer, "Software Testing Techniques", DreamTech India, New Delhi, 2nd Edition, 2003.
2. K.V.K. Prasad, "Software Testing Tools", DreamTech. India, New Delhi, 2005.

Reference Books

1. Burnstein, "Practical Software Testing", Springer International Edn, 2003.
2. E. Kit, "Software Testing in the Real World: Improving the Process", Pearson Education, Delhi, 1995.
3. R. Rajani, and P.P. Oak, "Software Testing", Tata Mcgraw Hill, New Delhi, 2004.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Be acquainted with testing and design style.	K1 & K2
CO2	Rich knowledge on graphs, flow of testing and choosing best techniques for testing.	K1 & K2
CO3	Intelligence acquaintance domains and interfacing testing of any software.	K3
CO4	Thorough in depth on any test cases they achieved by themselves.	K3, K4 & K5
CO5	Deal the bug and matching correct testing strategies for everything.	K5 & K6

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	S	S
CO2	S	M	S	S	S
CO3	S	S	S	S	S
CO4	M	M	S	S	S
CO5	S	M	S	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Elective – I	**Course Code:** 21UCS5E03		**Course Title:** E-Commerce Technologies	
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
V	6	90	5	100

Course Objectives

1. To provide an introduction to information systems for business and management.
2. Designed to familiarize students with organizational and managerial foundations of systems, the technical foundation for understanding information systems.

UNIT – I

History of E-Commerce and Indian Business Context: E-Commerce – Emergence of the Internet – Emergence of the WWW – Advantages of E-Commerce – Transition to E-Commerce in India – The Internet and India – E-transition Challenges for Indian Corporate.

Business Models for E-commerce: Business Model – E-business Models Based on the Relationship of Transaction Parties – E-business Models Based on the Relationship of Transaction Types.

UNIT – II

Enabling Technologies of the World Wide Web: World Wide Web – Internet Client -Server Applications – Networks and Internets.

E-Marketing: Traditional Marketing – Identifying Web Presence Goals – Online Marketing – E-advertising – Ebranding.

UNIT – III

E-Security: Information system Security – Security on the Internet – Information Security Environment in India.

Legal and Ethical Issues: Cyberstalking – Privacy is at Risk in the Internet Age – Phishing – Application Fraud – Skimming – Copyright

UNIT – IV

e-Payment Systems: Main Concerns in Internet Banking – Digital Payment Requirements – Digital Token-based e-payment Systems – Classification of New Payment Systems – Properties of Electronic Cash – Risk and e-Payment Systems – Designing E-Payment Systems – Digital Signature – Online Financial Services in India – Online Stock Trading.

UNIT – V

Information Systems for Mobile Commerce: What is Mobile Commerce? – Wireless Applications – Cellular Network – Technologies for Mobile Commerce – Wireless Technologies – Different Generations in Wireless Communication – Portals for E-Business: Portals – Human Resource Management – Various HRIS Modules.

Text Book

1. P.T. Joseph, “E-Commerce - An Indian Perspective”, PHI, 4th Edition, 2012.

Reference Book

1. David Whiteley, “E-Commerce Strategy, Technologies and Applications”, Tata Mc-Graw-Hill, 2001.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts and technologies used in the field of management information systems.	K1 & K2
CO2	Design components, systems and/or processes to meet required specifications for a web presence.	K2 & K3
CO3	Communicate effectively in ways appropriate to the discipline, audience and purpose.	K3
CO4	Have the knowledge of the different types of management information systems.	K4 & K5
CO5	Understand the processes of developing and implementing information systems.	K5 & K6

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	S	S
CO2	M	M	S	S	S
CO3	S	M	S	S	S
CO4	S	S	S	S	S
CO5	S	M	S	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Elective – II	**Course Code:** 21UCS6E04		**Course Title:** Data Mining	
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
VI	6	90	5	100

Course Objectives

1. To learn the basic concepts of Data Mining algorithms, methods and tools.
2. To Identify appropriate data mining algorithms to solve real world problems.
3. To develop and apply critical thinking, problem-solving, and decision-making skills.
4. To discover interesting patterns, analyze supervised and unsupervised models and estimate the accuracy of the algorithms.
5. To characterize the kinds of patterns that can be discovered by association rule mining, classification and clustering.

UNIT – I

Introduction: Data Mining Tasks – Data Mining Versus Knowledge Discovery in Databases – Relational Databases – Data Warehouses – Transactional Databases – Object Oriented Databases – Spatial Databases – Temporal Databases – Text and Multimedia Databases – Heterogeneous Databases – Mining Issues – Metrics – Social Implications of Data Mining.

UNIT – II

Data Preprocessing: Why Preprocess the Data – Data Cleaning – Data Integration – Data Transformation – Data Reduction – Data Discretization.

UNIT – III

Data Mining Techniques: Association Rule Mining – The Apriori Algorithm – Multilevel Association Rules – Multidimensional Association Rules – Constraint Based Association Mining.

UNIT – IV

Classification and Prediction: Issues regarding Classification and Prediction – Decision Tree induction – Bayesian Classification – Back Propagation – Classification Methods – Prediction – Classifiers accuracy.

UNIT – V

Clustering Techniques: Cluster Analysis – Clustering Methods – Hierarchical Methods – Density Based Methods – Outlier Analysis – Introduction to Advanced Topics: Web Mining, Spatial Mining and Temporal Mining.

Text Book

1. J. Han and M. Kamber, "Data Mining: Concepts and Techniques", Morgan Kaufmann, New Delhi, 2001,

Reference Books

1. M.H. Dunham, "Data Mining: Introductory and Advanced Topics", Pearson Education, Delhi, 2003,
2. Paulraj Ponnaiah, "Data Warehousing Fundamentals", Wiley Publishers, 2001.
3. S.N. Sivananda and S. Sumathi, "Data Mining", Thomsan Learning, Chennai, 2006.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the data mining principles and techniques.	K1 & K2
CO2	Learn the concept of raw data processing using data mining algorithms.	K1, K2 & K3
CO3	Learn data mining algorithms to build analytical applications.	K2, K3 & K4
CO4	Gain information's to extract patterns and to solve problems.	K3, K4 & K5
CO5	To cluster the high dimensional data for better organization.	K5 & K6

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	S
CO2	M	M	S	S	S
CO3	S	M	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Elective – II		**Course Code:** 21UCS6E05		**Course Title:** Cyber Security
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
VI	6	90	5	100

Course Objectives

1. To know about cost of security and Ransom ware.
2. To understand the configuration and security challengers.
3. To educate the dark side of computer's.
4. To protect from outside attacks and how to use the networks safely.

UNIT – I

Cyber Security: Steps for a Secure Cloud, Azure Security Center Cost Model: Shared Cost Model – License Cost of Security Center – Azure Cost of Data Storage – Other Considerations – Enterprise Security Architecture – Ransomware Lessons Learned.

UNIT – II

Cloud Security Operations: Cloud Security Challenges – Security Center Overview – Security Center Placement – Select an Azure Subscription. Azure Security Center Configuration: Azure Infrastructure Design – Standard Tier Advantages – Using Security Center.

UNIT – III

Dark Side of the Computer: Viruses, Trojans, and Attacks – Vulnerabilities, Risk Assessment, and Risk Management – Emerging Field of Cyber Security.

UNIT – IV

Internet, Social Media, and Cyber Attacks on Critical Infrastructures – Cyber Threat Spectrum – Cyberspace Attacks and Weapons.

UNIT – V

Basics of Critical Infrastructure Protection – Random Nature of Faults, Failures, and Engineering – In the Presence of Attackers – Issues of Time and Sequence – Economic Impact on Regulation and Duties to Protect – Critical Infrastructure Protection Strategies and Operations – Protection Design Goals and Duties to Protect.

Text Books

1. Marshall Copeland, "Cyber Security on Azure_ An IT Professional's Guide to Microsoft Azure Security Center", Apress, 1st Edition, 2017.
2. Taylor & Francis Group edited "Cyber-security Protecting Critical Infrastructures from Cyber Attack and Cyber Warfare", CRC Press, 2015.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Know about the security issues in the real world.	K1
CO2	Prevent from attacks and cost management.	K1 & K2
CO3	Identify the threads and risk management.	K2 & K3
CO4	Know of internet, social media and cyber-attacks and how they reach us.	K4 & K5
CO5	Apply appropriate strategies to protect from attacks.	K5 & K6

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	S	S
CO2	M	M	S	S	S
CO3	M	M	S	S	S
CO4	S	M	S	S	S
CO5	S	S	S	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Elective – II	**Course Code:** 20UCS6E06		**Course Title:** Network Security	
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
VI	6	90	5	100

Course Objectives

1. To know about various encryption techniques algorithms and models.
2. To understand the concept of key concepts in cryptography.
3. To understand the approaches of authentication, hash functions and mitigate attacks.
4. To impart knowledge on Network security.

UNIT – I

Model of Network Security – Security Attacks, Services and Attacks – OSI Security Architecture – Classical Encryption Techniques – SDES – Block Cipher Principles DES – Strength of DES – Block Cipher Design Principles – Block Cipher Mode of Operation – Evaluation Criteria for AES – RC4 – Differential and Linear Cryptanalysis – Placement of Encryption Function – Traffic Confidentiality.

UNIT – II

Number Theory – Prime Number – Modular Arithmetic – Euclid's Algorithm - Fermet's and Euler's Theorem – Primality – Chinese Remainder Theorem – Discrete Alogarithm – Public Key Cryptography and RSA – Key Distribution – Key Management – Diffie Hellman Key Exchange – Elliptic Curve Cryptography.

UNIT – III

Authentication Requirement – Authentication Function – MAC – Hash Function – Security of Hash Function and MAC – SHA - HMAC – CMAC - Digital Signature and Authentication Protocols – DSS.

UNIT – IV

Authentication Applications – Kerberos – X.509 Authentication Services – Email Security – IP Security – Web Security.

UNIT – V

Intruder – Intrusion Detection System – Virus and Related Threats – Countermeasures – Firewalls Design Principles – Trusted Systems – Practical Implementation of Cryptography and Security.

Text Book

1. William Stallings, "Cryptography & Network Security", Pearson Education, Fourth Edition, 2010.

Reference Books

1. Charlie Kaufman, Radia Perlman, Mike Speciner, "Network Security, Private Communication in Public World", PHI Second Edition, 2002.
2. Bruce Schneier, Neils Ferguson, "Practical Cryptography", Wiley Dreamtech India Pvt. Ltd., First Edition, 2003.
3. Douglas R Simson "Cryptography – Theory and practice", CRC Press, First Edition, 1995.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamentals of networks security, security architecture, threats, vulnerabilities, Security practices and System security standards.	K1 & K2
CO2	Apply the knowledge towards Authentication schemes to simulate different applications of different cryptographic operations cryptographic algorithms.	K2 & K3
CO3	Analyze the problem and develop the optimal cryptographic algorithms for the data in real time.	K3&K4
CO4	Evaluate and compare the model performances using various evaluation measures.	K5
CO5	Learn about concepts of system level and Network Level security.	K2

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	M
CO2	S	S	M	M	M
CO3	S	S	S	S	S
CO4	S	S	S	M	M
CO5	S	S	S	M	M

S – Strong **M – Medium** **L – Low**

Skill Based Elective Course

(SBEC)

Programme: B.Sc. Computer Science				
Skill Based Elective Course – I	**Course Code:** 21UCS3SP01		**Course Title:** Office Automation Lab	
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
III	2	30	2	100

Course Objectives

1. Understand the components of office automation.
2. Perform operations using MS Word, Excel, Power Point.
3. Understand and discuss about the use of Office Package.

I. MS-WORD

1. Text Manipulation: Write a paragraph about your institution and Change the font size and type, Spell check, Aligning and justification of Text.
2. Bio data: Prepare a Bio-data.
3. Find and Replace: Write a paragraph about yourself and do the following.
   Find and Replace - Use Numbering Bullets, Footer and Headers.
4. Tables and manipulation: Creation, Insertion, Deletion (Columns and Rows).
   Create a mark sheet.
5. Mail Merge: Prepare an invitation to invite your friends to your birthday party. Prepare at least five letters.

II. MS-EXCEL

1. Data sorting-Ascending and Descending (both numbers and alphabets).
2. Mark list preparation for a student.
3. Individual Pay Bill preparation.
4. Invoice Report preparation.
5. Drawing Graphs. Take your own table.

III. MS-POWERPOINT

1. Create a slide show presentation for a seminar.
2. Preparation of Organization Charts.
3. Create a slide show presentation to display percentage of marks in each semester for all students.

a. Use bar chart (X-axis: Semester, Y-axis: % marks).

b. Use different presentation template different transition effect for each slide.

E-References

1. https://ptgmedia.pearsoncmg.com/images/9780735623026/samplepages/9780735623026.pdf
2. https://www.dit.ie/media/ittraining/msoffice/MOAC_Excel_2016_Core.pdf
3. https://ptgmedia.pearsoncmg.com/images/9780735697799/samplepages/9780735697799.pdf

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Recognize when to use each of the Microsoft Office programs to create professional and academic documents.	K1
CO2	Create personal, academic and business documents following current professional and/or industry standards.	K1, K2 & K3
CO3	Identify and apply the menus in MS-Word.	K3, K4 & K5
CO4	Understand the menus in Excel.	K3, K4 & K5
CO5	Understand the components of Power point.	K3, K4 & K5

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	S	S
CO2	M	S	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Skill Based Elective Course – II	**Course Code:** 21UCS4S01		**Course Title:** Quantitative Aptitude – I	
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
IV	2	30	2	100

Course Objectives

1. To enhance the interpersonal skills and problem solving skills.
2. To improve the basic mathematical skills.
3. To help students who are preparing for any type of competitive examinations.

UNIT – I

Communication: Tense – Sentence Pattern - Articles – Prepositions.

UNIT – II

Soft Skill: Self Introduction – Interpersonal Skills – Soft Skills Training – Group Discussion – Importance of GD – Types of GD – Movements and Gestures to be Avoided in a GD.

UNIT – III

Numerical Aptitude: Problems on Numbers – Problems on Ages – Percentage.

UNIT – IV

Numerical Aptitude: Profit and Loss – Ratio & Proportion – Time & Work.

UNIT – V

Verbal Reasoning: Letter Series – Number Series – Coding and Decoding.

Text Books

1. Hari Mohan Prasad & Uma Rani Sinha, "Objective English for Competitive Examinations", Tata McGraw Hill Education Private Ltd., (Unit – I)

2. M. S. Rao, "Soft Skills Enhancing Employability-Connecting Campus with Corporate", IK International Publishing House, NewDelhi, 2010. (Unit – II)
3. Alex.K, "Soft Skills-Know Yourself and Know the World", S.Chand Company Ltd., 2011. (Unit – II)
4. R.S. Aggarwal, "Quantitative Aptitude", S.Chand, 2010. (Unit – III & IV)
5. R.S. Agarwal, "A Modern Approach to Verbal Reasoning (Fully Solved)", S.Chand Company Limited, New Delhi, Revised Edition, 2012. (Unit – V)

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Improve the communication skills	K1 & K2
CO2	Improve the interpersonal skills.	K1 & K2
CO3	Understand the basic concepts of quantitative ability.	K2, K3 & K4
CO4	Solve campus placements aptitude papers covering Quantitative Ability, Logical Reasoning and Verbal Ability.	K2, K3 & K4
CO5	Compete in various competitive exams like TANCET, GATE, TNPSC, UPSC, etc.	K3, K4 & K5

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	M	M	M	M	S
CO2	M	M	S	S	S
CO3	S	M	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Skill Based Elective Course – III		**Course Code:** 21UCS5SP02		**Course Title:** Android Programming Lab
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
V	3	45	2	100

Course Objectives

1. To understand the basic concept of mobile devices and types of mobile operating system.
2. To know the concept of cross platform system architecture.
3. To use the development tools in the Android development environment.
4. To develop their own apps using the major components of Android API.
5. To use the Java programming language to build.

List of Programs

1. Sample Application about Android Resources
2. Sample Application about Layouts
3. Sample Application about Intents
4. Sample Application about user interfaces
5. Sample Application about Animations
6. Sample Application about SQLite I
7. Calculator App in Android
8. Simple Android Camera Application
9. Basic List View Demo in Android
10. Google Map in Android

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand various mobile application development tools.	K1 & K2
CO2	Clearly known about Android.	K1 & K2
CO3	Understand user interface methods.	K1 & K2
CO4	Known about android resources.	K1, K2 & K3
CO5	To create mobile application.	K4, K5 & K6

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	M	S	S	S
CO3	S	S	S	S	S
CO4	S	M	S	S	S
CO5	S	S	S	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Skill Based Elective Course – IV		**Course Code:** 21UCS6S02		**Course Title:** Quantitative Aptitude – II
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
VI	2	30	2	100

Course Objectives

1. To enhance the Communication, interpersonal skills and problem solving skills.
2. To improve the basic mathematical skills and reasoning ability.
3. To help students who are preparing for any type of competitive examinations.

UNIT – I

Communication: Active Voice – Passive Voice – Question Tag – Reading Comprehension.

UNIT – II

Soft Skill: Employability Skills – Resume Preparation – Interview Tips and Questions – GD Skills – GD Etiquette – Essential Elements of a GD.

UNIT – III

Numerical Aptitude: Time & Distance – Simple Interest – Compound Interest.

UNIT – IV

Reasoning: Counting Figures: Squares and Triangles. Completion of Incomplete Pattern.

UNIT – V

Reasoning: Blood Relation Problems – Sense of Directions – Arrangement Problems – Syllogism.

Text Books

1. Hari Mohan Prasad & Uma Rani Sinha, "Objective English for Competitive Examinations", Tata McGraw Hill Education Private Ltd., (Unit – I)

2. M. S. Rao, "Soft Skills Enhancing Employability-Connecting Campus with Corporate", IK International Publishing House, NewDelhi, 2010. (Unit – II)
3. Alex.K, "Soft Skills-Know Yourself and Know the World", S.Chand Company Ltd., 2011. (Unit – II)
4. R.S. Aggarwal, "Quantitative Aptitude", S.Chand, 2010. (Unit – III & IV)
5. R.S. Agarwal, "A Modern Approach to Verbal Reasoning (Fully Solved)", S.Chand Company Limited, New Delhi, Revised Edition, 2012. (Unit – V)

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Improve the communication skills	K1 & K2
CO2	Improve the interpersonal skills.	K1 & K2
CO3	Understand the basic concepts of quantitative ability.	K2, K3 & K4
CO4	Solve campus placements aptitude papers covering Quantitative Ability, Logical Reasoning and Verbal Ability.	K2, K3 & K4
CO5	Compete in various competitive exams like TANCET, GATE, TNPSC, UPSC, etc.	K3, K4 & K5

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	M	M	M	M	S
CO2	M	M	S	S	S
CO3	S	M	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	S	S

S – Strong **M – Medium** **L – Low**

Non Major Elective Course (NMEC)

Programme: B.Sc. Computer Science				
Non Major Elective Course – I	**Course Code:** 21UCS3N01		**Course Title:** Basics of Computer	
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
III	2	30	2	100

Course Objectives

1. Understand the Digital number system and their conversions.
2. Identify the operations of logic Gates.
3. Comprehend the fundamental principles of simple Arithmetic Circuits.
4. Know the design and operations of Data Processing Circuits.
5. Realize the design of sequential logic circuits.
6. Gain the knowledge about the memory elements.

UNIT – I

Introduction to Computer: Introduction – Types of Computers – Characteristics of Computers. Generations of Computers: First Generation – Second Generation – Third Generation – Fourth Generation – Fifth Generation. Classification of Digital Computers: Introduction – Microcomputers – Personal Computer – Portable Computers – Mini Computers – Super Computers – Main Frames.

UNIT – II

Number System: Introduction – Decimal Number System – Binary Number System – Binary-Decimal Conversion – Decimal Binary Conversion – Binary Addition – Binary Subtraction – Complements – 9's Complement – 10's Complement – 1's Complements – 2's Complements – BCD – Bits, Bytes, Words – Octal – Hexadecimal Number System.

UNIT – III

Anatomy of Digital Computer: Functions and Components of Computer – Central Processing UNIT – Control UNIT – Arithmetic – Logic UNIT – Memory – Registers – Addresses. Memory UNITs: RAM, ROM, PROM, EPROM, EEPROM, And Flash Memory.

UNIT – IV

Input Devices: Introduction – Keyboard – Mouse – Types of Mice – Connections – Mouse Pad – Trackball – Joystick – Digitizing Tablet – Scanners – Digital Camera – MICR – OCR – OMR – Bar Code Reader – Speech Input Device- Touch Screen – Touch Pad – Light Pen. Output Devices: Introduction – Monitor – Classification of Monitors – Monochrome – Gray Scale – Color – Digital Monitor – Analog Monitor – Characteristics of Monitor – Printers.

UNIT – V

Computer Software: Introduction – Operating System – Utilities – Compiler and Interpreters – Word Processor – Spreadsheets – Presentation Graphics – DBMS – Programming Languages: Machine Language – Assembly Language – High Level language – Types of High Level Language. Data Processing: Data VS Information – File Processing – Sequential File Processing – Direct Access file Processing.

Text Book

1. Alexis Leon and Mathews Leon, "Fundamentals of Computer Science and Communication Engineering", Leon Techworld, 1998.

Reference Books

1. B Ram and Sanjay Kumar, "Computer Fundamentals", New Age International Publishers, 5th Edition, 2014.
2. Pradeep K Sinha, Priti Sinha, "Computer Fundamentals", BPB Publications, 2004.
3. Anita Goel, "Computer Fundamentals", Pearson Education India, 1st Edition, 2010.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the Number system and conversation from one system to another system.	K1 & K2
CO2	Understand the functional concepts of Logic gates.	K2
CO3	Analyze the concept of Boolean Algebra and Simplifying the Boolean expression.	K3 & K4
CO4	Apply the knowledge to perform arithmetical operations using Logical circuit.	K3 & K4
CO5	Gain the Knowledge about memory Elements.	K5

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	S	M
CO2	M	M	S	S	S
CO3	M	S	S	S	S
CO4	S	S	S	S	S
CO5	M	M	S	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Non Major Elective Course – I		**Course Code:** 21UCS3N02		**Course Title:** System Administration & Maintenance
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
III	2	30	2	100

Course Objectives

1. Understand basic concept & structure of Computer Hardware & Networking Components.
2. Identify the existing configuration of the computers & peripherals.
3. Apply their knowledge about computer peripherals to identify/rectify problems on board.
4. Integrate the PC's into Local Area Network & re-install OS.

UNIT – I

Introduction to Personal Computer: Computer System – Purposes & Characteristics of Cases – Power Supplies – Internal Components – Ports – Cables – Input Devices – Output Devices. Safe Lab Procedures and Tool Use: Safe Working Conditions and Procedures – Tools and Software used with PC Components.

UNIT – II

Computer Assembly: Open Case – Install Power Supply – Attach Components to Motherboard – Installation: Motherboard – Internal Drives – Drives in External Bayes – Adapter Cards. Internal Cables Connections – Reattach Side Panels – Connection of External Cables – Boot the Computer.

UNIT – III

Fundamental Operating System: Purposes – Characteristics of Modern Operating Systems – Concepts Comparisons, Limitations, and Compatibilities – Determination of Operating System Based on Customer Needs – Installation of Operating System – Navigate a GUI (Windows) – Common Preventive Maintenance Techniques – Troubleshoot.

UNIT – IV

Fundamental Laptops and Portable Devices: Common Uses – Components of Laptop – Comparison of the Components of Desktop and Laptops – Configure Laptops – Mobile Phone Standards – Preventive Maintenance Techniques – Troubleshoot Laptop and Portable Devices. Fundamental Printers and Scanners: Types of Printers and Scanners – Installation and Configuration Process of Printers and Scanners – Preventive Maintenance Techniques – Troubleshoot.

UNIT – V

Fundamental Networks: Principles – Types – Concepts and Technologies – Physical Components – LAN Topologies and Architectures – Standard Organizations – Ethernet Standards – OSI and TCP/IP Models – Configuration of NIC and Modem – Establishing Connectivity – Preventive Maintenance Techniques – Troubleshoot. Fundamental Security: Security Threats – Security Procedures – Preventive Maintenance Techniques – Troubleshoot Security.

Text Book

1. David Anfinson & Ken Quamme, "IT Essentials: PC Hardware and Software Companion Guide", Pearson Publications, 3rd Edition, 2008.

Reference Book

1. Quentin Docter, Emmett Dulaneyand Toby Skandier, "CompTIA A+ Complete Review Guide: Exam 220-901, Exam 220 – 902", Wiley Publications, 3rd Edition, 2015.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Enable the students to visualize the different aspects of networks, protocols and network design models.	K1 & K2
CO2	Enable the students to examine various layer design issues protocols.	K1 & K2
CO3	Enable the students to analyse and compare different LAN protocols.	K2 & K3
CO4	Enable the students to compare and select appropriate routing algorithms for a network.	K4 & K5
CO5	Enable the students to compare and select appropriate routing algorithms for a network applets.	K4 & K5

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	S	S
CO2	S	S	S	S	S
CO3	M	M	S	S	S
CO4	M	S	S	M	S
CO5	M	S	S	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Non Major Elective Course – II		**Course Code:** 21UCS4N03		**Course Title:** Exploring on Word
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
IV	2	30	2	100

Course Objectives

1. To explain the components of Microsoft Word.
2. Indicate the names and functions of the Word interface components.
3. Create, edit, save, and print documents to include documents with lists and tables.

UNIT – I

Exploring Word 2007: Working in the Word Environment – Opening, Moving Around in, and Closing a Document – Displaying Different Views of a Document – Creating and Saving a Document – Previewing and Printing a Document.

UNIT – II

Editing and Proofreading Documents: Make Changes to a Document – Insert Saved Text – Find the Most Appropriate word – Reorganize a Document Outline – Find and Replace Text.

UNIT – III

Error Corrections: Correct Spelling and Grammatical Errors – Finalize a Document – Changing the Look Quickly Format Text and Paragraphs – Manually Change the Look of Characters – Manually Change the Look of Paragraphs.

UNIT – IV

Bulleted and Numbered Lists: Create and Modify Lists – Presenting Information in Columns. Creating Table: Create a Tabular List – Present Information in a Table.

UNIT – V

Formatting a Table: Format Table Information – Perform Calculation in a Table – Use a Table to Control Page Layout.

Text Book

1. Joyce Cox and Team, "Step by Step 2007 Microsoft Office System", PHI Learning Private limited, New Delhi, 2009.

Reference Book

1. Peter Weverka, "MS Office 2013 All-in-One for Dummies", Wiley Publications, 1st Edition, 2013.

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Recognize when to use each of the Microsoft Office programs to create professional and academic documents.	K1
CO2	Create personal, academic and business documents following current professional and/or industry standards.	K1, K2 & K3
CO3	Identify and apply the menus in MS-Word.	K3, K4 & K5
CO4	Understand the editing and tables in word.	K3, K4 & K5
CO5	Understand the components of Word.	K3, K4 & K5

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	S	S
CO2	M	S	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S – Strong **M – Medium** **L – Low**

Programme: B.Sc. Computer Science				
Non Major Elective Course – II		**Course Code:** 21UCS4N04		**Course Title:** Basics of Internet
Semester	**Hours/Week**	**Total Hours**	**Credits**	**Total Marks**
IV	2	30	2	100

Course Objectives

1. Describe the important features of the Web and Web browser software.
2. Evaluate e-mail software and Web-based e-mail services.
3. Find, evaluate, and use online information resources.
4. Create HTML documents and enhance them with browser extensions.
5. Demonstrate the use of real-time chat and briefly describe the history of the wireless Internet.

UNIT – I

Introduction To The Internet: Computer in Business – Networking – Internet – E-mail – Resource Sharing – Gopher – World Wide Web – Telnet – Bulletin Board Service – Wide Area Information Service.

UNIT – II

Internet Technologies: Modem – Internet addressing – Physical connections – Telephone Lines – Internet browsers – Internet Explorer – Netscape Navigator.

UNIT – III

Introduction to HTML: Designing a Home Page – HTML Documents – Anchor Tag – Hyper Links.

UNIT – IV

Traditional Text and Formatting – Tables – Images – Frames

UNIT – V

Case Study: Online Passport – Online Gas Services – Online Train Reservation – Tamilnadu Government Services

Text Books

1. C Xavier, "World Wide Web with HTML", Tata McGraw Hill Education, 2000.
2. H.M. Deital, P.J. Deital,"Internet and World Wide Web – How to Program", PHI Learning, 4th Edition, 2007.

Reference Websites

1. http://www.ebharatgas.com/
2. http://passportindia.gov.in/
3. https://www.irctc.co.in
4. http://www.tn.gov.in/

Course Outcomes (COs)

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Learn about the Internet, Worldwide Web, as well as use Internet directories and search engines, and locate www addresses.	K1 & K2
CO2	find and evaluate information on the Web.	K2 & K5
CO3	learn the basics of e-mail, such as sending, forwarding and receiving mail, attaching documents, creating mailboxes, filters, and address books.	K1, K2, K3 & K4
CO4	Create web pages using HTML.	K5 & K6
CO5	Find, evaluate, and use online information systems.	K2, K3 & K4

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO / CO	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	S	S
CO2	S	M	S	S	S
CO3	S	S	S	S	S
CO4	S	M	S	S	S
CO5	S	S	S	M	S

S – Strong **M – Medium** **L – Low**