



**1.1.2: The programmes offered by the institution focus on employability / entrepreneurship / skill development and their course syllabi are adequately revised to incorporate contemporary requirements**

**SYLLABUS OF THE COURSES FOCUSING  
EMPLOYABILITY / ENTREPRENEURSHIP / SKILL  
DEVELOPMENT**



**B.Sc. COMPUTER SCIENCE**

## Computer Science

<b>I B.Sc (CS)</b>	<b>PROGRAMMING IN C</b>	<b>CS101S</b>
<b>SEMESTER – I</b>		<b>HRS/WK-4</b>
<b>CORE – I</b>		<b>CREDIT – 3</b>

**Objective:**

To understand the basic concepts of a C Language and its Programming skills.

**Course Outcomes (CO):**

**CO1:** To make use of various data types in C Programming.

**CO2:** To know the flow of various control structures.

**CO3:** To have familiarity with function calling mechanism.

**CO4:** To transform a problem into programming constructs.

**CO5:** To write C programs using Structures, Strings, Arrays, Pointers and File Handling Programs.

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER I	COURSE CODE: CS101S	TITLE OF THE PAPER: PROGRAMMING IN C	HOURS: 4	CREDITS: 3							
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	4	4	3	4	4	3	4	4	3.6
CO2	4	4	4	4	4	3	4	3	3	4	3.7
CO3	4	4	3	3	4	4	4	3	4	4	3.7
CO4	4	4	3	3	4	4	3	3	4	3	3.5
CO5	4	3	4	3	3	4	4	4	4	4	3.7
<b>Mean Overall Score</b>											3.6

**Result: The Score of this Course is 3.6(High)**

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Interval</b>	<b>0&lt;=rating&lt;=1</b>	<b>1.1&lt;=rating&lt;=2</b>	<b>2.1&lt;=rating&lt;=3</b>	<b>3.1&lt;=rating&lt;=4</b>	<b>4.1&lt;=rating&lt;=5</b>
<b>Rating</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

**UNIT –I** [10hrs]

**Basics of C:** C fundamentals Character set – Identifier and keywords – data types – constants –Variables – Declarations – Expressions – Statements – operators – **Library functions.**

**UNIT– II** [10hrs]

**I/O and Control Statements:** Data input output functions - Simple C programs - Flow of control

– if, if- else, while, do-while, for loop, nested control structures – switch, break and continue, go to statements.

**UNIT–III** [15hrs]

**Function and Storage classes:** Function – Definition – Prototypes – Passing arguments –Recursion - Storage classes.

**UNIT– IV** [15hrs]

**Arrays, Structures and Unions:** Arrays – Defining and Processing – Passing arrays to functions – Arrays and string - Structures and Unions.

**UNIT –V** [10hrs]

**Pointers and Files:** Pointers – Declarations – Passing pointers to function – Operation on Pointers – Pointer and Arrays – Files and operation on files.

**Text Books:**

1. Programming in ANSI C by E.Balagurusamy 6<sup>th</sup>Edition, McGraw Hill Education-2012.
2. Programming with ANSI and Turbo C Ashok N.Kamthane, 6<sup>th</sup>Edition, Pearson Education. 2009

**Reference Books:**

1. The C programming Language B.W. Kernighan and D.M. Ritchie,. 2nd Edition Prentice Hall;- 1998
2. C-The Complete Reference H. Schildt, 4<sup>th</sup>Edition , Tata McGraw Hillpublication-2010
3. Let us C Kanetkar Y., BPB Pub., NewDelhi-2004

<b>I B.Sc (CS)</b>	<b>DIGITAL LOGIC FUNDAMENTALS</b>	<b>CS102S</b>
<b>SEMESTER - I</b>		<b>HRS/WK-4</b>
<b>CORE - II</b>		<b>CREDIT – 3</b>

**Objective:**

To Understand the basic concepts of Digital Circuits and Logic design of Computers

**Course Outcomes (CO):**

**CO1:** To know the basic design of computer, arithmetic operation, digital number system and its conversion.

**CO2:** To understand the Boolean algebra and the operations of Logic Gates.

**CO3:** To know Simplification of Boolean expressions using K-map.

**CO4:** Gain knowledge about Arithmetic and Data Processing Digital Circuits.

**CO5:** Understand the principles of Sequential Logic Circuits such as Flip-flops and Counters.

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER I	COURSE CODE: CS102S	TITLE OF THE PAPER: DIGITAL LOGIC FUNDAMENTALS	HOURS: 4	CREDITS: 3							
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	4	4	4	4	4	4	3	4	4	3.6
CO2	4	4	4	4	4	3	4	3	3	4	3.4
CO3	4	4	4	3	4	4	4	3	4	4	3.4
CO4	4	4	4	4	4	4	3	3	4	3	3.5
CO5	4	4	4	4	3	4	4	4	4	4	3.2
<b>Mean Overall Score</b>											<b>3.4</b>

**Result: The Score of this Course is 3.4(High)**

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Interval</b>	<b>0&lt;=rating&lt;=1</b>	<b>1.1&lt;=rating&lt;=2</b>	<b>2.1&lt;=rating&lt;=3</b>	<b>3.1&lt;=rating&lt;=4</b>	<b>4.1&lt;=rating&lt;=5</b>
<b>Rating</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

**UNIT-I:**

[10hrs]

**Binary Systems:** Digital Computers and Digital Systems - Binary Number System  
Binary Subtraction- Binary Multiplication and Division-Number Base Conversion: decimal, binary, octal,hexadecimal .

**UNIT--II:**

[10hrs]

**Boolean algebra and Logic Gates:** Basic Definitions of Boolean algebra - Basic Theorems and Properties of Boolean Algebra - Digital Logic Gates: AND, OR, NOT, NAND, NOR, Exclusive OR and Exclusive NOR Gates- De Morgan's Theorem – Universal gates.

**UNIT-III:**

[15hrs]

**Simplification of Boolean Functions:** Sum of Products and Product of Sums – Karnaugh Maps - Two and Three Variable Maps - Four Variable Maps -Don't Care Conditions - Rolling the Map – Eliminating Redundant Groups.

**UNIT-IV:**

[15hrs]

**Combinational Logic Circuits:** Adders: Half Adder, Full Adder – Subtractors: Half subtractor, Full subtractor. - Binary Adder- BCDAdder – Encoder - Decoders – Multiplexers – Demultiplexers.

**UNIT-V:**

[10hrs]

**Sequential Circuits:** Flip Flops – RS Flip Flop – Clocked RS Flip Flop – D Flip Flop – JK Flip Flop – T Flip Flop – Master Slave Flip Flop - Counters: – Asynchronous and synchronous Counter

**Text Books:**

1. Digital Logic and Computer Design - M. Morris Mano PHI, 2ndEdition -1996
2. Principles of Digital Electronics, Dr. K. Meena, PHI Learning Private Limited, New Delhi - 1st Edition-2009.

**Reference Books:**

1. Introduction to Digital Technology Louis Neshelsky, John Wiley & Sons, Third Edition, 1983.
2. "Digital Logic Design Principles" - Norman Balabanian, Bradley Carlson -John Wiley & Sons, Inc 1 Edition1996

<b>I B.Sc (CS)</b>	<b>PRACTICAL - PROGRAMMING IN C</b>	<b>CSP101S</b>
<b>SEMESTER – I</b>		<b>HRS/WK-3</b>
<b>CORE- PRACTICAL -I</b>		<b>CREDIT – 2</b>

**Objective**

To unleash the Programming skills in C Language and Logic building capabilities.

**Course Outcomes (CO):**

- CO1:** To write programs using Control structures & Looping structures
- CO2:** To Understanding the String Manipulation.
- CO3:** To equip with the knowledge of Sorting & Searching
- CO4:** Ability to learn the concept of Matrix Manipulations & Recursion.
- CO5:** To Understand the concept of Handling File Operations

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER I	COURSE CODE: CSP101S	TITLE OF THE PAPER: Practical-PROGRAMMING IN C	HOURS: 3	CREDITS: 2							
COURSE OUTCOME S	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	4	3	3	3	4	4	3	4	3	3.4
CO2	4	4	3	4	3	4	3	4	4	3	3.6
CO3	4	4	3	3	3	3	4	3	4	4	3.5
CO4	3	4	3	3	3	3	3	4	4	4	3.4
CO5	4	4	3	3	3	4	4	3	3	4	3.5
<b>Mean Overall Score</b>											<b>3.5</b>

**Result: The Score of this Course is 3.5(High)**

Association Scale	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Interval</b>	<b>0&lt;=rating&lt;=1</b>	<b>1.1&lt;=rating&lt;=2</b>	<b>2.1&lt;=rating&lt;=3</b>	<b>3.1&lt;=rating&lt;=4</b>	<b>4.1&lt;=rating&lt;=5</b>
<b>Rating</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

**PRACTICAL-PROGRAMMING IN C**

1. Control Statements
  - a. Implementing Control statements
  - b. Implementing Loop structures.
2. Summation of series
3. String Manipulation.
4. Sorting
  - a. Bubble Sort
  - b. Selection Sort
  - c. Insertion Sort
5. Searching
  - a. Linear Search
  - b. Binary Search.
  - c. Matrix Manipulation
6. Recursion
7. File Handling – Marksheet.

<b>I B.Sc (CS)</b>	<b>PROGRAMMING IN C++</b>	<b>CS203S</b>
<b>SEMESTER - II</b>		<b>HRS/WK-4</b>
<b>CORE – III</b>		<b>CREDIT – 3</b>

**Objective:**

To Learn the basic concepts of Object-Oriented Programming and C++ Programming skills.

**Course Outcomes (CO):**

**CO1:** To learn the basic concepts& principles of Object-Oriented programming

**CO2:** To understand the C++ Fundamentals and Functions

**CO3:** To build logic using C++ with class and objects and Constructor

**CO4:** To learn and implement Inheritance and its types

**CO5:** To Understand the concept of streams and file management in C++

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER II	COURSE CODE: CS203S					TITLE OF THE PAPER: PROGRAMMING IN C++					HOURS: 4	CREDITS: 3
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	3	3	2	4	4	4	4	4	4	3	3.5	
CO2	3	4	3	4	3	4	4	3	3	4	3.5	
CO3	3	4	3	3	4	4	4	3	4	4	3.6	
CO4	3	3	3	3	4	4	4	3	4	4	3.5	
CO5	4	4	3	3	3	4	4	3	4	4	3.6	
<b>Mean Overall Score</b>											3.5	

**Result: The Score of this Course is 3.5(High)**

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

**UNIT-I**

[10hrs]

**OOP'S:** Principles of Object-Oriented Programming [OOP]: Evolution of C++ - Programming paradigms – Key concept of OOP – Advantages of OOP- Usage of OOP and C++ - Input and Output in C++ - Streams.

**UNIT-II**

[10hrs]

**C++ Fundamentals and Functions:** Stream Classes-Unformatted console I/O Operations – Introduction to C++ - Tokens, Keywords, Identifiers, Variables, Operators, Expressions and Control structures in C++ pointers and arrays –Function in C++ - Main function– function prototyping –Parameters passing in Functions – Values Return by functions –Inline Functions – Function overloading.

**UNIT-III**

[15hrs]

**Object Manipulation and Polymorphism:** Classes and objects; Constructors and Destructors; and Operator Overloading and type Conversion –Friend and Virtual functions.

**UNIT-IV**

[15hrs]

**Inheritance:** Single Inheritance – Multilevel inheritance – Multiple inheritances – Hierarchical – Hybrid Inheritance - Virtual Base Class-Virtual Functions and Polymorphism

**UNIT-V**

[10hrs]

**Working with Files:** Classes for File Stream Operation – Opening and Closing a File – End – of – File Detection – File Pointers-Updating a File – Error Handling during File Operation – Command - line Arguments.

**Text Books:**

1. Object Oriented Programming with C++, E.Balagurusamy, McGraw Hill Education,2013.
2. The C++ Programming Language: by Bjarne Stroustrup Special Edition2008
3. C++ Primer by Stanley B. Lippman, Josie Lajoie, and Barbara E. Moo, FifthEdition,2013.

**Reference Books:**

1. Object Oriented Programming with ANSI & Turbo C + +, Ashok N. Kamthane, Pearson Education,2003
2. Practical C++ Programming, by Steve Oualline, 1<sup>st</sup>Edition,2006
3. C++ Without Fear: A Beginner's Guide That Makes You Feel Smart by Brian R. Overland,2014

<b>I B.Sc(CS)</b>	<b>FUNDAMENTALS OF DATA STRUCTURES</b>	<b>CS204S</b>
<b>SEMESTER – II</b>		<b>HRS/WK-4</b>
<b>CORE – IV</b>		<b>CREDIT – 3</b>

**Objective:**

To Understand the Fundamentals of Data Structures and its algorithms.

**Course Outcomes(CO):**

**CO1:** To understand the Fundamental concepts in Data Structure and Arrays Structure.

**CO2:** To Learn the Stack and Queue operations and applications.

**CO3:** To gain knowledge about Linked List Concept and its applications.

**CO4:** To have knowledge about tree concept and ability to traverse trees.

**CO5:** To learn basics of graph and gain working knowledge about shortest path.

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER II	COURSE CODE:CS204S	TITLE OF THE PAPER: FUNDAMENTALS OF DATA STRUCTURES	HOURS: 4	CREDITS: 3							
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	4	4	4	4	4	4	2	2	4	3.6
CO2	4	4	4	4	4	4	4	2	2	4	3.6
CO3	4	4	4	3	4	4	4	2	2	4	3.5
CO4	4	4	4	4	4	3	4	2	2	4	3.5
CO5	4	4	4	4	3	4	4	2	2	4	3.5
Mean Overall Score											3.5

**Result: The Score of this Course is 3.5(High)**

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome.

**Introduction to Data structure:** Definition of a Data structure - Primitive and Composite Data types, Arrays, Operations on Arrays - Order Lists.

**UNIT-II** [10hrs]  
**Stacks and Queues:** Stacks – Operation - Application of Stack - Infix to Postfix Conversion - Queues- Operations on Queues, Queue Applications - Circular Queue.

**UNIT-III** [15hrs]  
**Linked List:** Singly Linked List - Representation of a Polynomial - Polynomial addition – Doubly Linked List.

**UNIT-IV** [15hrs]  
**Trees:** Binary trees -Representation – Conversion of Forest to Binary tree - Tree Traversals.

**UNIT-V** [10hrs]  
**Graphs:** Definition – Graph Representation - Types of Graphs - Shortest Path (Dijkstra's Algorithm).

**Text Books:**

1. Fundamentals of “Data structures in C++” ,E. Horowitz, S.Sahni and Mehta – 2<sup>nd</sup> Edition, Galgotia Publication-2008.
2. Pascal plus Data Structures Algorithms and Advanced Programming, R.Kruse and N.Dale and S.C. Lily — Tata McGrawHill – New Delhi -1985.
3. Data Structures using C and C++ by Langsam, Augenstein and Tanenbaum, PHI/Pearson Education, 2<sup>nd</sup> Edition,2015.

**Reference Books:**

1. Introduction to the Design and Analysis of Algorithms, S.E Goodman and S.T. Hedetniemi, McGraw Hill, InternationalEdition-1977.
2. Data Structures and Algorithm Analysis in C++ by Mark Allen Weiss, Pearson Education.3<sup>rd</sup> Edition,2007.

## Computer Science

<b>I B.Sc (CS)</b>	<b>PRACTICAL- PROGRAMMING IN C++ For the students admitted in the year2010</b>	<b>CSP202S</b>
<b>SEMESTER - II</b>		<b>HRS/WK-3</b>
<b>CORE- Practical - II</b>		<b>CREDIT – 2</b>

### Objective:

To implement all object-oriented programming concepts using C++ and to implement different data structures techniques using C++ Programs.

### Course Outcomes (CO):

**CO1:** To provide a sound understanding of the basic concepts of OOPs.

**CO2:** To equip the students with the knowledge of classes and objects

**CO3:** To understand the core concepts of Constructor and Inheritance

**CO4:** Ability to learn the concept of functions and Operator overloading

**CO5:** To learn the nuances of programming for data structures using C++ languages

### Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes

SEMESTER II	COURSE CODE: CSP202S					TITLE OF THE PAPER: PROGRAMMING IN C++					HOURS: 3	CREDITS: 2
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	3	3	2	2	4	4	4	3	3	3	3.1	
CO2	3	4	3	4	3	4	3	3	3	4	3.5	
CO3	3	3	3	3	3	4	4	3	4	3	3.4	
CO4	3	3	3	3	4	4	4	3	4	4	3.5	
CO5	4	3	3	3	2	4	3	3	4	3	3.2	
Mean Overall Score											3.3	

**Result: The Score of this Course is 3.3(High)**

<b>Association</b>	<b>1%-20%</b>	<b>21%-40%</b>	<b>41%-60%</b>	<b>61%-80%</b>	<b>81%-100%</b>
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Interval</b>	<b>0&lt;=rating&lt;=1</b>	<b>1.1&lt;=rating&lt;=2</b>	<b>2.1&lt;=rating&lt;=3</b>	<b>3.1&lt;=rating&lt;=4</b>	<b>4.1&lt;=rating&lt;=5</b>
<b>Rating</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

This Course is having **High** association with Programme Outcome and Programme Specific Outcome.

### **PRACTICAL - PROGRAMMING IN C++**

1. Implementing class and Objects.
2. Implementing Inline function
3. Implementing Friend function.
4. Implementing Constructor and Destructor
5. Implementing Operator overloading
6. Implementing Inheritance.

### **DATA STRUCTURE USING C++**

7. Implement PUSH, POP operations of stack using Arrays.
8. Implement add, delete operations of a queue using arrays.
9. Conversion of infix to postfix using stacks operations.
10. Binary tree traversals [In – order, Pre-order, and Post-order] using Recursion.

<b>YEAR – II</b>	<b>JAVA PROGRAMMING</b> <b>For the students admitted from the year 2019</b>	<b>19CS305</b>
<b>SEMESTER - III</b>		<b>HRS/WK-4</b>
<b>CORE – V</b>		<b>CREDIT –3</b>

**Objective:**

To understand the basic concepts of JAVA language in internet programming.

**Course Outcomes (CO):**

**CO1:** Understanding the principles and practice of object-oriented concepts and basic Java programs.

**CO2:** Knowledge of creating and using of Packages, Multithreading, Exception Handling

**CO3:** Design and implement Applet programming and AWT

**CO4:** Acquire knowledge of JDBC programming techniques in Java.

**CO5:** Learn to apply networking and RMI concepts through Java program.

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER III	COURSE CODE:19CS305					TITLE OF THE PAPER: JAVA PROGRAMMING					HOURS: 4	CREDITS: 3
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	2	3	3	4	4	4	4	4	4	3	3.5	
CO2	3	4	3	4	3	4	4	3	3	4	3.5	
CO3	3	4	3	3	4	4	4	3	4	4	3.6	
CO4	3	4	3	3	3	4	4	3	4	4	3.5	
CO5	4	4	3	3	3	4	4	3	4	4	3.6	
<b>Mean Overall Score</b>											3.5	

**Result: The Score of this Course is 3.5(High)**

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Interval</b>	<b>0&lt;=rating&lt;=1</b>	<b>1.1&lt;=rating&lt;=2</b>	<b>2.1&lt;=rating&lt;=3</b>	<b>3.1&lt;=rating&lt;=4</b>	<b>4.1&lt;=rating&lt;=5</b>
<b>Rating</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

This Course is having **High** association with Programme Outcome and Programme Specific Outcome.

**Fundamentals of Java Language:** Introduction to Java – Features of Java – Data Types – Arrays - **Control Statements**- Classes – Objects—Overloading method.

**UNIT-II** **[10hrs]**

**Packages, Interfaces and Exception Handling:** **Packages – Importing Packages – Interfaces – Exception Handling.**

**UNIT-III** **[10hrs]**

**Thread :**Life Cycle of Thread – Multithreading

**Applets :**Applet life cycle – creating simple applets- Loading and displaying images on applets -working with graphics

**UNIT-IV:** **[15hrs]**

**AWT :**AWT controls –windows Fundamentals - layout managers

**JDBC:** JDBC Architecture – Connecting to a Database (MS Access) – SQL commands-select, insert, delete, update.

**UNIT-V:** **[15hrs]**

**NETWORKING:** Networking Basics-URL- InetAddress – TCP/IP Sockets .

**RMI :**Introduction to RMI-RMI architecture - Example using RMI.

**Text Books:**

1. The Complete Reference, H. Schild, Tata McGraw-Hill publication, Fifth Edition, Jul2017.
2. JAVA: How to program, Paul J. Deitel, Harvey Deitel, Prentice Hall publication, tenth Edition,2014.
3. Core Java, Volume II--Advanced Features, Cray S. Horstman , Prentice Hall publication 2019.

**Reference Books:**

1. The Java Programme Language ,Wesley, K. Arnold and J. Gosling, Addison Wesley publications,2013
2. “Guide to Java Programming”, Peter Norton & William Stack, Techmedia Publications, NewDelhi, First Edition,1997

## Computer Science

<b>YEAR – II</b>	<b>FUNDAMENTALS OF ALGORITHMS</b>	<b>CS306S</b>
<b>SEMETER - III</b>		<b>HRS/WK-4</b>
<b>CORE – VI</b>		<b>CREDIT –3</b>

**Objective:**

To enable learning of basic concepts of Algorithms and its Applications.

**Course Outcomes (CO):**

After learning this course, the students should be able to expose

**CO1:** Ability to understand fundamental of Algorithms.

**CO2:** Ability to know about Multistage Graph Work with Trees with examples.

**CO3:** Ability to understand the Basic Traversal and Search Techniques.

**CO4:** Ability to Work with Greedy method.

**CO5:** Ability to know the basic concept of Np Hard and NP Complete

### Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes

SEMESTER III	COURSE CODE: CS306S	TITLE OF THE PAPER: FUNDAMENTALS OF ALGORITHMS	HOURS: 4	CREDITS: 3							
<b>COURSE OUTCOMES</b>	<b>PROGRAMME OUTCOMES(PO)</b>					<b>PROGRAMME SPECIFIC OUTCOMES(PSO)</b>					<b>MEAN SCORE OF CO'S</b>
	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>	
<b>CO1</b>	4	4	4	4	4	4	5	3	2	5	<b>3.9</b>
<b>CO2</b>	4	4	4	4	4	4	5	3	2	5	<b>3.9</b>
<b>CO3</b>	4	4	4	4	4	4	5	3	2	5	<b>3.9</b>
<b>CO4</b>	4	4	4	4	4	4	5	3	2	5	<b>3.9</b>
<b>CO5</b>	4	4	4	4	4	4	5	3	2	5	<b>3.9</b>
<b>Mean Overall Score</b>											<b>3.9</b>

**Result: The Score of this Course is 3.9(High)**

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Interval</b>	<b>0&lt;=rating&lt;=1</b>	<b>1.1&lt;=rating&lt;=2</b>	<b>2.1&lt;=rating&lt;=3</b>	<b>3.1&lt;=rating&lt;=4</b>	<b>4.1&lt;=rating&lt;=5</b>
<b>Rating</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

This Course is having **High** association with Programme Outcome and Programme Specific Outcome.

**UNIT-I**

[12hrs]

**Divide and Conquer:** Introduction to Algorithm- Complexity analysis- Divide and Conquer - Strassen's Matrix Multiplication-Quick Sort-Merge sort- Binary Search-Finding Max and Min.

**UNIT-II**

[12hrs]

**Dynamic Programming:** General method-multistage Graph-Traveling salesman problem.

**UNIT-III**

[12hrs]

**Basic Traversal and Search Technique:** Depth first search- Breadth first search - BackTracking- Graph colorings.

**UNIT-IV**

[12 hrs]

**Greedy method:** General Method - Shortest path- 0/1 Knapsack problem.

**UNIT-V**

[12 hrs]

**Np Hard and Np Complete Problem:** Basic concepts of Np-Hard and Np-Complete.

**Text Books:**

1. Computer Algorithms E.Horowitz.S.Sahni and S.Rajasekaran- - Galgotia Publication, Pvt.Ltd.,-2008.
2. Design and Analysis of Computer Algorithms by Alfred V. Aho, Pearson Education, 2004
3. Introduction to Algorithms, Third Edition by Thomas H. Cormen, 2014

**Reference Books:**

1. G.Brassard and Brately -Fundamentals of Algorithm-PHI-1997.
2. Data Structures and Algorithm Analysis in C++ by Mark Allen Weiss, Pearson Education, Second Edition,2007

<b>YEAR – II</b>	<b>PRACTICAL - JAVA PROGRAMMING</b> For the students admitted from the year 2019	<b>19CSP303</b>
<b>SEMESTER– III</b>		<b>HRS/WK-3</b>
<b>CORE – Practical - III</b>		<b>CREDIT - 2</b>

**Objective:**

To enable the students to learn the basic programs of JAVA and to make students to acquire the skill in JAVA programming.

**Course Outcomes (CO):**

**CO1:** To generate ability to Create simple packages.

**CO2:** Demonstrate the behavior of Multiple Inheritance.

**CO3:** Construct the program of Multithreading and Exception handling in Java.

**CO4:** Implement the GUI techniques (Applet and AWT).

**CO5:** Creating JDBC methods to establish connection with database and simple Networking & Java Bean programs.

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER III	COURSE CODE: 19CSP303	TITLE OF THE PAPER: PRACTICAL- JAVA PROGRAMMING	HOURS: 3	CREDITS: 2							
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	3	2	3	4	4	4	3	3	3	3.3
CO2	4	4	2	3	4	1	4	5	3	4	3.4
CO3	4	3	2	4	4	2	4	2	4	4	3.3
CO4	4	2	2	2	4	2	4	4	4	4	3.2
CO5	4	4	2	3	4	2	4	3	3	3	3.2
<b>Mean Overall Score</b>											3.3

**Result: The Score of this Course is 3.3(High)**

<b>Association</b>	<b>1%-20%</b>	<b>21%-40%</b>	<b>41%-60%</b>	<b>61%-80%</b>	<b>81%-100%</b>
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Interval</b>	<b>0&lt;=rating&lt;=1</b>	<b>1.1&lt;=rating&lt;=2</b>	<b>2.1&lt;=rating&lt;=3</b>	<b>3.1&lt;=rating&lt;=4</b>	<b>4.1&lt;=rating&lt;=5</b>
<b>Rating</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

This Course is having **High** association with Programme Outcome and Programme Specific Outcome.

**PRACTICAL - JAVA PROGRAMMING**

1. Finding area and Perimeter of a circle. Use Buffered Reader class.
2. Implementing and importing packages.
3. Implementing Interfaces-Arithmetic Manipulations
4. Exception Handling
5. Multithreading
6. Loading image onto applet
7. Implement an application for Arithmetic operation using AWT.
8. . Create a database for storing and manipulating student mark list using AWT.
9. Write a program to send in two values to the server program and get back the result  
calculate during RMI
10. Incorporating circle symbol onto Bean box.

## Computer Science

<b>II B.Sc (CS)</b>	<b>INTERNET PROGRAMMING</b> For the students admitted from the year 2019	<b>19CS407</b>
<b>SEMESTER – IV</b>		<b>HRS/WK-4</b>
<b>CORE – VII</b>		<b>CREDIT – 3</b>

**Objective:**

To enable the students to learn the concepts of Internet Programming.

**Course Outcomes (CO):**

**CO1:** To attain a basic knowledge about HTML and its tags

**CO2:** To Design and develop web pages using HTML

**CO3:** To Describe the basic JavaScript syntax and structures

**CO4:** To Understand the Document Object Model Forms in JavaScript

**CO5:** To Ability to identifying the basic suitable tags and CSS styles to design web pages and also to know the benefits of using XML.

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER IV	COURSE CODE: 19CS407	TITLE OF THE PAPER: INTERNETPROGRAMMING	HOURS: 4	CREDITS: 3							
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	4	2	3	4	4	4	3	3	3	3.4
CO2	4	4	2	3	4	4	4	3	3	3	3.4
CO3	4	4	2	3	4	4	4	3	3	3	3.4
CO4	4	4	2	3	4	4	4	3	2	3	3.3
CO5	4	3	2	3	4	4	4	3	2	3	3.2
<b>Mean Overall Score</b>											<b>3.3</b>

**Result: The Score of this Course is 3.3(High)**

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

**UNIT-I**

**[10 Hrs]**

**HTML:** Introduction to HTML – List – Creating Table – Linking Document Frames – Graphics to HTML Doc.

**UNIT-II**

**[10 Hrs]**

**JavaScript:** Introduction – Advantage of JAVA Script - JAVA Script Syntax – Data type – Variable – Array – Operator and Expressions – Looping Constructor – Function – Dialog Box.

**UNIT-III**

**[15Hrs]**

**JavaScript DOM Forms:** JSSS DOM-understanding objects in HTML-Browser objects-JavaScript forms:-Form objects-Built-in objects (String, Math, Date)-User defined objects.

**UNIT-IV**

**[10 Hrs]**

**DHTML:** Cascading Style Sheets-Class-Using Span Tag-External style sheets-Using div tag - Layers

**UNITV**

**[15Hrs]**

**XML:** Basic XML- Document Type Definition- XML Schema DOM and Presenting XML, XMLParsers and Validation, XSL and XSLT Transformation

**Text Books:**

1. “Internet: The Complete Reference” by Margaret Levine Young- McGraw Hill Education -Millennium Edition – 1999.
2. “The Internet For Dummies” by John R. Levine , Carol Baroudi, and Margaret Levine Young, Wiley Publishing , Inc- 9<sup>th</sup> Edition-2003.
3. “How the Internet Works” by Michael Troller, Preston Gralla– Que Publisher - 8th Edition - 2006.
4. “Internet – Complete Reference” by Margaret Levine Young - Tata McGraw-Hill Education Pvt. Ltd., - Second Edition – TMHEducation-2002.
5. “Web Enable Commercial Application Development Using HTML, DHTML, Java Script, Pen CGI” by Ivan Bayross- BPB Publications,2000.

**Reference Books**

1. “Internet – Complete Reference” by Margaret Levine Young - Tata McGraw-Hill Education Pvt. Ltd., - Second Edition – TMHEducation-2002.
2. “The Everyday Internet All-in-One Desk Reference For Dummies” by Peter Weverka- Wiley Publishing , Inc. - 3<sup>rd</sup>Edition –2005.
3. “HTML- The Complete Reference” by Thomas A. Powell -Third Edition, TMH,2002.

<b>II B.Sc, (CS)</b>	<b>COMPUTER ARCHITECTURE</b> (For the students admitted from the year 2019)	<b>19CS408</b>
<b>SEMESTER – IV</b>		<b>HRS/WK-4</b>
<b>CORE – VIII</b>		<b>CREDIT - 3</b>

**Objective:**

To Learn and understand the main components of a computer system and the considerations in their design.

**Course Outcomes (CO):**

- CO1:** To know about registers and functions of data transfer.
- CO2:** To understand the function of Arithmetic Instruction Pipelining.
- CO3:** To understand the different algorithms used in architecture
- CO4:** To acquire knowledge about data transfer between peripheral devices.
- CO5:** To understand the memory types and organization.

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER IV	COURSE CODE: 19CS408					TITLE OF THE PAPER: COMPUTER ARCHITECTURE					HOURS: 4	CREDITS: 3
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	3	4	3	4	4	3	4	3	3	3.5	
CO2	4	4	3	3	4	4	3	4	4	4	3.7	
CO3	3	3	3	3	3	3	4	4	3	4	3.3	
CO4	4	3	4	4	3	3	4	4	4	3	3.6	
CO5	3	3	3	3	3	4	3	4	4	4	3.4	
<b>Mean Overall Score</b>											3.5	

**Result: The Score of this Course is 3.5 (High)**

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome.

**Unit-I**

[12hrs]

**Central Processing Unit:** General Register and stack Organization-Instruction Formats -Addressing Modes-Data Transfer and Manipulation.

**Unit-II**

[12hrs]

**Pipelining:** Arithmetic, Instruction and RISC Pipelining-Vector Processing.

**Unit-III**

[12hrs]

**Computer Arithmetic:** Addition and Subtraction — Multiplication and division Algorithms Floating Point and Decimal Arithmetic operations.

**Unit-IV**

[12hrs]

**Input Output Organization:** Peripheral Devices- I/O Interface- Asynchronous Data Transfer -Models of Transfer-Priority Interrupt – Direct Memory Access – I/O Processor.

**Unit-V**

[12hrs]

**Memory Organization:** Memory Hierarchy – Main Memory-Auxiliary Memory – Associative Cache and Virtual Memory.

**Text Books:**

1. Computer System Architecture, M.M.Mano, 3<sup>rd</sup> Edition-PHI-1994
2. Computer System Architecture, J.P.Haynes, McGrawHill-1988
3. Computer Architecture: A Quantitative Approach, by John L.Hennessy and David A. Patterson, 4<sup>th</sup> Edition-2007.

**Reference Books:**

1. Computer Organization and Design, Pal Chaudhary p, Prentice Hall of India ,2004.
2. Computer Organization and Architecture , Hayes J P , 2<sup>nd</sup> Edition , McGraw Hill,1998.
3. Structured Computer Organization, Tanenbaum A S, 6<sup>th</sup> Edition, Prentice Hall,2006.

<b>II B.Sc (CS)</b>	<b>PRACTICAL - INTERNET PROGRAMMING</b> For the students admitted from the year 2019	<b>19CSP404</b>
<b>SEMESTER - IV</b>		<b>HRS/WK-3</b>
<b>CORE – PRACTICAL - IV</b>		<b>CREDIT – 2</b>

**Objective:**

To enable the students to design simple Web Pages using HTML and write simple scripting programs.

**Course Outcomes (CO):**

**CO1:** To create a static web page that defines all text formatting tags of HTML.

**CO2:** Ability to create a static webpage using table tags of HTML

**CO3:** Construct the webpage using list tags in HTML

**CO4:** Integrating the concepts of CSS in creating web pages.

**CO5:** Ability to create webpage using FORMS in JavaScript and to understand the functionality to Develop programs in JavaScript

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER IV	COURSE CODE: 19CSP404					TITLE OF THE PAPER: PRACTICAL-INTERNETPROGRAMMING					HOURS: 3	CREDITS: 2
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	4	2	4	3	4	4	3	2	4	3.4	
CO2	4	4	2	4	4	5	4	3	2	4	3.6	
CO3	4	3	3	4	3	4	4	3	3	4	3.4	
CO4	4	4	2	4	4	3	4	3	3	4	3.5	
CO5	4	4	2	4	4	4	4	3	2	4	3.5	
<b>Mean Overall Score</b>											3.5	

**Result: The Score of this Course is 3.5(High)**

<b>Association</b>	<b>1%-20%</b>	<b>21%-40%</b>	<b>41%-60%</b>	<b>61%-80%</b>	<b>81%-100%</b>
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Interval</b>	<b>0&lt;=rating&lt;=1</b>	<b>1.1&lt;=rating&lt;=2</b>	<b>2.1&lt;=rating&lt;=3</b>	<b>3.1&lt;=rating&lt;=4</b>	<b>4.1&lt;=rating&lt;=5</b>
<b>Rating</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

This Course is having **High** association with Programme Outcome and Programme Specific Outcome.

**PRACTICAL INTERNET PROGRAMMING**

1. Create a static webpage using table tags of HTML
2. Create webpage using list tags of HTML.
3. Apply style sheet in Webpage
4. Create webpage using FORMS.
5. Script code for n numbers of Fibonacci series.
6. Script code for employee salary calculation.
7. Script code for simple Calculator.
8. Script Code using Math Functions.
9. Script Code using String Functions.

## Computer Science

<b>III B.Sc (CS)</b>	<b>RELATIONAL DATABASE MANAGEMENT SYSTEM</b>	<b>CS509</b>
<b>SEMESTER – V</b>		<b>HRS/WK-6</b>
<b>CORE – IX</b>		<b>CREDIT – 5</b>

**Objective:**

To Understand the basic concepts of RDBMS and its practical applications.

**Course Outcomes (CO):**

**CO1:** Ability to understand the Database management system concepts

**CO2:** Ability to understand Entities and entity sets – relationships and relationship sets, E-Rdiagram and Keys.

**CO3:** Ability to understand Relational Model

**CO4:** Ability to know the basic knowledge of Normalization

**CO5:** Ability to learn the basic concept of DDL, DML, DCL operations

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER V	COURSE CODE: CS509					TITLE OF THE PAPER: Relational Database Management System					HOURS: 6	CREDITS: 5
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	3	3	4	5	4	4	3	4	3	2	3.5	
CO2	4	4	3	4	4	4	4	4	2	2	3.5	
CO3	4	4	3	4	4	4	3	4	3	2	3.5	
CO4	4	3	2	3	4	4	4	4	3	2	3.3	
CO5	4	3	4	3	3	3	3	3	3	2	3.1	
<b>Mean Overall Score</b>											<b>3.4</b>	

**Result: The Score of this Course is 3.4(High)**

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Interval</b>	<b>0&lt;=rating&lt;=1</b>	<b>1.1&lt;=rating&lt;=2</b>	<b>2.1&lt;=rating&lt;=3</b>	<b>3.1&lt;=rating&lt;=4</b>	<b>4.1&lt;=rating&lt;=5</b>
<b>Rating</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

**UNIT –I**

[20 Hrs]

**Database management system:** Definition – purpose of database systems – data abstraction – data models – instances and schemes – data independence – database manager – database administrator – database users – overall system structure.

**UNIT-II**

[20 Hrs]

**Entity Relationship Model:** Entities and entity sets – Relationships and Relationship Sets – attributes – mapping constraints – keys –E-R diagram – reducing E-R diagrams to tables – generalization –aggregation.

**UNIT–III**

[20 Hrs]

**Relational Model:** the relational algebra – the tuple relational calculus – the domain relational calculus.

**UNIT–IV**

[20 Hrs]

**Normalization:** First Normal Form – Second Normal Form – Third Normal Form – Boyce – Codd normal form - Fourth Normal Form.

**UNIT–V**

[10 Hrs]

**Oracle SQL:** DDL, DML, DCL operations – integrity constraints – string functions – number functions – data arithmetic – selecting distinct values – working with null values –pseudo columns– grouping and ordering data–subqueries–joins–union, intersect & minus–indexes–clusters – views – sequences – synonym – users, roles and privileges – grant and revoke permission – locks.

**Text Books:**

1. “Database System concepts “Henry F.Korth& Abraham Silberschatz”-TMH-1998.
2. “Developing ORACLE FORMS Applications “Albert Lulushi–PHI-1997.
3. “Oracle the complete reference”,George Koch & Kevin loney –Oracle Press Edition-1997

**Reference Books:**

1. An Introduction to Database System by C.J. Date.,8thEdition,2009
2. “Principles of database system”JeffreyD. Ullman, Pearson Publication, 2nd Edition,2014
3. ” Introduction to PL/SQL”, George Koch & Kevin loney ,Oracle Corporation Press - 2008

## Computer Science

<b>III B.Sc (CS)</b>	<b>DOT NET TECHNOLOGIES</b> <b>For the students admitted in the year 2017</b>	<b>CS510S</b>
<b>SEMESTER – V</b>		<b>HRS/WK-5</b>
<b>CORE –X</b>		<b>CREDIT –5</b>

**Objective:**

To make the student get exposed with the latest programming concept DOTNET and to equip them with skills related to C# and ASP.NET programming.

**Course Outcomes (CO):**

**CO1:** Understand the basic concepts of DOT NET framework and its components.

**CO2:** Acquire the basic programming knowledge using .NET framework.

**CO3:** Identify and differentiate the ASP and ASP.NET and its architecture.

**CO4:** Understand the fundamental controls and web controls in C#.

**CO5:** Understand about ADO.NET and have an effective database as a backend.

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER V	COURSECODE: CS510S					TITLE OF THE PAPER: DOT NET TECHNOLOGIES					HOURS: 5	CREDITS: 5
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	3	3	3	4	4	4	4	3	4	4	3.6	
CO2	3	4	3	4	4	4	4	3	3	4	3.6	
CO3	4	3	4	4	3	3	4	3	3	4	3.5	
CO4	3	4	3	4	3	4	4	3	4	4	3.6	
CO5	3	4	3	4	3	3	3	4	3	4	3.4	
Mean Overall Score											3.5	

**Result: The Score of this Course is 3.5(High)**

<b>Association</b>	<b>1%-20%</b>	<b>21%-40%</b>	<b>41%-60%</b>	<b>61%-80%</b>	<b>81%-100%</b>
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Interval</b>	<b>0&lt;=rating&lt;=1</b>	<b>1.1&lt;=rating&lt;=2</b>	<b>2.1&lt;=rating&lt;=3</b>	<b>3.1&lt;=rating&lt;=4</b>	<b>4.1&lt;=rating&lt;=5</b>
<b>Rating</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

**UNIT-I**

**[10hrs]**

**Introduction to Dot Net:-** Dot Net Framework –CLR-MSIL-JIT-Managed Code-Benefits of Dot Net.

**UNIT-II:**

**[15hrs]**

**C#.Net:** Data types-Variables-Arrays - Properties - Namespace - Methods - Interface - Delegation.

**UNIT-III:**

**[20hrs]**

**ASP.NET:** Difference between ASP and ASP.NET-Architecture of ASP.NET-Execution model -Difference between Code Behind and aspx file-**Implementation of simple web application.**

**UNIT-IV:**

**[10hrs]**

**Controls in C#:** Button - Textbox - Timer - PictureBox - Radio Button - Menu.  
**Web Controls:** AdRotator-Validation-Calendar .

**UNIT –V:**

**[20hrs]**

**ADO.NET:** ADO.Net Objects Model – Architecture of ADO.NET-Working with Grid control -Working with Crystal Report Viewer control.

**Text Books:**

1. C# Programmers Harvey M. Deitel& Paul J.Deitel - Second Edition-Pearson Edition - 2011.
2. C#.Net Yashavant Kanetkar, Motilal Books of India 1- Edition2004.
3. C# in a nutshell. O’Reilly Publication Peter Drayton , Ben Albahari, Ted Neward.. 1 Edition -2002
4. Programming with C# E.Balaguruswamy. -. Tata McGraw – Hill Publication. 1- Edition 5th Reprint, Tata McGraw Hill,2004.

**Reference Books:**

1. C# - A Beginner’s Guide Herbert Schlitz Osborne/ McGraw – Hill Publication- 1 Editon 2002
2. C# Programming with the Public Bata Burton Harvey, Simon Robinson, Julian Templeman and Karli Waston, , Shroff Publishers & Distributors Pvt. Ltd(SPD) Mumbai, 3rd Edition - 2001.
3. Ben Albahart, Peter Drayton and Brad Merrill, ‘c# Essentials’, SPD, Mumbai March-1 Editon2001.
4. Thamari Selvei, A text Book on C#: A Systematic Approach to OOP, Pearson Ed. 1st Edition:2013

<b>III B.Sc (CS)</b>	<b>SOFTWARE ENGINEERING</b>	<b>19ECS51A</b>
<b>SEMESTER – V</b>		<b>HRS/WK-6</b>
<b>Elective – II Option(I)</b>	<b>For the students admitted from the year 2019</b>	<b>CREDIT – 4</b>

**Objective:**

To introduce the concepts of software Engineering and the various phases in Software development in order to equip the students in developing project.

**Course Outcomes (CO):**

After learning this course, the students should be able to expose

**CO1:** Ability to understand the Software Engineering and Models

**CO2:** Ability to understand Requirement Engineering and Requirement Engineering Tasks

**CO3:** Ability to understand Building Analysis Model

**CO4:** Ability to know the Testing strategies

**CO5:** Ability to learn the basic concept of the Management Spectrum

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

<b>SEMESTER V</b>	<b>COURSE CODE: 19ECS51A</b>					<b>TITLE OF THE PAPER: Software Engineering</b>					<b>HOURS: 6</b>	<b>CREDITS: 4</b>
<b>COURSE OUTCOMES</b>	<b>PROGRAMME OUTCOMES(PO)</b>					<b>PROGRAMME SPECIFIC OUTCOMES(PSO)</b>					<b>MEAN SCORE OF CO'S</b>	
	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>		
<b>CO1</b>	4	4	4	3	4	3	3	3	4	4	3.6	
<b>CO2</b>	4	4	3	3	4	4	4	4	4	3	3.7	
<b>CO3</b>	4	4	3	4	4	4	4	3	3	3	3.6	
<b>CO4</b>	4	4	3	4	4	4	4	3	4	4	3.8	
<b>CO5</b>	4	4	3	4	4	4	4	3	3	4	3.7	
<b>Mean Overall Score</b>											3.7	

**Result: The Score of this Course is 3.7(High)**

<b>Association</b>	<b>1%-20%</b>	<b>21%-40%</b>	<b>41%-60%</b>	<b>61%-80%</b>	<b>81%-100%</b>
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Interval</b>	<b>0&lt;=rating&lt;=1</b>	<b>1.1&lt;=rating&lt;=2</b>	<b>2.1&lt;=rating&lt;=3</b>	<b>3.1&lt;=rating&lt;=4</b>	<b>4.1&lt;=rating&lt;=5</b>
<b>Rating</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

**UNIT-I:** **[20hrs]**

**Software Engineering and Models:** Introduction -Characteristics of Software-Software Myths - **Process Models:** The Waterfall Model- Incremental Process Models: The Incremental Model, The RAD Model – **Evolutionary Process Models:** Prototyping, The Spiral Model, The Concurrent Development Model.

**UNIT-II:** **[15hrs]**

**Requirement Engineering:** Requirement Engineering Tasks: Inception, Elicitation, Elaboration, Negotiation, Specification, Validation, Requirement management - Initiating the Requirements Engineering Process: Identifying the stake-holder, Recognizing the multiple view point, Working towards collaboration, Asking the first question- Eliciting Requirements: Collaborative requirement gathering- Quality function deployment (QFD)- Users scenarios- Elicitations work product.

**UNIT-III:** **[20hrs]**

**Building Analysis Model: Requirement Analysis:** Overall objectives and Philosophy, Analysis Rule of thumbs, Domain Analysis - Data Modeling: Data Objects, Data Attributes, Relationships, Cardinality and Modality – Flow Oriented Modeling – Class Based Modeling – Creating a Behavioral Model.

**UNIT-IV:** **[20hrs]**

**Testing:** Introduction about testing: Testing ,Generic characteristics of testing, Verification and Validation - Test Strategies for Conventional Software: Unit Testing, Integration Testing: Top- down Integration, Bottom-up Integration - Validation Testing – System Testing –White Box Testing – Basic Path testing : Flow Graph Notation, Independent paths, Cyclomatic Complexity, Graph matrices method – Control Structure – Black Box Testing: Graph-Based Testing Methods , Equivalence Partitioning, Boundary Value Analysis, Orthogonal Array Testing

**UNIT-V:** **[15hrs]**

**Project Management:** The Management Spectrum- The People: The Players, Team Leaders, the Software Team- Coordination and Communication Issues-The Product: Software Scope, Problem Decomposition - The Process: Melding the Product and the Process, Process Decomposition - The Project: Signs of Project Failure, Five-part commonsense approach to software projects - Formal Technical Reviews(FTR).

**Text Books:**

1. R. S. Pressman – Software Engineering –Sixth Edition McGraw Hill International edition –2007.

**Reference Books:**

1. Richard Fairley – Software Engineering – (Design, Reliability and Management) – Tata McGraw Hill edition –1983.
2. Software Engineering: (Update) (8th Edition) by Ian Sommerville

<b>III B.Sc (CS)</b>	<b>MANAGEMENT INFORMATION SYSTEM</b>	<b>19ECS51B</b>
<b>SEMESTER – V</b>		<b>HRS/WK-6</b>
<b>Elective – II Option(II)</b>		<b>CREDIT - 4</b>

**Objective:**

To introduce the concepts of Management Information System and its various phases in Software Development Management to equip the students in understanding project Environment.

**Course Outcomes (CO):**

After learning this course, the students should be able to expose

- CO1:** Ability to understand the basics of Information Systems (IS)
- CO2:** Ability to understand Information systems for business operations
- CO3:** Ability to understand Managing Information Technology
- CO4:** Ability to know the Enterprise Resource Planning (ERP)
- CO5:** Ability to learn the basic concept of ERP implementation

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER V	COURSE CODE: 19ECS51B					TITLE OF THE PAPER: Management Information System					HOURS: 6	CREDITS: 4
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	4	3	2	4	4	4	2	4	3	3.4	
CO2	4	4	3	2	4	4	4	2	4	4	3.5	
CO3	4	4	3	3	4	3	3	3	4	3	3.4	
CO4	3	4	3	3	4	4	4	2	4	4	3.5	
CO5	4	4	3	2	4	4	4	3	4	4	3.6	
<b>Mean Overall Score</b>											3.5	

**Result: The Score of this Course is 3.5(High)**

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Interval</b>	<b>0&lt;=rating&lt;=1</b>	<b>1.1&lt;=rating&lt;=2</b>	<b>2.1&lt;=rating&lt;=3</b>	<b>3.1&lt;=rating&lt;=4</b>	<b>4.1&lt;=rating&lt;=5</b>
<b>Rating</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

This Course is having **High** association with Programme Outcome and Programme Specific Outcome.

**UNIT-I:** [20hrs]

**Introduction to Information systems(IS):** why study IS- why business need information technology (IT) – fundamentals of IS concepts – overview of IS – solving business problems with IS – developing IS solutions.

**UNIT-II:** [20hrs]

**Information systems for business operations:** Business IS – marketing, manufacturing, human resource, accounting and financial information systems – transaction processing system – management information and decision supportsystems.

**UNIT-III:** [20hrs]

**Managing information technology:** Managing information resource and technologies – global IT management – planning and implementing business change with IT.

**UNIT-IV:** [15hrs]

**Enterprise Resource Planning (ERP):** an overview – benefits of ERP – ERP and related technologies – business process reengineering – data warehousing – data mining – online analytical processing– supply chain management.

**UNIT-V:** [15hrs]

**ERP implementation:** ERP implementation life cycle – implementation methodology – hidden cost – organizing the implementation – vendors, consultants and users contracts with vendors, consultants and employees project management and monitoring – ERP present and future – turbo change the ERP systems – enterprise integration applications – ERP and E- commerce – ERP and Internet.

**Text Book:**

1. James A O'Brien – Management Information Systems for managing IT in the internet networked Enterprise – 4<sup>th</sup>Edition, Tata McGraw Hill, New Delhi, 1999.

**Reference Books:**

1. Enterprise Resource Planning - Alexis Leon, Tata McGraw Hill, New Delhi, 2000.
2. Alexis Leon ERP Demystified ... Enterprise Resource Planning, Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2007.
3. Management Information Systems, W.S. Jaswadekar – Tata McGraw Hill, New Delhi, 1998.

## Computer Science

<b>III B.Sc(CS)</b>	<b>DATA COMMUNICATION AND NETWORKS</b> <b>For the students admitted in the year 2019</b>	<b>19ECS52A</b>
<b>SEMESTER - V</b>		<b>HRS/WK-5</b>
<b>Elective –I</b> <b>(Option I)</b>		<b>CREDIT –4</b>

### Objective:

To enable the students to get acquainted with the basics of Networks and to make them concentrate on research side with respect to networks.

### Course Outcomes (CO):

**CO1:** To know about basics of networks and internetworks.

**CO2:** To understand the function of layers and signals.

**CO3:** Ability to understand the different transmission medium with error correction and detection.

**CO4:** Ability to acquire knowledge about switching

**CO5:** To understand the concept of networking, internetworking devices and routing algorithm.

### Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes

SEMESTER V	COURSE CODE:19ECS52A					TITLE OF THE PAPER: DATA COMMUNICATION AND NETWORKS					HOURS: 5	CREDITS: 4
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	3	3	3	4	4	3	3	3	4	3.4	
CO2	3	4	3	4	4	4	3	3	3	4	3.5	
CO3	3	3	4	3	3	3	3	3	4	3	3.2	
CO4	4	3	4	3	3	3	4	3	3	3	3.3	
CO5	3	3	4	3	4	3	4	3	3	4	3.4	
<b>Mean Overall Score</b>											3.4	

**Result: The Score of this Course is 3.4(High)**

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

**UNIT-I** **[10hrs]**

**Networks:** Protocols and standard – line configuration – topology – transmission mode – categories of networks – inter networks.

**UNIT-II** **[20hrs]**

**The OSI Model:** Functions of the layers – TCP/IP protocol suite – signals – analog and digital signal – periodic and a periodic signal – analog signals – digital signal – data transmission – data terminal equipment – data circuit terminals equipment – modems.

**UNIT-III** **[20hrs]**

**Transmission Media:** Guided media – unguided media – transmission impairments – media comparison. Multiplexing – FDM – TDM – WDM. Error detection and correction – types of errors – detection – vertical redundancy check (VRC) – longitudinal redundancy check (LRC) – cyclic redundancy check (CRC) – check sum – error correction.

**UNIT-IV** **[15hrs]**

**Switching:** Circuit switching – packet switching – message switching – networking and internetworking devices – repeaters – bridges – routers – gateways.

**UNIT-V** **[10hrs]**

**Routing algorithms:** Distance vector routing – link state routing – data link control – line discipline – flow control – error control.

**Text Books:**

1. “Data Communications and Networks” – Behrouz A Forouzan, Second Edition, Tata McGraw Hill, 2002.
2. “Data and Computer Communication”, William Stallings, 7<sup>th</sup> Edition, Pearson Education–2006.
3. Introduction to Data Communications and Networking. Wayne Tomasi . Pearson Prentice Hall, 2005

**Reference Books:**

1. William Stallings, “Data & Computer Communications”, Sixth Edition, Pearson Education, 2001.
2. Introduction to Data Communications and Networking by Behrouz Forouzan, Catherine Ann Coombs, and Sophia Chung Fegan-1997.
3. Fred Halsall, “Data Communications, Computer Networks and Open Systems”, Addison Wesley, 1995.

<b>III B.Sc (CS)</b>	<b>ELECTRONIC COMMERCE</b> For the students admitted in the year 2019	<b>19ECS52B</b>
<b>SEMESTER - V</b>		<b>HRS/WK-5</b>
<b>Elective –I (Option II)</b>		<b>CREDIT –4</b>

**Objective:**

To explore the basic concepts of E-Commerce and its Applications in real world.

**Course Outcomes (CO):**

- CO1:** To know about basics of E-Commerce.
- CO2:** To understand the use of Electronic Payment.
- CO3:** To understand the various security policies.
- CO4:** To acquire knowledge about various cards used for transactions.
- CO5:** To know about the Internet Applications for E-commerce.

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER V	COURSE CODE: 19ECS52B					TITLE OF THE PAPER: Electronic Commerce					HOURS: 5	CREDITS: 4
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	3	3	4	5	4	4	3	4	3	3	3.6	
CO2	4	4	3	4	4	4	4	4	2	3	3.6	
CO3	4	4	3	4	4	4	3	4	3	2	3.5	
CO4	4	3	2	3	4	4	4	4	3	3	3.4	
CO5	4	3	4	3	3	3	3	3	3	4	3.3	
<b>Mean Overall Score</b>											<b>3.48</b>	

**Result: The Score of this Course is 3.48(High)**

<b>Association</b>	<b>1%-20%</b>	<b>21%-40%</b>	<b>41%-60%</b>	<b>61%-80%</b>	<b>81%-100%</b>
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Interval</b>	<b>0&lt;=rating&lt;=1</b>	<b>1.1&lt;=rating&lt;=2</b>	<b>2.1&lt;=rating&lt;=3</b>	<b>3.1&lt;=rating&lt;=4</b>	<b>4.1&lt;=rating&lt;=5</b>
<b>Rating</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

This Course is having **High** association with Programme Outcome and Programme Specific Outcome.

**UNIT-1**

[10 HRS]

**Electronic commerce environment and opportunities:** Background – the electronic commerce environment - electronic marketplace technologies – models of electronic commerce: Overview – electronic data interchange – migration to open EDI – electronic commerce with WWW/Internet – Commerce Net Advocacy – Web commerce going forward.

**UNIT-II**

[15 HRS]

**Approaches to safe electronic commerce:** Overview – secure transport protocols – secure transactions – secure electronic payment protocol (SEPP) – Secure electronic transaction (SET) – certificates for authentication – security on web servers and enterprise networks – electronic cash and electronic payment schemes: Internet monetary payment and security requirements – payment and purchase order process – on-line electronic cash.

**UNIT-III**

[20 HRS]

**Internet/Intranet security issues and solutions:** The need for computer security – specific intruder approaches – security strategies – security tools – encryption – enterprise networking and access to the internet – antivirus programs – security teams.

**UNIT-IV**

[20 HRS]

**MasterCard/visa secure electronic transaction:** Introduction – business requirements – concepts – payment processing – E-mail and secure E-mail technologies for electronic commerce: Introduction – The means of distribution A Model for message handling – how does E-mail work? MIME: Multipurpose internet mail extensions – S/MIME: Secure multipurpose internet mail extensions – MOSS: Message object. Security services – Comparisons of security methods – MIME and related facilities for EDI over the internet.

**UNIT-V**

[10HRS]

**Internet and web site establishment: Introduction** – technologies for web servers – internet tools relevant to commerce – internet applications for commerce – internet charges – internet access and architecture – searching the internet – internet resources: A travelogue of web malls : Introduction a shopping experience – a travelogue – applications: Advertising on the internet: Issues and technologies: Introduction – advertising on the web – “Marketing 101” – creating a website.

**Text Books:**

1. Daniel Minoli and Emma Minoli. Web commerce technology handbook. Tata Mc Graw Hill. 1999.
2. Kamallesh K Bajaj and Debjani Nag.. E-Commerce, the cutting edge of business. TataMcGrawHill.1999
3. Janice Reynolds.. The Complete E-Commerce Book: Design, Build & Maintain a Successful Web-based Business. Focal Press Publication. 2004

**Reference Books:**

1. Kenneth C. Laudon, Carol GuercioTraver.. E-commerce: Business, Technology, Society. Addison WesleyPublication,2001
2. Constance H. McLaren, Bruce J. McLaren. E-commerce: Business on the Internet South. Western Educational Publication,1999.

III B.Sc (CS)	<b>PYTHON PROGRAMMING</b>	<b>19SCS51</b>
SEMESTER – V	(Skill Enhancement Course)	<b>HRS/WK-2</b>
IV - SEC – PRACTICAL	For the students admitted from the year 2020	<b>CREDIT - 2</b>

**Objective:**

This course introduces students to learn fundamentals of Python Programming and to get employed in various MNC.

**Course Outcomes (CO):**

**CO1:** To write, test, and debug simple Python programs.

**CO2:** To implement Python programs with conditionals and loops

**CO3:** Represent compound data using Python lists, tuples, dictionaries.

**CO4:** To learn database connectivity in python.

**CO5:** Students can understand Python and apply to get Employability skills.

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER V	COURSE CODE:19SCS51					TITLE OF THE PAPER: Practical- Python Programming					HOURS:2	CREDITS:2
COURSE OUTCOME S	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	3	4	3	3	3	4	4	3	4	3	3.4	
CO2	4	4	3	4	3	4	3	4	4	3	3.6	
CO3	4	4	3	3	3	3	4	3	4	4	3.5	
CO4	3	4	3	3	3	3	3	4	4	4	3.4	
CO5	4	4	3	3	3	4	4	3	3	4	3.5	
Mean Overall Score											3.5	

**Result: The Score of this Course is 3.5(High)**

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome.

1. Introduction and installation of python.
2. Write a program to demonstrate different data types in Python.
3. Write a program to perform different Arithmetic Operations in Python.
4. Write a simple program to perform Looping in Python.
5. Write a program to demonstrate working with arrays (numpy)
6. Write a program to demonstrate working with lists in python.
7. Write a program to demonstrate working with tuples in python.
8. Write a program to demonstrate working with dictionaries in python.
9. Write a program using split operator
10. Create a database for student mark sheet preparation.

**Text Books:**

1. Jeeva Jose and P. Sojan Lal, “Introduction to Computing and Problem Solving with PYTHON”, KhannaBook Publishing Co. (P) Ltd., 2016.

**Reference Books:**

1. Wesley J. Chun, “Core Python Programming”, Second Edition, Prentice Hall Publication, 2006.
2. Micheal Dawson, “Python Programming for Absolute Beginners”, Third Edition, Course Technology, 2010.

<b>III B.Sc (CS)</b>	<b>PRACTICAL - ORACLE</b>	<b>CSP505</b>
<b>SEMESTER – V</b>		<b>HRS/WK-3</b>
<b>CORE - PRACTICAL V</b>		<b>CREDIT – 2</b>

**Objective:**

To make the student aware of the ORACLE as a Back-End tool.

**Course Outcomes (CO):**

**CO1:** Ability to understand the Simple queries using DDL, DML and DCL

**CO2:** Ability to understand Views and snapshots.

**CO3:** Ability to understand PL/SQL Block

**CO4:** Ability to know the basic PL/SQL functions, procedures and Triggers

**CO5:** Ability to learn the basic concept of Oracle Reports.

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER V	COURSE CODE: CSP505					TITLE OF THE PAPER: ORACLE					HOURS: 3	CREDITS: 2
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	3	3	4	5	4	4	3	4	3	2	3.5	
CO2	4	4	3	4	4	4	4	4	2	3	3.6	
CO3	4	4	3	4	4	4	3	4	3	2	3.5	
CO4	4	3	2	3	4	4	4	4	3	4	3.5	
CO5	4	3	4	3	3	3	3	3	3	3	3.2	
Mean Overall Score											3.5	

**Result: The Score of this Course is 3.5(High)**

<b>Association</b>	<b>1%-20%</b>	<b>21%-40%</b>	<b>41%-60%</b>	<b>61%-80%</b>	<b>81%-100%</b>
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Interval</b>	<b>0&lt;=rating&lt;=1</b>	<b>1.1&lt;=rating&lt;=2</b>	<b>2.1&lt;=rating&lt;=3</b>	<b>3.1&lt;=rating&lt;=4</b>	<b>4.1&lt;=rating&lt;=5</b>
<b>Rating</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

This Course is having **High** association with Programme Outcome and Programme Specific Outcome.

## **PRACTICAL - ORACLE**

### **SQL**

1. Simple Queries using DDL, DML and DCL
2. SQL Aggregate Functions
3. SET Operations
4. Views and Snapshots
5. Multiple Tables and Nested Queries

### **PL/SQL**

6. PL/SQL Block
7. Function and Procedures
8. Subprograms and Packages
9. Triggers
10. Cursors

### **Forms and Reports**

11. Designing Oracle Forms using Menus and Buttons
12. Developing Oracle Reports.

<b>III B.Sc, (CS)</b>	<b>PRACTICAL - DOT NET TECHNOLOGIES</b> <b>For the students admitted in the year 2017</b>	<b>CSP506S</b>
<b>SEMESTER - V</b>		<b>HRS/WK-3</b>
<b>CORE PRACTICAL – VI</b>		<b>CREDIT –2</b>

**Objective:**

To enable students to learn and program using C#.NET and also to develop web application using ASP.NET.

**Course Outcomes (CO):**

**CO1:** Knowledge to develop windows and web applications.

**CO2:** Develop a simple bio-data storage application.

**CO3:** Usage of the standard controls for creating color chooser and notepad applications.

**CO4:** Learn to create login form using MS-Access as backend.

**CO5:** Acquire a good programming knowledge for creating database applications and design a simple website using master page.

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER V	COURSE CODE: CSP506S					TITLE OF THE PAPER: Practical-Dot Net Technologies					HOURS: 3	CREDITS: 2
COURSE OUTCOME S	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	3	4	3	3	3	4	4	3	4	3	3.4	
CO2	4	4	3	4	3	4	3	4	4	3	3.6	
CO3	4	4	3	3	3	3	4	3	4	4	3.5	
CO4	3	4	3	3	3	3	3	4	4	4	3.4	
CO5	4	4	3	3	3	4	4	3	3	4	3.5	
Mean Overall Score											3.5	

**Result: The Score of this Course is 3.5 (High)**

<b>Association</b>	<b>1%-20%</b>	<b>21%-40%</b>	<b>41%-60%</b>	<b>61%-80%</b>	<b>81%-100%</b>
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Interval</b>	<b>0&lt;=rating&lt;=1</b>	<b>1.1&lt;=rating&lt;=2</b>	<b>2.1&lt;=rating&lt;=3</b>	<b>3.1&lt;=rating&lt;=4</b>	<b>4.1&lt;=rating&lt;=5</b>
<b>Rating</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

This Course is having **High** association with Programme Outcome and Programme Specific Outcome.

## PRACTICAL - DOT NET TECHNOLOGIES

### WINDOWS APPLICATION

1. To develop simple student bio data
2. Create a color chooser using standard control.
3. To develop Notepad Application.
4. Login Form Creation using MS Access.

### WEB APPLICATION

5. Create an application to sending a request from one page to another using session.
6. Create a simple website for an organization using MasterPage.
7. To develop database application for student mark list processing using validation control  
(Oracle)
8. To develop database Application for Telephone Directory to store phone number, Customer name and Customer address and display it with Grid View control.(SQL Server)

## Computer Science

III B.Sc (CS)	<b>OPERATING SYSTEM</b>	19CS613
SEMESTER - VI		HRS/WK- 6
CORE - XI	For the students admitted from the year 2019	CREDIT – 5

### Objective:

To make the students aware of all basic concepts related to operating system and illustrate with UNIX Case Study.

### Course Outcomes (CO):

After learning this course, the students should be able to expose

**CO1:** Ability to understand the services provided by the OS and also to understand the Structure of the file system.

**CO2:** Ability to understand about process and how the processes are Communicated and scheduled.

**CO3:** Ability to understand the different techniques of memory management.

**CO4:** Ability to know the basic knowledge of protection and security mechanisms.

**CO5:** Ability to learn the basic concept of operating system using UNIX operating System.

### Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes

SEMESTER VI	COURSE CODE: 19CS613					TITLE OF THE PAPER: OPERATING SYSTEM					HOURS: 6	CREDITS: 5
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	4	4	3	5	4	4	4	3	5	4.0	
CO2	4	4	4	4	4	4	4	3	4	5	4.0	
CO3	3	3	3	3	3	4	4	4	3	4	3.4	
CO4	4	3	4	4	4	4	4	4	3	4	3.8	
CO5	3	4	4	4	5	4	4	4	4	5	4.1	
<b>Mean Overall Score</b>											3.8	

**Result: The Score of this Course is 3.8(High)**

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	$0 \leq \text{rating} \leq 1$	$1.1 \leq \text{rating} \leq 2$	$2.1 \leq \text{rating} \leq 3$	$3.1 \leq \text{rating} \leq 4$	$4.1 \leq \text{rating} \leq 5$
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome.

**UNIT-I**

[20 hrs]

**Introduction to Operating System:** Definition of Operating System- Booting: Before Booting and after Booting - Types of Booting – Kerne l- History of Operating System - Operating system functions: Information Management, Process Management, and Memory Management.

**UNIT-II**

[20 hrs]

**Process Management and Deadlock:** Process Management: Context Switching - Different States of Process - Process State Transition Diagram - Process Control Block (PCB), Operation on Process – Levels of Scheduling – Short term Scheduling Policies - Inter-process communication - Deadlock – Deadlock prerequisites - Deadlock Strategies.

**UNIT-III**

[20hrs]

**Memory Management:** Memory Management: Real Memory Management-: Contiguous Real Memory Management - Single Contiguous - Fixed Partitioned - Variable Partitions- Non-Contiguous Real Memory Management –Paging - Segmentation - Virtual Memory Management Systems.

**UNIT-IV**

[20hrs]

**GUI and Security:** GUI – Components of GUI – Requirements of Windows based GUI – Security: Threats - Attacks - Worms - Virus - Design principles – Encryption: Methods of Encryption – Authentication: Authentication in Centralized Environment - Authentication in Distributed Environment.

**UNIT-V**

[10hrs]

**UNIX:** Unix - Architecture of Unix - Various Modules of Unix and their relationship – Unix File System- Different Types of Files - Important Unix Directories and Files – Basic commands in Unix.

**Text Books:**

1. A.S.Godbole-OperatingSystems-TMH-1999.
2. A.Silberschatz and P.B.Galvin- Operating system concepts-Addision-Wesley Publishing company, Fifth Edition,1998.

**Reference Books:**

1. Andrew S.Tannenbaum, “Operating Systems: Design and Implementation”, 3/e, PHI,2006.
2. Charles Crowley,”Opearting Systems-A design Oriented Approcah”,Tata MC Graw Hill, 1998.
3. William Stallings, “Operating Systems”,5/e PHI/Pearson Education ,1997.

III B.Sc, (CS)	<b>OPEN SOURCE TECHNOLOGIES-PHP</b> For the students admitted in the year 2019	19CS614
SEM – VI		HRS/WK- 6
CORE - XII		CREDIT - 5

**Objective:**

To impart basic knowledge of PHP and MySQL with Programming Skills.

**Course Outcomes (CO):**

- CO1:** To gain knowledge about basics of PHP.
- CO2:** To understand the concept of strings and arrays.
- CO3:** To implement function and control structures
- CO4:** Ability to learn about controls for reading data in Web page.
- CO5:** To implement the concept of database in PHP.

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER VI	COURSE CODE: 19CS614					TITLE OF THE PAPER: OPEN SOURCE TECHNOLOGY- PHP					HOURS: 6	CREDITS: 5
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
											3.5	
CO1	4	4	3	3	3	4	4	3	4	3	3.5	
CO2	3	3	3	3	2	4	4	3	4	3	3.2	
CO3	3	3	3	3	2	4	4	3	3	3	3.1	
CO4	3	3	3	4	3	3	3	3	4	3	3.2	
CO5	3	3	4	3	3	3	4	3	4	4	3.4	
<b>Mean Overall Score</b>											3.2	

**Result: The Score of this Course is 3.2(High)**

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome.

**UNIT-I**

[15 Hrs]

**Essential PHP:** Creating your Development Environment – Mixing HTML and PHP – Command - Line PHP – Working with Variables – Creating Constants – Understanding PHP’s Internal Data types – Operators and FlowControl.

**UNIT-II**

[20 Hrs]

**Strings And Arrays:** String Functions- Converting to and from Strings - Formatting Text String -Modifying Data in an Array-Deleting Array Elements- Arrays with Loops - PHP Array Functions -Sorting Arrays.

**UNIT-III**

[20 Hrs]

**Creating Functions:** Passing Functions-Passing Arrays to Functions- Passing by Reference -Using Default Arguments- Returning Data from functions- Nesting Functions. **Control Statements:** Data Input/Output functions - flow of control-control structures -switch, break and continue - Go to statement-comma operator.

**UNIT-IV**

[20 Hrs]

**Reading Data In Web Pages:** Setting up web pages to communication with PHP- HandlingText Fields-Checkbox-Radio buttons-Password Controls- List boxes- Buttons – Hidden Control – File Upload.

**UNIT-V**

[15Hrs]

**Working With Databases:** Creating a MYSQL Database-Creating a New Table-Putting Data into the New Database-Accessing the Databases in PHP-Updating Databases-Inserting New Data Items into a Database- Deleting Records-Creating New Tables-Creating a New Database-Sorting your Data.

**Text Book:**

“The Complete Reference PHP”, Steven Holzner, Tata McGraw Hill Pvt.Ltd., 2008.

**Reference Book:**

“Core PHP programming”, Leon Atkinson, Pearson Education, 2004.

<b>III B.Sc, (CS)</b>	<b>COMPUTER GRAPHICS</b> <b>For the students admitted from the year 2019</b>	<b>19ECS65A</b>
<b>SEMESTER–VI</b>		<b>HRS/WK-5</b>
<b>Core –VIII</b>		<b>CREDIT – 4</b>

**Objective:**

To enable Students, Learn and Understand the basic concepts of Computer Graphics

**Course Outcomes (CO):**

**CO1:** Ability to learn about the basic knowledge of Graphics systems

**CO2:** Ability to know about the Attributes of I/O and 2-D transformation models.

**CO3:** Ability to understand clipping, interactive graphics I/P and picture construction techniques

**CO4:** Ability to understand 3-D display methods

**CO5:** Ability to know about Projections and Projection operations.

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER VI	COURSE CODE:19ECS65A	TITLE OF THE PAPER: COMPUTER GRAPHICS	HOURS: 5	CREDITS: 4							
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	4	4	4	4	4	5	3	2	5	3.9
CO2	4	4	4	4	4	4	5	3	2	5	3.9
CO3	4	4	4	4	4	4	5	3	2	5	3.9
CO4	4	4	4	4	4	4	5	3	2	5	3.9
CO5	4	4	4	4	4	4	5	3	2	5	3.9
<b>Mean Overall Score</b>											<b>3.9</b>

**Result: The Score of this Course is 3.9(High)**

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Interval</b>	<b>0&lt;=rating&lt;=1</b>	<b>1.1&lt;=rating&lt;=2</b>	<b>2.1&lt;=rating&lt;=3</b>	<b>3.1&lt;=rating&lt;=4</b>	<b>4.1&lt;=rating&lt;=5</b>
<b>Rating</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

This Course is having **High** association with Programme Outcome and Programme Specific Outcome.

**UNIT-I**

**[15 Hrs]**

**Introduction to Computer Graphics:** Video display devices – Raster scan system – Random Scan System – Interactive input Devices – Graphics software – Output primitives – line drawing algorithms – Line function – circle Generating algorithms.

**UNIT-II**

**[15 Hrs]**

**Output Primitives:** Attributes of output Primitives – line attributes – Color and Grayscale style – Area filling algorithms – Character attributes Inquiry functions – Two dimensional transformations – Basic transformation – composite transformation – Matrix representation –Other transformations.

**UNIT-III**

**[15 Hrs]**

**Two-dimensional viewing:** Two – dimensional viewing – window – to view port co-ordinate transformation – clipping algorithms – interactive input methods –logical classification of input devices – interactive picture construction methods.

**UNIT-4**

**[15Hrs]**

**Three dimensional viewing:** Three – dimensional concepts – Three dimensional display methods – parallel Projection –Perspective projection – Depth Cueing – Visible line and surface identification.

**UNIT –V**

**[15Hrs]**

**Three dimensional Transformations:** Three dimensional transformations - Three-dimensional viewing – Projection – Viewing transformations – Depth buffer(Z-Buffer) method – A-buffer method - implementation of viewing operations.

**Text Books:**

1. Computer Graphics [C Version] – D. Hearn and M.P. Basker – Person Education -1996
2. Computer Graphics: Principles and Practice in C (2nd Edition) by James D. Foley, Andries van Dam, Steven K. Feiner, and John F. Hughes-1990
3. Schaum's Outline of Computer Graphics by Zhigang Xiang and Roy A. Plastock-McGraw- Hill Education -2000

**Reference Books:**

1. Principle of Interactive Computer Graphics by W.M. Newman and RF. Sproull – McGraw Hill International Edition -1979.
2. Interactive Computer Graphics: A Top-Down Approach Using OpenGL by Edward Angel 5th Edition-2009

III B.Sc (CS)	<b>WEB GRAPHICS</b> For the students admitted in the year 2019	19ECS65B
SEM – VI		HRS/WK – 5
ELECTIVE - III Option (II)		CREDIT - 4

**Objectives:**

To enable students, learn and incorporate graphics in Web based Applications through understanding of appropriate tools.

**COURSE OUTCOMES:**

- CO1** : Understand the basic concepts of web graphics and basic HTML tags to design a website.
- CO2** : Understand the built-in tools of Photoshop.
- CO3** : Designing and adding multimedia to the webpage
- CO4** : Understanding and implementing the basic tools of Photoshop.
- CO5** : Acquire knowledge to handle images in an effective manner.

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER VI	COURSE CODE: 19ECS65B					TITLE OF THE PAPER: WEB GRAPHICS					HOURS: 5	CREDITS: 4
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	3	4	3	3	4	3	4	4	3	3	3.4	
CO2	3	3	3	3	3	3	4	3	4	4	3.3	
CO3	3	3	3	3	4	3	4	3	3	4	3.3	
CO4	3	3	3	4	3	4	3	3	3	3	3.2	
CO5	3	3	3	3	3	4	3	3	4	3	3.2	
Mean Overall Score											3.3	

**Result: The Score of this Course is 3.3(High)**

<b>Association</b>	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
<b>Scale</b>	1	2	3	4	5
<b>Interval</b>	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
<b>Rating</b>	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome.

**UNIT-I**

[15 Hrs]

**Introduction:** HTML Coding – Basic Web Graphics – Web Page Design – Site building – Image Maps – Adding Multimedia to the Web.

**UNIT-II**

[15 Hrs]

**Paint Sharp Pro/Photoshop:** Introduction – Image Basics – File Formats – GIF – JPEG – Color Palette – Layers – Creating new Images – Brushes – Grids – Scaling Images – Moving and Merging layer – Too Palette – Screen Capturing – Gray – Using Style Palette – Animation.

**UNIT-III**

[15 Hrs]

**Image Handling:** Scanning images – adding text to the images – Designing icons – Creating background images – Color models – Color Depths – Color Calibration – Creating Gradients – Oil paint effect.

**UNIT-IV**

[15 Hrs]

**Multimedia:** Creating Clipping- Animation with sound effect – audio or video – Window's Media Player ActiveX control – Embedding VRML in a web page – Real player ActiveX control.

**UNIT-V**

[15 Hrs]

**Applications:** Creating website with a particular theme - Graphics – Animations and Interactions.

**Text Book and Reference Books:**

1. Photoshop 6 Visual jump start, Adobe Richard Schrand, Published by SybexInc.,U.S.,2000
2. Flash 5.0 graphics, Animation and Interaction, Macromedia, James L Mohles2000.

<b>III B.SC(CS)</b>	<b>MULTIMEDIA</b> <b>For the students admitted from the year 2019</b>	<b>19ECS66A</b>
<b>SEMESTER – VI</b>		<b>HRS/WK – 5</b>
<b>ELECTIVE- IV Option(I)</b>		<b>CREDIT – 4</b>

**Objectives:**

To enable the students to learn the concepts of Multimedia.

**Course Outcomes (CO):**

**CO1:** Understand the basic need and ways of using multimedia.

**CO2:** Understanding the basics of text and its origin.

**CO3:** Gain knowledge about the multimedia project developing team.

**CO4:** Acquire the knowledge about video and its standards.

**CO5:** To develop and understand about the multimedia project planning and Costing.

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER VI	COURSE CODE: 19ECS646A	TITLE OF THE PAPER: MULTIMEDIA	HOURS: 5	CREDITS: 4							
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	3	3	3	4	4	3	3	3	3.2
CO2	3	3	3	4	3	4	4	3	3	3	3.3
CO3	3	4	3	4	3	3	3	3	4	3	3.3
CO4	3	3	3	3	3	3	4	3	4	3	3.2
CO5	3	3	3	3	3	4	3	3	3	4	3.2
Mean Overall Score											3.2

**Result: The Score of this Course is 3.2(High)**

<b>Association</b>	<b>1%-20%</b>	<b>21%-40%</b>	<b>41%-60%</b>	<b>61%-80%</b>	<b>81%-100%</b>
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Interval</b>	<b>0&lt;=rating&lt;=1</b>	<b>1.1&lt;=rating&lt;=2</b>	<b>2.1&lt;=rating&lt;=3</b>	<b>3.1&lt;=rating&lt;=4</b>	<b>4.1&lt;=rating&lt;=5</b>
<b>Rating</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

This Course is having **High** association with Programme Outcome and Programme Specific Outcome.

**UNIT-I:**

[15 Hrs]

**Multimedia:** Definition and Introduction to Multimedia – **Introduction to Making Multimedia:** Needs of Multimedia - **TEXT:** The power of meaning – About fonts and faces – Using text in multimedia – Computers and Text – Font editing and Design tools – Hypermedia and Hypertext.

**UNIT-II:**

[15 Hrs]

**Sound:** The power of sound – Multimedia system sounds – MIDI versus Digital Audio – Digital Audio – Making MIDI audio – Audio, File formats – Adding sound to your Multimedia project - **IMAGES:** Making still Images – Color – Image file formats.

**UNIT -III:**

[15 Hrs]

**Animation:** The Power of Motion – Principles of Animation – Making animations that works.

**UNIT-IV:**

[15 Hrs]

**Video:** Using Video – Working of Video – Broadcast video standards – Integrating computers and television – Shooting and Editing Video – Video tips – Recording formats – Digital Video.

**UNIT-V:**

[15 Hrs]

**Planning And Costing:** Project planning – Estimating – RFPs and Bid Proposals -Designing – Producing.

**Text Book:**

1. “Multimedia Making it Work” -Tay Vaughan -- McGraw Hill, 8thEdition-2010,

**Reference Book:**

1. Multimedia in Practice: Technology and Applications -Jeffcoate, Judith -- Prentice Hall, 2001.

## Computer Science

<b>III B.Sc, (CS)</b>	<b>BIG DATA ANALYTICS</b>	<b>ECS66B</b>
<b>SEM – VI</b>		<b>HRS/WK- 5</b>
<b>Elective- IV Option(II)</b>		<b>CREDIT - 4</b>

### Objectives:

To understand the fundamentals of big data analytics and the methodologies used in storing, manipulating and analyze large volumes of unstructured data.

### Course Outcomes (COs):

**CO1:** Ability to acquire knowledge on the basics of Big Data.

**CO2:** Knowing the role and use of virtualization in big data.

**CO3:** Ability to have a clear idea on hadoop tools and techniques used in big data.

**CO4:** Ability to become a Big Data Analytics.

**CO5:** Ability to appreciate the Big Data Storage concepts and technologies

### Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes

SEMESTER VI	COURSE CODE: ECS66B					COURSE TITLE: BIG DATA ANALYTICS					HOURS: 5	CREDITS: 4
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	4	4	3	4	4	4	4	3	5	3.9	
CO2	3	4	4	3	4	4	4	4	4	5	3.9	
CO3	4	4	4	4	4	4	3	4	4	4	3.9	
CO4	4	4	3	3	5	3	4	3	3	4	3.6	
CO5	4	3	4	4	5	4	4	4	4	5	4.1	
Mean Overall Score											3.8	

**Result: The Score of this Course is 3.8(High)**

<b>Association</b>	<b>1%-20%</b>	<b>21%-40%</b>	<b>41%-60%</b>	<b>61%-80%</b>	<b>81%-100%</b>
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Interval</b>	<b>0&lt;=rating&lt;=1</b>	<b>1.1&lt;=rating&lt;=2</b>	<b>2.1&lt;=rating&lt;=3</b>	<b>3.1&lt;=rating&lt;=4</b>	<b>4.1&lt;=rating&lt;=5</b>
<b>Rating</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

This Course is having **High** association with Programme Outcome and Programme Specific Outcome.

**UNIT-I**

[15 HRS]

**Introduction To Big Data Analytics:** Big Data – History of Big data- Types of Big data – Structured, Unstructured Data and Semi structured – Characteristics of Big Data – Importance of Big data.

**UNIT-II**

[15 HRS]

**Big data analytics:** Activities performed in Big Data – Classification of analytics – Challenges of Big data analytics- Terminologies used in Big Data Environments – Analytics tools.

**UNIT-III**

[15 HRS]

**Hadoop:** Hadoop Overview - Hadoop architectures – Working of Hadoop – Advantage of Hadoop - Key aspects and Components of Hadoop – Limitation of Hadoop.

**.UNIT-IV**

[15 HRS]

**MapReduce Fundamentals:** MapReduce task - Text Analytics and Big Data-Customized Approaches for Analysis of Big Data

**UNIT-V**

[15 HRS]

Integrating Data Sources-Real-Time Data Streams and Complex Event Processing, Operationalizing Big Data.

**Text Book:**

1. Judith Hurwitz, Alan Nugent, Fern Halper, Marcia Kaufman. “ Big Data For Dummies”, Wiley India, New Delhi., 2013

**Reference Books:**

1. Paul Zikopoulos, Dirk deRoos, Krishnan Parasuraman, Thomas Deutsch, James Giles, David Corrigan.. Harness the Power of Big Data The IBM Big Data Platform, Tata McGraw Hill Publications, New Delhi.2012
2. Michael Minelli (Author), Michele Chambers (Author), Ambiga Dhiraj (Author).. Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Todays Businesses, Wiley Publications, New Delhi,2013
3. Zikopoulos, Paul, Chris Eaton. Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, Tata McGraw Hill Publications, New Delhi,2011.

## Computer Science

<b>III B.Sc(CS)</b>	<b>GIMP</b>	<b>19SCS62</b>
<b>SEMESTER – VI</b>	(Skill Enhancement Course)	<b>HRS/WK-2</b>
<b>SEC – PRACTICAL</b>	<b>For the students admitted from the year 2020</b>	<b>CREDIT - 2</b>

### Objectives:

- ❖ This skill course introduces to fundamentals of Open-Source graphics tool GIMP.
- ❖ At the end of the course, students should have Practical exposure to GIMP.
- ❖ Students will Learn different effects and build desktop applications in GIMP.

### Course Outcomes (CO):

**CO1:** Acquire Fundamental knowledge on GIMP.

**CO2:** Learn the Basics of GIMP Interface and its practical impact.

**CO3:** Solve the effects related to effects applied on GIMP.

**CO4:** Develop an idea about new techniques applied in GIMP.

**CO5:** Create Applications like Banner, Business Card used for Employability Training.

### Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes

SEMESTER V	COURSE CODE:19SCS62					TITLE OF THE PAPER: Practical- GIMP					HOURS: 2	CREDITS: 2
COURSE OUTCOME S	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	3	4	3	3	3	4	4	3	4	3	3.4	
CO2	4	4	3	4	3	4	3	4	4	3	3.6	
CO3	4	4	3	3	3	3	4	3	4	4	3.5	
CO4	3	4	3	3	3	3	3	4	4	4	3.4	
CO5	4	4	3	3	3	4	4	3	3	4	3.5	
<b>Mean Overall Score</b>											<b>3.5</b>	

**Result: The Score of this Course is 3.5(High)**

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Interval</b>	<b>0&lt;=rating&lt;=1</b>	<b>1.1&lt;=rating&lt;=2</b>	<b>2.1&lt;=rating&lt;=3</b>	<b>3.1&lt;=rating&lt;=4</b>	<b>4.1&lt;=rating&lt;=5</b>
<b>Rating</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

1. Introduction and installation of GIMP
2. Demonstrate using Tool-box
3. The menus and windows
4. Layer and Layer masking
5. Performing Text Effects
6. Modify Color effects in images
7. Drawing Shapes in GIMP
8. Cutting Images and removing background
9. Design a Business Card
10. Develop a Banner for College

**Text books:**

1. Beginning Photo Retouching & Restoration Using GIMP, Phillip Whitt, ISBN-13: 978-1-484204-04-7, Paperback (308pp.), EPUB, MOBI, DF, Publisher/Date: Apress/2014, Website: <http://www.apress.com/9781484204047>
2. The Book of GIMP, Olivier Lecarme, Karine Delvare, ISBN-13: 978-1-59327-383-5, Paperback, 67 6pp, No Starch Press/2013- <http://nostarch.com/gimp>.

**Reference Books**

1. Jan Smith, Roman Joost, "GIMP for Absolute Beginners", A press Publications, 2012
2. Fazreil Amreen, "Instant GIMP Starter", Packet Publishing., 2013.
3. Jason van Gumster, Robert Shimonski, "GIMP Bible", Wiley Publishing, Inc, 2010.

<b>III B.Sc (CS)</b>	<b>PRACTICAL – OPEN-SOURCE TECHNOLOGIES</b>	<b>CSP607S</b>
<b>SEM – VI</b>		<b>HRS/WK- 3</b>
<b>CORE PRACTICAL- VII</b>		<b>CREDIT -2</b>
<b>PHP</b>		
<b>For the students admitted in the year 2019</b>		

**Objective:**

To enable the student to learn practical scripts and build applications in PHP.

**Course Outcomes (CO):**

**CO1:** Learn to develop simple web application in PHP.

**CO2:** To implement string and array and user defined function in Webapplication.

**CO3:** Acquire knowledge and skills for creating Home page using PHP.

**CO4:** Learn to create web form and use POST method in PHP.

**CO5:** Develop web applications to implement database concept and learn to build some common web applications using controls.

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER VI	COURSE CODE: CSP607S	TITLE OF THE PAPER: Open Source Technologies-PHP	HOURS: 3	CREDITS: 2							
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	3	3	3	3	4	4	4	4	4	3.6
CO2	3	3	2	2	2	4	4	3	3	3	2.9
CO3	4	3	3	3	3	3	4	4	4	3	3.4
CO4	3	3	2	2	2	3	4	3	3	3	2.8
CO5	4	3	3	3	3	4	4	4	4	4	3.6
CO6	4	3	2	3	3	4	4	3	4	3	3.3
Mean Overall Score											3.2

**Result: The Score of this Course is 3.2(High)**

<b>Association</b>	<b>1%-20%</b>	<b>21%-40%</b>	<b>41%-60%</b>	<b>61%-80%</b>	<b>81%-100%</b>
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Interval</b>	<b>0&lt;=rating&lt;=1</b>	<b>1.1&lt;=rating&lt;=2</b>	<b>2.1&lt;=rating&lt;=3</b>	<b>3.1&lt;=rating&lt;=4</b>	<b>4.1&lt;=rating&lt;=5</b>
<b>Rating</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

This Course is having **High** association with Programme Outcome and Programme Specific Outcome.

**PRACTICAL – OPEN SOURCE TECHNOLOGIES-PHP**

1. Simple Programs
2. String Functions
3. Arrays
4. Functions
5. Create a Home Page using PHP
6. Form creation using POST method
7. Database Operations
8. Login form
9. Student mark list creation
10. Electricity bill preparation.

<b>III B.Sc (CS)</b>	<b>MINI PROJECT</b> For the students admitted in the year 2018	<b>JCS601</b>
<b>SEMESTER - VI</b>		<b>HRS/WK-3</b>
<b>Practical – Mini Project</b>		<b>CREDIT –2</b>

**Objective:**

The main objective of the Project is to expose the students to industry atmosphere and to get a broad idea to develop project.

**Course Outcomes (CO):**

**CO1:** Ability to perform Critical Thinking, Reasoning, and Creative Thinking.

**CO2:** Ability to use the technology

**CO3:** Ability to visualize the problems and Provide Solution

**CO4:** Ability to test technical skills.

**CO5:** Ability to work both independently and in groups on presentations and/or development of Projects.

SEMESTER VI	COURSE CODE: JCS601	TITLE OF THE PAPER: MINI PROJECT												HOURS: 3	CREDITS: 2
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)								MEAN SCORE OF CO'S	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	5	4	5	5	4	4	4	4	4	3	4	4	4	4.10	
CO2	5	4	5	5	4	4	4	4	5	3	4	4	4	4.20	
CO3	5	5	5	5	5	5	5	4	5	3	4	4	4	4.50	
CO4	5	5	5	5	5	5	5	4	5	3	4	4	4	4.50	
CO5	5	5	5	5	5	5	5	4	5	3	4	4	4	4.50	
Mean Overall Score														4.4	

**Result: The Score of this Course is 4.4 (High)**

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **VERY HIGH** association with Programme Outcomes and Programme Specific Outcomes.

**Group Project: A group consist of 2 students.**

**FORMAT FOR PREPARING PROJECT REPORT**

Arrangement of contents

1. Title Page
2. Bonafide Certificate
3. Acknowledgement
4. Table of contents
5. Abstract
6. Chapters of the Report
7. References
8. Appendices, if any

Appendices should be named as

APPENDIX -A

APPENDIX -B

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**BINDING SPECIFICATION**

Report should be bound using flexible cover of thick white art paper. The Spine for the bound volume should be of black of 2cms width. The Cover should be printed in block letters.

**MARGIN SPECIFICATION**

Top	:4	cms
Bottom	:3	cms
Left	:4.5	cms
Right	:2.5	cms

**PAGE NUMBERING**

All Page numbers should be typed without punctuation on the bottom-center portion of the page. The Preliminary pages(table of contents and abstract) should be numbered in lowercase roman literals. Papers of main text, starting with chapter-1, Should be consecutively numbered using Arabic numerals.

## Computer Science

<b>SEMESTER – IV</b>	<b>BASICS OF COMPUTERS AND ITS APPLICATIONS</b> (Offered to the Department of Zoology)	19ACS401
<b>SEC</b>		<b>HRS/WK: 3</b>
		<b>Credits : 2</b>

**Objective:**

To know the fundamentals of computers to understand how to use computer application in daytoday business.

**Course Outcomes (CO):**

**CO1:** To Understand what is a Computer and Basic concept of computer is.

**CO2:** Aware about various types of Computers, types of input and output devices

**CO3:** To Learning about the Installing& Removing of Software

**CO4:** Understand computer viruses and its types.

**CO5:** To Understanding basics usage of MS-Office Packages and the basics concept of Internet.

### Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes

SEMESTER IV	COURSE CODE: 19ACS401	TITLE OF THE PAPER:Basics of Computers and its Applications														HOURS: 3	CREDITS: 2
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10		
CO1	4	4	4	3	4	4	4	4	3	2	3	2	4	4	4	3.50	
CO2	4	4	4	3	4	4	4	4	3	2	3	2	4	4	4	3.50	
CO3	5	4	4	3	4	5	5	4	3	2	4	2	4	4	4	3.80	
CO4	5	4	4	3	4	5	5	4	3	2	4	2	4	4	4	3.80	
CO5	5	4	4	3	4	5	5	4	3	2	4	2	4	4	4	3.80	
Mean Overall Score																3.68	

**Result: The Score of this Course is 3.68(High)**

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme SpecificOutcome.

**UNIT- I:** **[9hrs]**

**Introduction of Basics of Computers:** Introduction of Computer-Computer and its components- Characteristics of Computer- Generation of Computer-Types of Computers- Uses of Computers- Latest trends in computer.

**UNIT- II:** **[9 hrs]**

**Computer peripherals and Installing & Removing of Software:** Computer Peripherals - CPU –Types of Processors- Memory - Storage Devices - Input Devices - Output Devices:  
**Installing & Removing of Software:** -Installing of new software -Removing of a Software  
-Installing of new fonts -Tamil Fonts – Viruses-Antivirus Software's

**UNIT- III:** **[9 hrs]**

**PC Package:** Introduction to Word Processing, Advantages of word processing, Creating, Saving and Editing a document: Selecting, Deleting, Replacing Text, Copying text to another file. Formatting Text and Paragraph: Using the Font Dialog Box, Paragraph Formatting using Bullets and Numbering in Paragraphs, Checking Spelling, Line spacing, Margins, Space before and after paragraph.

**UNIT- IV :** **[9 hrs]**

**Introduction to spreadsheet,** Entering information: Numbers, Formula, Editing Data in a cell, Excel functions, Using a Range with SUM, Moving and copying data, Inserting and Deleting Row and Columns in the worksheet, Using the format cells Dialog box, Using chart wizard to create a chart.

**UNIT- V:** **[9 hrs]**

**Introduction to Power Point and Internet Basics:** Introduction of slide presentation- Presentations-Creating, Manipulating & Enhancing Slides-Organizational Charts- Inserting clip Arts, Adding Objects- formatting and checkingtext. **Internet Basics:** Internet basics - Basic Internet terms - Getting connected to Internet -Internet applications - Electronic Mail - Searching the Web.

**TEXT BOOKS:**

1. Fundamentals of Computer, Kritika Gupta, Sunil Chauhan, Akash Saxena– Laxmi Publication. -2008
2. Fundamentals of Computer, Raja Raman, Prentice Hall of India publications. -2003
3. Microsoft Office 2007 Bible. , John Walkenbach, Herb Tyson, Cary N.Pr, Faithe Wempen, John Wiley & Sons publications, 2007.
4. Fundamentals of Internet and the World Wide Web “Raymond Greenlaw--Second Edition-Mc
5. Graw- Hill publications,2017.

**REFERENCE BOOKS:**

1. “Introduction to Computers and Basic Programming, Xavier,” 3rdEdition , New Age International,New Delhi ,2008
2. “Computer Fundamentals “,Sinha P. K., 6<sup>th</sup>Edition,BPB publications, 2004.
3. “Microsoft Office 2007,Will Train, Gini Corter, Annette Marquis” BPBpublications,2007
4. “PC Software for Windows 98, Made Simple R. K. TAXALI ” TMH publications, 2001
5. ”MS Office 2000 for every one”, Sanjay Saxena, Vikas Publishing House PVT LTD,2000

<b>SEMESTER – III</b>	<b>BASICS OF COMPUTERS AND ITS APPLICATIONS (Offered to the Department of Tamil)</b>	<b>19ETA31</b>
<b>Allied</b>		<b>HRS/WK: 7</b>
		<b>Credits: 5</b>

**OBJECTIVE:**

To know the fundamentals of computers to understand how to use computer application in day today business.

**Course Outcomes (CO):**

**CO1:** To Understand what is a Computer and Basic operating system

**CO2:** Aware about various types of Computers, types of input and output devices, Installing& Removing of Software

**CO3:** To Understand the basic usage of MS-Office Packages – MS-Word

**CO4:** To Understand the basic usage of MS-Office Packages – MS-Excel

**CO5:** To Understand the basic usage of MS-Office Packages – MS-PowerPoint and the basics concept of Internet.

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER III	COURSE CODE:19ETA31					TITLE OF THE PAPER: Basics of Computers and itsApplications					HOURS:7	CREDITS:5
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4			
CO1	5	5	5	5	5	5	5	5	5	5	5	
CO2	5	5	5	5	5	5	5	5	5	5	5	
CO3	4	4	4	4	4	5	5	5	5	5	4.5	
CO4	4	4	4	4	4	4	4	4	4	4	4	
CO5	4	4	4	4	4	4	4	4	4	4	4	
Mean Overall Score											4.5	

**Result: The Score of this Course is 4.5 (Very High)**

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **Very High** association with Programme Outcome and Programme Specific Outcome.

**UNIT- I:**

[21Hrs]

**Basics of Computers and GUI Based Operating System :** Introduction of Computer-Computer and its components- Characteristics of Computer- Generation of Computer-Types of Computers- Uses of Computers. GUI Based Operating System Parts of Windows screen-Status Bar,- Use of Common Icons -Viewing & Removing of File, Folders and Directories-Creating and Renaming of files and folders -Opening and closing of different Windows.

**UNIT- II :**

[21Hrs]

**Computer peripherals and Installing & Removing of Software:** Computer Peripherals - CPU –Types of Processors- Memory - Storage Devices - Input Devices - Output Devices- **Installing & Removing of Software:** Installing & Removing of Fonts and Software's – Viruses- Antivirus Software's

**UNIT- III:**

[21Hrs]

**PC Package:** Introduction to Word Processing, Advantages of word processing, Creating, Saving and Editing a document: Selecting, Deleting, Replacing Text, Copying text to another file. Formatting Text and Paragraph: Using the Font Dialog Box, Paragraph Formatting using Bullets and Numbering in Paragraphs, Checking Spelling, Line spacing, Margins, Space before and after paragraph.

**UNIT- IV :**

[21Hrs]

**Introduction to spreadsheet:** Entering information: Numbers, Formula, Editing Data in a cell, Excel functions, Using a Range with SUM, Moving and copying data, Inserting and Deleting Row and Columns in the worksheet, Using the format cells Dialog box, Using chart wizard to create a chart.

**UNIT-V:**

[21Hrs]

**Introduction to Power Point and Internet Basics:** Introduction of slide presentation- Presentations -Creating, Manipulating & Enhancing Slides- Organizational Charts- Inserting clip Arts, Adding Objects - formatting and checking text. **Internet Basics:** Networks-Types of Networks - Network Topologies-Internet basics - Basic internet terms - Getting connected to internet - Internet applications - Electronic Mail - Searching the Web.

**Text Books:**

1. Fundamentals of Computer , Kritika Gupta, Sunil Chauhan, AkashSaxena– Laxmi Publication.-2008
2. Fundamentals of Computer, Raja Raman, Prentice Hall of India publications .-2003.
3. Microsoft Office 2007 Bible. , John Walkenbach, Herb Tyson, Cary N.Pr, Faithe Wempen, John, Wiley & Sons publications, 2007.
4. Fundamentals of Internet and the World Wide Web “Raymond Greenlaw--Second Edition -McGraw-Hill publications,2017

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1. “Introduction to Computers and Basic Programming, Xavier,” 3rd Edition , New Age International,New Delhi ,2008
2. “Computer Fundamentals “,Sinha P. K., 6<sup>th</sup>Edition,BPB publications, 2004.
3. “Microsoft Office 2007,Will Train, Gini Corter, Annette Marquis” BPB publications,2007.
4. “PC Software for Windows 98, Made Simple R. K. TAXALI ” TMH publications, 2001.
5. ”MS Office 2000 for every one”,Sanjay Saxena, Vikas Publishing House PVT LTD,2000.