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Department of Computer Science

RATHINAM COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)

RATHINAM TECHZONE CAMPUS, POLLACHI ROAD, EACHANARI, COIMBATORE – 21.

Syllabus for
BCA(Computer Applications)
I,II,III,IV,V & VI Semester
2017-2018 Batch onwards

Vision and Mission of the Institution:

VISION

A world renowned INDUSTRY-INTEGRATED INSTITUTION that imparts knowledge, skill, and research culture in young men and women to suit emerging young India.

 MISSION

To provide quality education at affordable cost, and to maintain academic and research excellence with a keen focus on INDUSTRY-INTEGRATED RESEARCH AND EDUCATION.

MOTTO

Meaningful INDUSTRY-READY education and research by all means

Vision and Mission of the Department:

VISION

To be renowned itself as a reputed organization in education and research aimed towards industrial and societal needs

MISSION

To provide quality education to meet the need of profession and society. Establish Industry Institute Interaction program to enhance the entrepreneurship skills.

Program Educational Objectives (PEO)

PEO1	:	Utilize and implement hardware and software technologies that provide computing solutions to address the needs of an organization.
PEO2	:	Identify various needs within the organization and provide solution using computing technologies.
PEO3	:	Apply basic cultural, social, legal, and ethical practices inherent in the discipline of computing
PEO4	:	Engage in life-long learning to adapt to innovations and change in order to be successful
PEO5	:	To promote awareness among student graduates towards issues of social relevance and introduce them to professional ethics and practice.

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Mapping of Institute Mission to PEO

Institute Mission	PEO's
To provide quality education at affordable cost, and to maintain academic and research excellence with a keen focus on INDUSTRY-INTEGRATED RESEARCH AND EDUCATION	PEO1, PEO2, PEO5

Mapping of Department Mission to PEO

Department Mission	PEO's
To provide quality education to meet the need of profession and society. Establish Industry Institute Interaction program to enhance the entrepreneurship skills.	PEO1, PEO2, PEO3, PEO5,

Program Outcomes (PO):

PO01	:	Graduates of the programme with solid foundation in fundamentals of Programming.
PO2	:	Design solutions and design system components or process that meetthespecified needs with appropriate consideration for the publichealth andsafety, and the cultural, societal, and environmental considerations.
PO3	:	Use research-based knowledge and research methods including design ofanalysis and interpretation of data, and synthesis of the information to providevalid conclusions.
PO4	:	Create, select, and apply appropriate techniques, resources IT tools includingprediction and modeling to complex activities with an understanding of thelimitations.
PO5	:	An facility to plan, execute, and evaluate a computer-based system, process, component, or program to meet desired needs.
PO6	:	Understand the impact of the professional solutions in societal andenvironmental contexts, and demonstrate the knowledge of, andneed for sustainable development.
PO7	:	Apply ethical principles and commit to professional ethics andresponsibilities and norms of the logical practice.
PO8	:	Function effectively as an individual, and as a member or leader indiverse teams, and in multidisciplinary settings.
PO9	:	Design, and analyze precise specifications of algorithms, procedures, andinteraction behavior

PO10	:	Recognize the need for, and have the preparation and ability toengage in independent and life-long learning in the broadestcontextof technological change.
PO11	:	Ability to identify, formulate, and develop solutions to computational challenges.
PO12	:	Ability to use a range of programming languages and tools to develop computer programs to solve problems effectively.

Correlation between the POs and the PEOs

Program Outcomes		PEO1	PEO2	PEO3	PEO4	PEO5
PO1	:		√			√
PO2	:	√		√		
PO3	:	√	√		√	
PO4	:			√		
PO5	:	√	√		√	
PO6	:		√		√	√
PO7	:			√	√	
PO8	:	√		√		
PO9	:	√	√	√		
PO10	:		√		√	
PO11	:	√	√			
PO12	:	√	√		√	

Components considered for Course Delivery is listed below:

1. Class room Lecture

2. Laboratory class and demo

3. Assignments

4. Mini Project

5. Project

6. Online Course

7. External Participation

8. Seminar

9. Internship

Mapping of POs with Course Delivery:

Program Outcomes	Course Delivery								
	1	2	3	4	5	6	7	8	9
PO1	√	√	√	√	√				√
PO2	√					√	√	√	√
PO3	√	√		√	√				√
PO4	√	√		√	√				√
PO5		√		√	√				
PO6	√	√					√		
PO7			√				√	√	
PO8							√	√	
PO9		√		√	√				
PO10							√	√	
PO011		√		√	√		√		
PO12		√		√	√				

RATHINAM COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)

Scheme of curriculum for BCA Computer Applications

for the students admitted in the Batch during 2017 - 2018

Board of Studies – Computer Science (UG)

S.No	Sem	Part	Type	Subject	Credit	Hour	Int	Ext	Total
1	1	I	L1	Language - I	3	6	40	60	100
2	1	II	E1	English for Communication	3	6	40	60	100
3	1	III	C1	Core - I - Problem Solving techniques using C	4	6	40	60	100
4	1	III	CP1	Core Practical – I - C Programming Lab	4	5	40	60	100
5	1	III	A1	Allied – I	4	5	40	60	100
6	1	IV	AEC1	Ability Enhancement Compulsory Course-I – Environmental Studies @	2	2	50	0	50
7	1	VI	VAC	Value Added Course - I@	2	-	100	-	100
1	2	I	L2	Language - II	3	6	40	60	100
2	2	II	E2	English for Computer Science	3	6	40	60	100
3	2	III	C2	Core - II - Java Programming - I	4	4	40	60	100
4	2	III	C3	Core III – Data Structure	4	4	40	60	100
5	2	III	CP2	Core Practical - II -Java Programming Lab	4	3	40	60	100
6	2	III	A2	Allied – II	4	5	40	60	100
7	2	IV	AEC2	Ability Enhancement Compulsory Course-II – Value Education Human Rights @	2	2	50	0	50
8	2	VI	VAC	Value Added Course - II@	2	-	100	-	100
1	3	III	C4	Core - IV - Web Technology	4	7	40	60	100
2	3	III	CP3	Core Practical – III - Web Technology Lab	4	7	40	60	100
3	3	III	A3	Allied - III	4	6	40	60	100
4	3	III	CP4	Core Practical – IV – Industrial Training Report	2	0	0	50	50

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5	3	IV	S1	Skill Enhancement Courses – I	4	6	40	60	100
6	3	IV	AEC3	Ability Enhancement Compulsory Course-III – (Tamil / Advanced Tamil (OR) Non-major elective-1 (Yoga for Human Excellence) / Women's Rights / Career Enhancement – I) @	2	2	50	0	50
7	3	VI	VAC	Value Added Course - III@	2	-	100	-	100
8	3	VI	IDL	Inter Department Learning – I#	2	2	-	100	100
1	4	III	C5	Core - V - Shell Programming	4	6	40	60	100
2	4	III	CP5	Core Practical – V – Shell Programming Lab	4	5	40	60	100
3	4	III	A4	Allied - IV	4	6	40	60	100
4	4	IV	S2	Skill Enhancement Courses – II	4	6	40	60	100
5	4	IV	SP1	Skill Lab – I	4	3	40	60	100
6	4	IV	AEC4	Ability Enhancement Compulsory Course-IV – (Tamil / Advanced Tamil (OR) Non-major elective-II (General Awareness) / Career Enhancement – II) @	2	2	50	0	50
7	4	VI	VAC	Value Added Course - IV@	2	-	100	-	100
8	4	VI	IDL	Inter Department Learning – II#	2	2	-	100	100
1	5	III	C6	Core - VI - Android Application Development	5	6	40	60	100
2	5	III	EL1	Elective - I	5	6	40	60	100
3	5	III	EL2	Elective - II	5	6	40	60	100
4	5	III	CP6	Core Practical – VI - Android App Development Lab	4	6	40	60	100
5	5	III	CP7	Core Practical – VII – Mini-project	3	-	-	100	100
6	5	IV	S3	Skill Enhancement Courses – III	4	6	40	60	100
7	5	VI	VAC	Value Added Course - V@	2	-	100	-	100
1	6	III	EL3	Elective - III	5	6	40	60	100
2	6	III	EL4	Elective - IV	5	6	40	60	100
3	6	III	CP8	Core Practical – VIII – Elective Lab	4	4	40	60	100
4	6	III	CP9	Core Project	8	8	40	160	200

5	6	IV	S4	Skill Enhancement Courses – IV	4	6	40	60	100
6	6	V	EX	Extension Activity@	2	-	50	-	50
					140	180			3500

Note :

1. Learning the courses – Programming in C, Web Technology, Database & SQL, Software Engineeringand Career Enhancement Course – student shall appear for the NSDC Certification – Junior Software Developer.

@ - No End Semester Examination, only Internal Exam.

- No Internal Examination, only End Semester Exam.

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Allied Subjects

Allied	BCA
Allied – I	PC & Mobile Hardware Trouble Shooting
Allied – II	Mathematics for Computer Applications
Allied – III	Entrepreneurship for IT
Allied - IV	Quantitative and Aptitude

Skill Subjects

Skill Subject	BCA
Skill Enhancement Courses – I	Computer Graphics and Animation
Skill Enhancement Courses – II	Information and Cyber Security
Skill Enhancement Courses – III	PHP & MySQL
Skill Enhancement Courses - IV	Software Project Management

List of Electives:

Specialization	Elective - I	Elective - II	Elective - III	Elective - IV
Data Analytics	Data Mining	R Programming	Big Data Analytics	Hadoop Programming
Computer Networks & Security	Computer Networks	Cryptography and Network Security	TCP / IP Protocol Suite	Wireless Sensor Network
Animation	Human Computer Interface	Learning Maya	3D Animation Essentials	Adobe illustrator & After Effects
Testing	Software engineering	Software Testing	Software Quality Assurance	Tools for Software Testing
Cloud Infrastructures	Information Storage Management System	Grid Computing	Cloud Computing	Cloud Infrastructure Services

Inter Department Learning Courses:

Semester – III	1. Fundamentals of IT & Hardware 2. Office Automation 3. E-Resources 4. Web Designing
Semester - IV	1. Cyber Law 2. Animation Techniques 3. E-Learning 4. E-Commerce

Mapping of Courses and POs:

S- Strong Coorelation   M – Medium Coorelation   B – Blank

Course Code	Course Name	Program Outcomes											
		P01	PO2	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
	Core - I - Problem Solving techniques using C	S	M	S	S		M	M	M	S	M	S	S
	Core Practical – I - C Programming Lab	S	M		S		M		M	S	M	S	S
	Allied – I - Mathematics for Computer Science		M	M	M		M	M	M			M	M
	Allied – I - PC & Mobile Hardware Trouble Shooting	M	S		S			M	M			M	M
	Allied – I - Mathematics for Information Technology	M	M				M	M			M	M	M
	Value Added Course - I@		M	M		M			M		M	M	M
	English for Computer Science		M	S	M		M	S	M			M	M
	Core - II - Java Programming - I	S	M	M	S		M	M		S	M	S	S
	Core III – Data Structure	S	M	M	S		M	M	M	S	M	S	S
	Core Practical - II - Java Programming Lab	S	M		S		M	M		S	M	S	S
	Allied – II PC & Mobile Hardware Trouble Shooting	M	S		S			M	M			M	M
	Allied – II Mathematics for Computer Applications		M	M	M		M	M	M			M	M
	Value Added Course - II@	M								M		M	M
	Core - IV - Web Technology	S	M	M	M		M	M		S	M	S	S

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Course												
Core Practical – III - Web Technology Lab	S	M	M	M		M	M		S	M	S	S
Allied - IIIQuantitative and Aptitude		M	M	M	M	M	S	M			M	M
Allied - IIIEntrepreneurship for IT	M				S	S	M	M				
Skill Enhancement Courses – IDatabase Management	M	M	M	S		M	S	M	S		M	M
Skill Enhancement Courses – I Computer Graphics and Animation	M	M	M	M		M	M		S		M	M
Value Added Course III – Basic Multimedia - I	M		M	M					S		M	M
Core - V - Shell Programming	S	M	S	S		M	M		M	M	S	S
Core Practical – V – Shell Programming Lab	S	M	S	S		M	M		M	M	S	S
Allied - II PC & Mobile Hardware Trouble Shooting	M	S		S			M	M			M	M
Allied - II PC &Mathematics for Computer Applications		M	M	M		M	M	M			M	M
Skill Enhancement Courses Lab – II Computer Graphics and Animation	M	M	M	M		M	M		S		M	
Skill Enhancement Courses Lab – II Information and Cyber Security	M	M	M	S	M		M	M		S	M	M
Value Added Course – IVBasic Multimedia - II	M			M					S			

Semester I:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core - I - Problem Solving techniques using C	**4**	**5**	**1**	**0**	**Theory**

Introduction :

This subject covers in detail all aspects of the C language, including its foundation: C. To provide a plat form for the students in C programming.

Course Outcome:

CO1	:	Demonstrate the flowchart cand design an algorithm for a given problem and to develop C programs using operators
CO2	:	Develop conditional and iterative statements to write C programs

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CO3	:	Exercise user defined functions to solve real time problems
CO4	:	Inscribe C programs that use Pointers to access arrays, strings and functions.
CO5	:	Exercise user defined data types including structures and unions to solve problem

Unit I   **[12 periods]**
Overview of computers and Programming – Electronics Computers then and Now – Computers Hardware – Computer Software – The Software development Method – Applying the software development method – Professional Ethics for Computer Programmers – C Language Elements – Variable Declarations and Data Types – General form of a C Program – Arithmetic Expressions – Common Programming Errors.

Unit II :   **[12 periods]**
Building Programs from Existing information – Case study – Library Functions – Top-Down Design and Structure charts – Functions without Arguments – Functions with Input Arguments-Common Programming Errors (CPE) – Control Structures – Conditions – The if Statement – If statements with Compound Statements – Decision steps in Algorithms – More Problem solving – Nested if statements and Multiple-Alternative decisions- The Switch Statement – CPE – Repetition in Programs – Counting Loops and the While statement – Computing a sum or a product in a loop – The For statement – Conditional Loops – Loop Design – Nested Loops – the do-while statement and flag-controlled loops – How to debug and test programs – CPE.

Unit III :   **[12 periods]**
Pointers and the Indirection Operator – functions with output parameters – Multiple calls to function with Input/Output parameters – Scope of Names – Formal Output parameters as Actual Arguments – CPE – Arrays – Declaring and Referencing Arrays – Array subscripts – Using array elements as function arguments- Array arguments – Searching and sorting an Array – Multidimensional Arrays – Strings – String Basics – String Library functions – String Comparison – Arrays of pointers – Character Operations – Conversions – CPE

Unit IV: **[12 periods]**
Recursion – Problem solving with recursion – CPE – Structure and Union types : User-defined Structure types – Structure type data as input and output parameters – Functions whose result values are structured – Problem solving with structure types – Parallel arrays and Arrays of structures – Union Types - CPE

Unit V: **[12 periods]**
Text and Binary File Processing – Input/Output files:Review and Further Study – Binary Files – Searching a Database – CPE – Using Abstraction to Manage Complexity – Header files – implementation files – Conditional compilation – Defining Macros with parameters – C++ support for Object Oriented Programming.

Textbook:
1. Problem Solving and Program Design in C, Jeri R. Hanly and Elliot B. Koffman, Pearson Publication, Seventh Edition, 2012.

Reference :
1. The C programming Language, second edition, Brain W.Kernighan, Dennis M.Ritchie, Prentice Hall, 1988
2. C++ : The Complete Reference Third Edition - Herbert Schildt - Osborne McGraw-Hill, 2003.

3. L.Kathirvelkumaran and R. Muralidharan , "Basic Concepts in C Programming",Coimbatore Institute of Information Technology ,First Edition 2016.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes											
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P010**	**P011**	**P012**
CO1	H	-	L	L	-	M	-	H	H	-	M	H
CO2	H	-	M	L	-	-	L	H	H	-	M	H
CO3	M	-	L	L	-	-	M	L	M	-	M	H
CO4	H	-	L	L	-	-	-	L	L	-	-	H
CO5	-	-	L	L	-	L	-	M	M	-	M	H

H - High ; M- Medium ; L- Low

Semester I:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core - Practical - I – C Programming Lab	**4**			**5**	**Practical**

1.
   a. Design flow charts for logical problems.
   b. Design algorithm for simple problems.

2.
   a. Design Pseudocode steps for simple problems.
   b. Write a simple program based on operators (pre, post increment , bitwise and , or , etc.).
   c. Write a simple program based on conversions (from int to float & float to int)

3.

a. Write a program for find the max and min from the three numbers.
b. Write the program for the simple, compound interest.
c. Write program for students marks grading.

4.

a. The total distance travelled by vehicle in 't' seconds is given by distance = ut+1/2at2 where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec2). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.
b. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

5.

a. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
b. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
c. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

6.

a. Write a C program to calculate the following
    i.   sum: sum=1-x2/2! +x4/4!-x6/6!+x8/8!-x10/10!
    ii.   sum=x-x3/3!+x5/5!........................,
    iii.   sum=1+x/1!+x^2/2!+x^3/3!..............,
b. Write a C program to find the roots of a Quadratic equation.

7.

a. Write C programs that use both recursive and non-recursive functions
    i.   To find the factorial of a given integer.
    ii.   To find the GCD (greatest common divisor) of two given integers.
b. Write a program for implementing of Storage classes: (Auto, static, extern, register)

8.

a. Write a C program to find the minimum and maximum integer in a list of integers.
b. Write a C program that uses functions to perform the following:
    i.   Addition of Two Matrices
    ii.   Multiplication of Two Matrices
    iii.   Transpose of a matrix

9.

a. Write a C program that uses functions to perform the following operations:
    i.   To insert a sub-string in to a given main string from a given position.
    ii.   To delete n Characters from a given position in a given string.
b. Write a C program to determine if the given string is a palindrome or not.

    c. Write a C program to count the lines, words and characters in a given text.

10.
    a. Write a functions to compute mean , variance , SD, sorting of n elements in single dimension array.
    b. Write a C program to convert a Roman numeral to its decimal equivalent.

11.
    a. Write a C program which copies one file to another.
    b. Write a C program to reverse the first n characters in a file. (Note: The file name and n are specified on the command line.)

Allied – I / II

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Allied - PC and Mobile Hardware Trouble Shooting	4	4	1		Allied

Introduction : To know the fundamentals of Computer Hardware and Software Installation.

Course Outcome:

CO1	:	Understand the basics of Computer Maintenance and understands the Mobile servicing.
CO2	:	Exercise Mobile Phone Repair and Maintenance , Diagnosing and repairing mobile phone faults
CO3	:	To learn about basic knowledge about Laptop device and components.

| CO4 | : | Understand basic troubleshooting in mobile and Ethics and Legal Aspects of Working |
| CO5 | : | Understand basic repair and maintenance |

Unit I: **[12 periods]**
Introduction to the Personal Computer - Safe Lab Procedures and Tool Use - Computer Assembly Step by Step - Install the Power Supply - Attach the Components to the Motherboard and Install the Motherboard - Install Internal Drives - Install Drives in External Bays - Install Adapter Cards - Connect All Internal Cables - Reattach the Side Panels and Connect External Cables to the Computer - Boot the Computer for the First Time.

Unit II :   **[12 periods]**
Basics of Preventive Maintenance and Troubleshooting - the Purpose of Preventive Maintenance - Identify the Steps of the Troubleshooting Process - Fundamental Operating Systems - the Purpose of an Operating System - Determine Operating System Based on Customer Needs - Install an Operating System - Identify and Apply Common Preventive Maintenance Techniques for Operating Systems.

Unit III :   **[12 periods]**
Fundamental Laptops and Portable Devices - Identify and Describe the Components of a Laptop - Compare and Contrast Desktop and Laptop Components - Compare the Different Mobile Phone Standards - Identify Common Preventive Maintenance Techniques for Laptops and Portable Devices- Fundamental Networks - the Principles of Networking - Types of Networks - Basic Networking Concepts and Technologies - the Physical Components of a Network - LAN Topologies and Architectures - the OSI and TCP/IP Data Models

Unit IV: **[12 periods]**
Fundamental Security - Why Security Is Important - Security Threats - Security Procedures - Common Preventive Maintenance Techniques for Security - Troubleshoot Security. Communication Skills - the Relationship Between Communication and Troubleshooting - Good Communication Skills and Professional Behavior - Ethics and Legal Aspects of Working with Computer Technology - the Call Center Environment and Technician Responsibilities

Unit V: **[12 periods]**
Mobile Phone Repair and Maintenance – Types of Mobile Phones – Potential Hazards associated with Mobile Phone Repair – Parts of a Conventional Mobile Phone – Mobile Phone Repair Tools – Disassembling and Assembling a Mobile Cell phone – Diagnosing and repairing mobile phone faults – Repair of common mobile phone faults.

Textbook:
   1. IT Essentials – PC Hardware and Software Companion Guide – David Anfinson, Ken Quammo, 3rd Edition, CISCO Press, 2008

Reference :
   1. Repair and Maintenance of Mobile Cell Phones, Joan Mutero, Commenwealth of Learning, 2015.
   2. B. Govindarajalu, "IBM PC and Clones: Hardware, Troubleshooting and Maintenance", TMH, 2002.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes											
	P01	**PO2**	**PO3**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P010**	**P011**	**P012**
CO1	H	L	-	L	-	-	-	L	-	L	M	L
CO2	M	L	-	L	-	-	-	L	L	-	M	L

CO3	H	-	-	L	-	-	-	L	-	-	M	L
CO4	H	L	-	L	H	H	H	L	L	L	M	L
CO5	H	L	-	L	-	-	-	L	L	L	M	L

H - High ; M- Medium ; L- Low

Semester - I

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Value Added Course– I – Office Automation	**2**	**0**	**0**		**Allied**

Introduction : To know the fundamentals of Microsoft Word, MsExcel and MsPowerPoint for their office automation.

Course Outcome:

CO1	:	Ability to understand basic level knowledge in Ms Word
CO2	:	To gain basic documentation works in Ms Work

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CO3	:	Ability to working real time documentation process
CO4	:	Ability to identify and analyze worksheet in Ms Excel
CO5	:	Ability to understand diagnostic procedures and troubleshooting techniques to office automation

UNIT –I :   [6 periods]

Ms word : Create a new document - Open, save and print a document - Edit and format text - Change the page layout, background and borders - Insert headers and footers - Insert and edit tables - Insert clip art and pictures to documents - Perform a mail merge - Share and review shared document files . Outline : Word Basics - Work with Text - Format Documents - Work with Text Objects - Work with References - Work with Illustrations - Specialized Documents - Collaborate with Others - Web Pages.

UNIT – II :   [6 periods]

Ms Excel : Create, open and view a workbook - Save and print workbooks - Enter and edit data - Modify a worksheet and workbook - Work with cell references - Learn to use functions and formulas - Create and edit charts and graphics - Filter and sort table data - Work with pivot tables and charts -Import and export data. Outline : Excel Basics - Work with Cells and Worksheets - Calculate Your Data - Format your Workbook - Add Charts and Graphics - Collaborate with Others - Analyze your Data - Work with Macros and the Web

UNIT- III :   [6 periods]

Ms power point : Create a new presentation - Modify presentation themes - Add and edit text to slides - Add new slides to a presentation - Insert clipart images and shapes to slides - Insert and modify tables and charts - Add sound and video to a slide presentation - Insert and edit animations and slide transitions - Display a speaker-lead and self-running presentation – Outline : PowerPoint Basics - Create Presentations - Insert and Modify Text - Work with Graphics and Media - Final Preparations -Deliver a Presentation

Text Books:

1. Joyce Cox and Joan Prepernau, " Step by Step , Microsoft Office Work 2007", Microsoft Press, 2007.
2. Curtis D. Frye, "Step by Step , Microsoft Excel 2010", Microsoft Press, 2010.

Reference Books:

1. Pradeep K Sinha and Priti Sinha , "Computer Fundamentals ", BPB Publications, 2004 .

Semester II:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core - II - Java Programming	**4**	**4**	**1**		**Theory**

Introduction : To understand the concepts of object-oriented, event driven, and concurrent programming paradigms and develop Skill Based in using these paradigms using Java.

Course Outcome:

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CO1	:	The model of object oriented programming: abstract data types, encapsulation, inheritance and polymorphism
CO2	:	Fundamental features of an object oriented language like Java: object classes and interfaces, exceptions and libraries of object collections
CO3	:	How to take the statement of a business problem and from this determines suitable logic for solving the problem; then be able to proceed to code that logic as a program written in Java.
CO4	:	Analyze java applications with relation databases
CO5	:	Ability to analyze a problem, and Develop applet window with different AWT tools.

Unit I:[12 periods]
Fundamentals of Object – oriented programming – Introduction – Object-object oriented programming – Objects and Classes – Data abstraction and Encapsulation – Inheritance – Polymorphism – Dynamic Binding – Message Communication – Benefits of OOP – Applications of OOP – Java Evolution – History – Java features – How java differs from C and C++ - Java and the Internet – Java and World Wide Web – Web Browsers – Java Environment – Overview of Java Language – Simple Java Program – Java Program Structure – Java Tokens – Java Statements – Implementing Java – Java Virtual Machine – Command Line Arguments.

Unit II :   [12 periods]
Constants, Variables and Data Types – Declaration of variables – Scope of Variables – Symbolic Constants – Type Casting – Operators and Expressions – Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators –Conditional Operator – Bitwise operator – Special Operators – Arithmetic Expressions – Evaluation of Expressions – Precedence of Arithmetic Operators - Type Conversions in Expressions – Operator Precedence and Associativity – Decision Making and Branching – Decision Making with If statement – Simple If statement – if-Else statement – Nesting of if-Else statement – The Else if ladder – the switch statement – the ?: operator.

Unit III :   [12 periods]
Decision Making and Looping – The While Statement – the Do statement – The For statement – Jumps in Loops – Labeled Loops – Classes, Objects and Methods – Defining a Class – Fields Declaration – Methods Declaration – Creating Objects – Accessing Objects – Constructors – Method Overloading – static members – Nesting of Methods – Inheritance – Overriding methods – Final Variables – Final Classes – Finalizer Methods – Abstract Methods and classes – Methods with Varargs – Visibility Control – Arrays and Strings – Wrapper classes – Enumerated types.

Unit IV: [12 periods]
Interfaces – Defining Interfaces – Extending Interfaces – Implementing Interfaces – Accessing Interface variables – Packages – Java API Packages – Naming Conventions – Creating Packages – Accessing a Package – Using a Package – Adding a class to a package – Hiding classes – static import – Multithreaded Programming – Creating Threads – Extending the Thread classes – Stopping and Blocking a Thread – Lifecycle of Thread – Using Thread methods –

Unit V: [12 periods]
Types of Errors – Exception – Syntax of Exception handling code – Multiple catch statements – Using Finally statement – Throwing our own Exceptions - Applet Programming – How Applet differs from Applications – Building Applet Code – Applet Lifecycle – Creating an Executable Applet – Concept of Streams – Stream Classes – Byte-Stream classes – Character Stream classes – Using Streams – other useful I/O classes – Using the file class – I/O functions – Creating of files – Reading / Writing characters – Reading /writing bytes – Handling Primitive data types – Random Access files – Interactive I/O – Other stream classes.

Textbook:

1. Java Programming a Premier, E. Balagurusamy, 3rd Edition, 2009 TMH.

Reference :
1. K. Arnold and J. Gosling, "The JAVA programming language", Third edition, Pearson Education, 2000.
2. Timothy Budd, "Understanding Object-oriented programming with Java", Updated Edition, Pearson Education, 2000.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes											
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P010**	**P011**	**P012**
CO1	H	-	L	L	-	M	-	H	H	-	M	H
CO2	H	-	M	L	-	-	L	H	H	-	M	H
CO3	M	-	L	L	-	-	M	L	M	-	M	H
CO4	H	-	L	L	-	-	-	L	L	-	-	H
CO5	-	-	L	L	-	L	-	M	M	-	M	H

H - High ; M- Medium ; L- Low

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Semester II

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core – III – Data Structures	4	4			Theory

Introduction :

To master the design and applications of linear, tree, and graph structures.

Course Outcome:

CO1	:	An Ability to understand the linked with different types of linked list. Exemplify and implement stack, queue and list ADT to manage.
CO2	:	An Ability to understand the difference between linear and non-linear data structure. Implement binary search tree to design applications like expression trees.
CO3	:	ability to analyze and identify its elements and attributes using trees
CO4	:	Indentify, model, solve and develop code for real life problems like shortest path using graph theory
CO5	:	An ability to know how the data's are stored in an organized manner

Unit - I :   **[12 periods]**

Abstract Data Types (ADT) – List ADT – array-based implementation – linked list implementation – cursor-based linked lists – doubly-linked lists – applications of lists – Stack ADT – Queue ADT – circular queue implementation – Applications of stacks and queues

Unit – II :   **[12 periods]**

Need for non-linear structures – Tree ADT – tree traversals – left child right sibling data structures for general trees – Binary Tree ADT – expression trees – applications of trees – binary search tree ADT.

Unit – III: **[12 periods]**

AVL trees – Binary Heaps – B-Tree – Hashing – Separate chaining – open addressing – Linear Probing.

Unit – IV: **[12 periods]**

Definitions – Topological sort – breadth-first traversal - shortest-path algorithms – minimum spanning tree – Prim's and Kruskal's algorithms – Depth-first traversal – biconnectivity – euler circuits – applications of graphs

Unit – V: **[12 periods]**

Greedy algorithms – Divide and conquer – Dynamic programming – backtracking – branch and bound – Randomized algorithms – algorithm analysis – asymptotic notations – recurrences – NPcomplete problems

Text Book :

1. M. A. Weiss, "Data Structures and Algorithm Analysis in C", Pearson Education Asia, 2002.
2. ISRD Group, "Data Structures using C", Tata McGraw-Hill Publishing Company Ltd., 2006.

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Reference:

1. A. V. Aho, J. E. Hopcroft, and J. D. Ullman, "Data Structures and Algorithms", Pearson Education, 1983.
2. R. F. Gilberg, B. A. Forouzan, "Data Structures: A Pseudocode approach with C", Second Edition, Thomson India Edition, 2005.
3. Sara Baase and A. Van Gelder, "Computer Algorithms", Third Edition, Pearson Education, 2000.
4. L.Kathirvelkumaran and R. Muralidharan , "Data Structure for Beginners ",Coimbatore Institute of Information Technology ,First Edition 2019.
5. T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein, "Introduction to algorithms", Second Edition, Prentice Hall of India Ltd, 2001.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes											
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P010**	**P011**	**P012**
CO1	H	-	L	L	-	M	-	H	H	-	M	H
CO2	M	-	L	L	-	-	L	H	H	-	L	H
CO3	M	-	L	L	-	-	L	L	L	-	M	H
CO4	M	-	L	L	-	-	-	L	L	-	-	H
CO5	-	-	L	L	-	L	-	M	M	-	M	H

H - High ; M- Medium ; L- Low

Semester II:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core Practical II - Java Programming Lab	4	0	0	3	Core

Course Outcome:

CO1	:	Implement object oriented principles for reusability
CO2	:	Assign priorities and resolve runtime errors with multithreading and exception handling techniques
CO3	:	Interpret event handling techniques for interaction of the user with GUI
CO4	:	Analyze java applications with relation databases
CO5	:	Develop applet window with different AWT tools.

1. Create a Student Package to Maintain the Information about the student. Use Constructors to initialize the student Number and Use Overloading method to set the percentage of the mark by Using this Package Create a Java Program.

2. Program to Implement Polymorphism, Inheritance and Inner Classes.

3. Program to implement the concept of Package in employee salary processing.

4. Animate Images at Different Intervals by using Multithreading Concepts using Applet.

5. To write a java program that creates a string object and initializes it with your name and performs the following operations

   a) To find the length of the string object using appropriate String method.

   b) To find whether the character 'a' is present in the string. If yes find the number of times 'a' appear in the name and the location where it appears

6. Write a java program to create a StringBuffer object and illustrate how to append characters and to display the capacity and length of the string buffer.

7. Write a Java Program to implement the concept of Interface with your own example.

8. Write a Java Program to handle divide by Zero error using Exception Hanlding.

9. Write a Java Program to design your dream house using Applet.

10. Write a Java Program to read and write stream of characters.

11. Write a Java Program to read and write stream of bytes.

12. Write a Java Program to demonstrate the usage of package for students result processing.

13. Write a Java Program to implement Arrays and Multidimensional Arrays.

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Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes											
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P010**	**P011**	**P012**
CO1	M	-	L	L	-	M	-	M	H	-	M	H
CO2	H	-	M	L	-	-	L	M	M	-	M	H
CO3	L	-	L	M	-	-	M	L	M	-	M	H
CO4	M	-	L	M	-	-	-	L	L	-	-	H
CO5	-	-	L	L	-	L	-	M	M	-	M	H

H - High ; M- Medium ; L- Low

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Semester III:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core - IV - Web Technology	**4**	**7**	**-**	**-**	**Theory**

Introduction: This Course is designed for the aspiring Web Designers and Developers with a need to understand the HTML, CSS, and Javascript in enough detail along with its simple overview, and practical examples. This Course will give you enough ingredients to start with HTML, CSS and Javascript from where you can take yourself at higher level of expertise.

Course Outcome:

CO1	:	To identify the audience, purpose, uses, and structure of your web site and brief introduction about HTML, CSS and javascript.
CO2	:	To learn the elements of HTML, using it to add content to your original design in the form of web pages.
CO3	:	To Design and develop basic web pages using HTML and CSS. Design and develop web pages using CSS styles, internal and/or external style sheets.
CO4	:	To Find appropriate snippets of JavaScript code and to adapt them to work with your site as well as learn to read and critique JavaScript code.
CO5	:	To become proficient in the use of JavaScript commands, objects, functions, and tools. Topics addressed.

Unit - I :   **[12 periods]**

Introduction - The Internet in Industry and Research- Introduction to HTML5, CSS3, JavaScript - Evolution of the Internet and World Wide Web - Web Basics- Multitier Application Architecture - Client-Side Scripting versus Server - Side Scripting - World Wide Web Consortium (W3C) - HTML Introduction - HTML Headings - HTML Linking – Images - Lists – Table - Forms.

Unit – II :   **[12 periods]**

HTML Form Input types - Text Input Controls - Radio Button Control - Select Box Control - File Upload Box - Button Controls - Hidden Form Controls - HTML5 Form input Types - Input and Data list elements and auto complete attribute - The autofocus Attribute - The placeholder Attribute - The required Attribute - Page-Structure Elements .

Unit - III: **[12 periods]**

Introduction to Scripting - How is JavaScript Constructed? - JavaScript Development Tools - Your first javascript - Obtaining User Input with prompt Dialogs - Arithmetic Operator - Decision Making: Equality and Relational Operators.

Unit - IV: **[12 periods]**

Control statements - Decision Making and Branching - While Repetition Statement - Increment and Decrement Operators - For Statement – Switch – do while - break and continue Statements - Logical operators .

Unit - V: **[12 periods]**

Functions – Recursion - JavaScript Arrays - JavaScript Array sort () Method - JavaScript Array index Of() Method - Multidimensional Arrays - Math Object - String Object - Date Object - Javascript Event Handling - Event Handler Locations and Uses - Event Handlers - Mouse Events.

Text Books :

1. Paul Deitel, Harvey Deitel, and Abbey Deitel, "Internet and World Wide Web – How to Program", 5th Edition, Pearson Education, 2012.
2. Marty Hall and Larry Brown, "Core Web Programming" Second Edition, Volume I and II, Pearson Education, 2001.

Reference Books:

1. L.Kathirvelkumaran. Muralidharan,"Web Technology Fundamentals In HTML, CSS, Javascript", First Edition, Coimbatore Institute of Information Technology.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes											
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P010**	**P011**	**P012**
CO1	H	-	M	L	L	M	-	M	H	-	M	H
CO2	H	-	M	L	L	-	L	L	M	-	L	H
CO3	H	-	H	M	L	L	M	L	L	-	M	H
CO4	M	-	M	M	L	-	-	L	L	-	-	H
CO5	H	-	M	L	L	L	-	H	H	-	M	H

H - High ; M- Medium ; L- Low

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Semester III:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core Practical – III - Web Technology Lab	4	7	-	-	Lab

Course Outcome:

CO1	:	Conceptualize and plan an internet-based business that applies appropriate business models and web technologies.
CO2	:	To Select and apply markup languages for processing, identifying, and presenting of information in web pages.
CO3	:	Design websites using appropriate security principles, focusing specifically on the vulnerabilities inherent in common web implementations.
CO4	:	Incorporate best practices in navigation, usability and written content to design websites that give users easy access to the information.
CO5	:	To Create a static website using HTML and add dynamic functionality to it by using java Script.

1. Write an HTML code to display your education details in a tabular format.

2. Write an HTML code to display your CV on a web page.

3. Write an HTML code to create a Home page having three links: About Us, Our Services and Contact Us. Create separate web pages for the three links.

4. Write an HTML code to create a login form. On submitting the form, the user should get navigated to a profile page.

5. Write an HTML code to create a Registration Form. On submitting the form, the user should be asked to login with this new credentials.

6. Write an HTML code to create your Institute website, Department Website and Tutorial website for specific subject.

7. Write an HTML code to illustrate the usage of the following:

- Ordered List
- Unordered List
- Definition List

8. Write an HTML code to create a frameset having header, navigation and content sections.

9. Write an HTML code to demonstrate the usage of inline CSS.

10. Write an HTML code to demonstrate the usage of internal CSS.

11. Write an HTML code to demonstrate the usage of external CSS.

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12. Write a Java script to prompt for users name and display it on the screen.

13. Design HTML form for keeping student record and validate it using Java script.

14. Write programs using Java script for Web Page to display browsers information.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes											
	P01	PO2	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
CO1	L	-	M	L	L	M	L	M	H	-	M	H
CO2	H	-	L	L	L	-	L	L	L	L	L	H
CO3	H	-	M	M	L	L	M	L	M	L	-	L
CO4	L	-	M	M	L	-	L	L	M	-	M	L
CO5	H	-	H	L	L	L	-	H	H	L	M	H

H - High ; M- Medium ; L- Low

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Semester III:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Allied – III Entrepreneurship for IT	4	6	-	-	Theory

Introduction : A person who is willing and able to convert a new idea or invention into a successful innovation. The idea of incremental innovation is simple: large change is a byproduct of small innovations compounded with others.

Course Outcome:

CO1	:	Have the ability to discern distinct entrepreneurial traits.
CO2	:	Know the parameters to assess opportunities and constraints for new business ideas.
CO3	:	Understand the systematic process to select and screen a business idea.
CO4	:	Design strategies for successful implementation of ideas.
CO5	:	To write a business plan for IT Industry.

Unit - I : [12 periods]

Concept of Entrepreneurship - Meaning - Types - Classification of Entrepreneurs - Factors influencing Entrepreneurship - Functions of Entrepreneurs.

Unit – II : [12 periods]

Importance of small scale industries - Definition - Contribution to national economy - Classification of small scale units - Cottage, tiny, village, ancillary, KVI Cent.

Unit – III: [12 periods]

Entrepreneurial Development Programmers (EDP) - Role, relevance, and achievements – Role of Government in organizing EDPs - Concessions, rebates, incentives and subsidies to small scale units –PMRY (Prime Minister's RozgarYojana (PMPY)- EPZ and 100% EOUs.

Unit – IV: [12 periods]

Industrial Estates - Concept, infrastructure for small business units.Unit – VInstitutions for the development of small scale industries - NSIC, SIDCO, SIDO, SISI, Development Commissioner - TANSI, SIDCO, DIC, Directorate of Industries and Commerce.

Unit – V: [12 periods]

Entrepreneurship and Information Technology: Online entrepreneurship-Niche-market Building-website showcasing – business automation- orders and payments – outsourcing – customer feedback and scalability – customer database for sustainable development.

Text Book :

1. Dave Chaffey & Steve Wook, "Business Information Management", Prentice Hall, 2005.

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Reference Books:

1. Marius A. Janson and Stanislaw Wrycza "Information Technology and Entrepreneurship: Three Cases from Poland, University of Missouri-St. Louis.
2. Bonita M. Kolb, "Entrepreneurship for the Creative and cultural Industries", Routledge, 2015.
3. Sean Wise and Brad Feld, "Startup Opportunities, Know when to quit your day job", Wiley, Second Edition,

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes											
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P010**	**P011**	**P012**
CO1	L	L	H	L	H	M	L	L	H	-	L	L
CO2	L	L	M	-	H	M	L	L	M	L	L	L
CO3	L	-	M	-	H	-	M	L	M	L	L	L
CO4	L	-	M	L	H	L	-	M	L	-	L	L
CO5	-	-	L	L	H	M	M	H	-	-	L	L

H - High ; M- Medium ; L- Low

Semester III:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core Practical – IV – Industrial Training Report	2	0	-	-	Internship

Introduction: Summer Internship Programme will provide the platform to the students to gain an exposure to industry practices, understand live organizational situation and learn the application of management theory in practice.

Course Outcome:

CO1	:	To enable students gain an exposure to industry
CO2	:	To gain and understand the company's history, details of its founders or shareholders, the nature of business, organizational structure, reporting relationships
CO3	:	To indentify the real-time problem in the project
CO4	:	To gain working experience in the industry
CO5	:	To adopt the industry state of affairs

Guidelines for Summer Internship Program (SIP):

1) The primary objective of the Summer Internship Program is to enable students gainan exposure to industry and understand current and contemporary managementpractices by spending a minimum of three to four weeks in a company during theirsummer break

2) The internship training is done individually.

3) Students are required to indentify a company for their SIP in consultation with andapproval of their faculty guide. The choice of the company should be intimated to theSIP coordinator before commencement of the Internship. Simultaneously, studentsshould also have identified a guide within the company (industry guide) under whosesupervision and guidance they would carry out their SIP.

4) During their stay with the company, students are required to gain and understand thecompany's history, details of its founders or shareholders, the nature of business,organizational structure, reporting relationships, working of the different managementfunctions (such as finance, HR, marketing, sales and Operations), key issues andconcerns, and nature and types of customers through observation, discussion, andinteraction with the company personnel. This list is only indicative, and not exhaustive.Students should collect and gather as much as possible of written materials, publisheddata, and related matter.

5) Obtain SIP completion certificate on company letterhead before leaving theorganization. Maintain SIP diary with details on activities and personal learning during projectperiod.

7) A committee, consisting of the Director, Head of the department, and another memberof faculty is formed for the compliance of the internship. At the end of the SIP, The student shall prepare at least two copies of the report: onecopy for submission to the college and one copy for the student. More copies may beprepared If the organization or the guide or both ask for one

copy each. The reportshould clearly indicate the sources from which information was obtained. All pagesshould be numbered, and numbers should be placed at the centre of the bottom ofthe page. All tables, figures and appendices should be consecutively numbered orlettered, and suitably labeled. The report shall be printed and bound (preferably spiralbound) with not less than 50 A4 size pages.

9) The internship training report should be submitted to the department within a monthfrom the date of commencement of third semester.

10) If the student fails in submitting the internship training report on or before the abovedate, an application for late submission along with the necessary fee for late submissionas fixed by the college shall be forwarded to the Controller of Examinations along withthe report.

11) However such submission shall not be accepted after the end of third semester.

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Semester III:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Skill Enhancement Courses – I Database Management	4	6	-	-	Theory

Introduction: An introduction to the design and creation of relational databases. Topics include storing, retrieving, updating and displaying data using Structured Query Language (SQL) integrated into Stored Procedures, Functions, Packages and Triggers (PL/SQL Programming).

Course Outcome:

CO1	:	To understand the terminology, features, classifications, and characteristics embodied in database systems.
CO2	:	To understand and apply the Relational Data Model and Relational model concepts.
CO3	:	To gain knowledge in data models and schemas in DBMS. To understand the features of database management systems and Relational database.
CO4	:	To gain basic Concepts and appreciate the applications Of database systems.
CO5	:	To use the Relational model and how it is supported by SQL and PL/SQL.

Unit - I :   **[12 periods]**

 Introduction : Database system Applications – Database system versus File System – View of Data– Data Models – Database languages – Database Users and administrators – Transaction management – Database system structure – Application Architectures – History of database system- Entity Relationship Model : Basic Concept – Constraints – keys – Design Issues – Entity Diagram – Weak Entity Set- Extended E-R Features - Design of an E-R Database Schema – Reduction of an E-R Schema of Tables.

Unit – II :   **[12 periods]**

Relational Model : Structure of Relational databases - The Relational Algebra – Extended Relational – Algebra operations – Modification of the Database – The Tuple Relational Calculus – The Domain Relational Calculus – Integrity and Security : Domain Constraints – Referential Integrity – Assertions – Triggers – Security and Authorization – Encryption and Authentication

Unit - III: **[12 periods]**

Relational Database Design : First Normal Form – Functional Dependencies – Decomposition – Desirable Properties of Decomposition – Boyce Codd Normal Form – Third Normal Form – Forth Normal Form – Overall Database Design Process

Unit – IV: **[12 periods]**

Introduction about SQL : Introduction to SQL : DDL – DML – Introduction to SQL Server – SQL Constraints : Primary Key – Foreign Key – Not Null – Candidate Key   – Unique – Check – Built-in-Functions : String Function – date and Time Function   – Mathematical and Statistical Function – The GROUP BY Statements – User Defined Functions.

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Unit – V: **[12 periods]**

PL/SQL: Overview – PL/SQL Syntax – Data Types – Variables – Constant & Literals – Operations – Loops – Procedure – Functions – Cursors – Exceptions – Triggers – Packages.

Text Book :

1. "Database System Concepts " Fourth Edition Authors : Abraham Silberschatz, Bell Laboratories , Henry F. Korth Bell Laboratories S. Sudarshan - Indian Institute of Technology, Bombay.

Reference Books:

1. Pranab Kumar Das Gupta, P. Radha Krishna, "Database Management System Oracle SQL and PL/SQL", PHI Learning Private Limited,Second Edition,2013.
2. John Adolph Palinski, "Oracle SQL and PL/SQL Handbook", Pearson Education, 2003.
3. Elmasri and Navathe, "Fundamental of Database System", Addison-Wesley,Person, 2011.
4. Phil Partt and Mary Last, "Concepts of Database Management", Cengage Learning, 2014,8th Edition.
5. Isrd Group, "Introduction to Database Management Systems",Tata McGraw-Hill Education, 2005.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes											
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P010**	**P011**	**P012**
CO1	L	M	L			L	L	M	M	L	L	M
CO2	H	M	L					M	M	L	L	M
CO3	H	M	M			L	L	M	M	L	L	M
CO4	H	H	H					L	L		M	H
CO5	H	H	H					L	L		M	H

H - High ; M- Medium ; L- Low

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Semester III:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Skill Enhancement Courses – I Computer Graphics and Animation	**4**	**6**	**-**	**-**	**Theory**

Introduction : Computer graphics is concerned with producing images and animations (or sequences of images) using a computer. This includes the hardware and software systems used to make these images. The task of producing photo-realistic images is an extremely complex one, but this is a field that is in great demand because of the nearly limitless variety of applications.

Course Outcome:

CO1	:	To gain knowledge about the computer graphics and their hardware and software systems used to make these images.
CO2	:	To Recognize and evaluate critical and aesthetic issues within computer graphics and the mixed media.
CO3	:	To be able to describe the general software architecture of programs that use 3D computer graphics.
CO4	:	The task of producing photo-realistic images is an extremely complex one, but this is a field that is in great demand because of the nearly limitless variety of applications.
CO5	:	To Apply aesthetic judgments and critical thinking skills to art and graphics related issues.

Unit - I :   **[12 periods]**

A Survey of Computer Graphics - Computer-Aided Design - Presentation Graphics - Computer Art – Entertainment - Education and Training – Visualization - Image Processing - Graphical User Interfaces – Video Display Devices - Refresh Cathode-Ray Tubes - Raster-Scan Displays - Random-Scan Displays -Color CRT Monitors.

Unit – II :   **[12 periods]**

Direct-View Storage Tubes - Flat-Panel Displays - Three-Dimensional Viewing Devices - Stereoscopic and Virtual-Reality Systems - Raster-Scan System Video Controller - Raster-Scan Display Processor - Random-Scan Systems - Graphics Monitors and Workstations - Input Devices – Keyboards – Mouse - Trackball and Spaceball – Joysticks Data Glove – Digitizers - Image Scanners - Touch Panels - Light Pens - Voice Systems.

Unit – III: **[12 periods]**

Two-Dimensional Geometric Transformations - Basic Transformations-Translation –Rotation Scaling - Matrix Representations and Homogeneous Coordinates - Composite Transformations – Translations – Rotations – Scalings. General Pivot-Point Rotation - General Fixed-Point Scaling - General Scaling Directions - Concatenation Properties. General Composite Transformations and Computational Efficiency

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Unit – IV: [12 periods]

Three-Dimensional Display Methods- Parallel Projection - Perspective Projection - Depth Cueing - Visible Line and Surface – Identification - Surface Rendering - Exploded and Cutaway Views - Three-Dimensional and Stereoscopic Views - Three-Dimensional Graphics Package.

Unit – V: [12 periods]

Design of Animation Sequences - General Computer-Animation Functions - Raster Animations - Computer-Animation Languages - Key-Frame Systems – Morphing - Simulating Accelerations - Motion Specifications Direct Motion Specification - Goal-Directed Systems - Kinematics and Dynamics

Text Book :

1. Donald Hearn, Pauline Baker, Computer Graphics – C Version, second edition, Pearson Education,2004.

Reference Books:

1. F.S. Hill, Computer Graphics using OPENGL, Second edition, Pearson Education, 2003.
2. James D. Foley, Andries Van Dam, Steven K. Feiner, John F. Hughes, Computer Graphics-Principles and practice, Second Edition in C, Pearson Education, 2007.
3. Malay K. Pakhira, "Computer Graphics, Multimedia and Animation",PHI Learning Pvt. Ltd., 2010.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes											
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P010**	**P011**	**P012**
CO1	M	L	M	L				L	L	M	L	M
CO2	M	M	M	M		L		L	L	M	M	M
CO3	M	L		M							L	M
CO4	M	M	M	M		L	L	L	L		L	M
CO5	M	M		L				L		M		M

H - High ; M- Medium ; L- Low

Semester III:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Value Added Course – III Basic Multimedia - I	2	0	-	-	Theory

Introduction : To give students a broad grounding in issue surrounding multimedia, including the underlying concepts and representations of sound, pictures and video, integration of media, and delivery of multimedia.

Course Outcome:

CO1	:	To provide basic understanding of Adobe Photoshop overview
CO2	:	To understand of interface for Adobe Photoshop
CO3	:	To understand layer and style concept in Adobe Photoshop
CO4	:	To provide basic understanding of Adobe Illustrator overview
CO5	:	To provide knowledge in the 2D illustration and creating creative works in 2D application

Unit - I :   **[6 periods]**

Adobe Photoshop CS6 : Getting to Know the Work Area : Starting to work in Adobe Photoshop - Using the tools - Using the options bar and other panels - Undoing actions in Photoshop - Customizing the workspace - Finding resources for using Photoshop .

Unit - II: **[6 periods]**

Adobe Photoshop CS6 : Basic Photo Corrections : Strategy for retouching - Resolution and image size - Getting started - Adjusting the color in Camera Raw - Straightening and cropping the image in Photoshop.

Unit – III: **[6 periods]**

Adobe Photoshop CS6: Layer Basics : About layers - Getting started - Using the Layers panel - Rearranging layers - Applying a gradient to a layer - Applying a layer style - Adding an adjustment layer - Updating layer effects - Adding a border - Flattening and saving files

Unit -IV: **[6 periods]**

Adobe Illustrator CS5 : overview - Getting started -Working with multiple artboards - Creating shapes - Working with the Shape Builder tool - Working with drawing modes - Working with strokes - Working with color groups and recoloring artwork -Placing Adobe Photoshop images in Illustrator .

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Text Book:

1. Adobe product team members, "Adobe Photoshop CS6, Classroom in a Book",Adobe Systems Incorporated,2012.
2. Adobe product team members, "Adobe Illustrator CS5, Classroom in a Book", Adobe Systems Incorporated, 2010.

Reference Book:

1. Ze-Nian Li and Mark S. Drew," Fundamentals of Multimedia", Pearson Education International,2004.

Semester III:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Inter Department Learning – I Fundamentals of IT & Hardware	2	2	-	-	Theory

Introduction: Fundamentals of IT & hardware designed primarily for students in computer science. However, it also meets the need of students in other fields, as a course that provides the knowledge about basic of information technology. Also they gain knowledge in hardware components and its functionalities.

Course Outcome:

CO1	:	Ability to define and appropriately use information technology terms and describe the characteristics and representations of data, and interpret and compare data in different representations
CO2	:	Ability to describe the essential elements of the computer's architecture and discuss how this architecture functions
CO3	:	Ability to use a hypertext markup language to produce basic Web documents and describe the characteristics of operating systems and compare different operating systems
CO4	:	Ability to identify and analyze computer hardware, software, and network components
CO5	:	Ability to classify and explain the function of different computer hardware components and also understand diagnostic procedures and troubleshooting techniques to personal computers

Unit - I: **[6 periods]**

The Personal Computer : A Brief Look at the Evolution of Computers - The Evolution of Personal Computers - The PC over the Years - Intel versus Apple - An Overview of Systems and Components.

Unit – II: **[6 periods]**

Personal Computer : Input Devices - Output Devices - Inside the System Case - It All Works Together – Electricity and the PC.

Unit – III: **[6 periods]**

Motherboards - Motherboard Designs - Backplanes - Chipsets and Controllers : Introduction to Chipsets. The BIOS and the Boot Process An Introduction to the BIOS - The BIOS Utilities and Programs.

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Unit – IV: **[6 periods]**

Computer Memory - A Brief Overview of ROM - CMOS – RAM - Random Access - Bits, Bytes, and Words - Memory Speeds, ROM.

Text Book:

1. Ron Gilster , "PC Hard a beignners guide", Osborne/McGraw - Hill, 2001.

References:

1. "Fundamentals of Information Technology", by V.Rajaraman, 2nd Edition, PHI Learning Private Limited,2013.
2. "PC Hardware: The Complete Reference", by Craig Zacker and John rourke,McGraw-Hill Publications,2001.
3. "Fundamentals of Information Technology" by Deepak Bharihoke , 3rd Edition, excel book's publication,2009.

Semester III:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Inter Department Learning – I office Automation	2	2	-	-	Theory

Introduction: Office automation involves the use of computer and telecommunication technologies to simplify and support office routine functions, improve communications and thereby increase office productivity.

Course Outcome:

CO1	:	Ability to understand basic level knowledge in Ms Word
CO2	:	To gain basic documentation works in Ms Work
CO3	:	Ability to working real time documentation process
CO4	:	Ability to identify and analyze worksheet in Ms Excel
CO5	:	Ability to understand diagnostic procedures and troubleshooting techniques to office automation

UNIT-I: [6 periods]

Exploring Word 2007   - Working in the Word Environment - Opening, Moving Around in, and Closing a Document - Sidebar: Compatibility with Earlier Versions - Displaying Different Views of a Document. Creating and Saving a Document - Previewing and Printing a Document .

Unit II: [6 periods]

Editing and Proofreading Documents - Making Changes to a Document - Inserting Saved Text - Finding the Most Appropriate Word - Reorganizing a Document Outline - Finding and Replacing Text -Correcting Spelling and Grammatical Errors .

Unit-III: [6 periods]

Changing the Look of Text - Quickly Formatting Text and Paragraphs - Manually Changing the Look of Characters - Manually Changing the Look of Paragraphs - Creating and Modifying Lists

Unit-IV: [6 periods]

Setting Up a Workbook : Creating Workbooks - Modifying Workbooks - Modifying Worksheets - Zooming In on a Worksheet - Arranging Multiple Workbook Windows - Adding Buttons to the Quick Access Toolbar - Maximizing Usable Space in the Program Window.

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Text Books:

3. Joyce Cox and Joan Prepernau, " Step by Step , Microsoft Office Work 2007", Microsoft Press, 2007.
4. Curtis D. Frye, "Step by Step , Microsoft Excel 2010", Microsoft Press, 2010.

Reference Books:

2. Pradeep K Sinha and Priti Sinha , "Computer Fundamentals ", BPB Publications, 2004 .

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Semester III:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Inter Department Learning – I E-Resources	2	2	-	-	Theory

Introduction : To learn technologies involved in e-resources application development and also become aware of the current business potential of e-resources based business.

Objectives: The student should be able gain knowledge about modern technology for learning and acquaint with the e-Learning Tools.

Course Outcome:

CO1	:	To gain knowledge about E- Resources
CO2	:	Selection of content using the different techniques
CO3	:	Accessing of the E- Resources
CO4	:	Legal issues are solved
CO5	:	Legal issues are solved

UNIT- I: [6 periods]

Introduction – Purpose-History-Scope-authors- collection of policy statements- E-books- E-Journals- E-Images.

UNIT-II : [6 periods]

Selection And Evaluation Of E-Resources : Content-Technical requirements- Functionality and reliability- Technical feasibility - vendor support- Supply.

UNIT- III: [6 periods]

Licensing E-Resources :Access Concern- Use of electronic information resources- Vendor support .

UNIT – IV : [6 periods]

Technical Issues :Technical considerations – Flexibility and enhancements - Legal issues

UNIT - V: [6 periods]

Review And Renewal Process : Review of usage data- Other renewal considerations.

Text Book:

1. Charles E. Carraher and L. H. Sperling, "Renewable-Resource Materials", Polymer Science and Technology, 2013

Semester III:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Inter Department Learning – I Web Designing	2	2	-	-	Theory

Introduction: To develop the skill & knowledge of Web page design.

Objectives: Develop skills in analyzing the usability of a web site. Understand how to plan and conduct user research related to web usability.

Course Outcome:

CO1	:	Select and apply markup languages for processing, identifying, and presenting of information in web pages.
CO2	:	To apply images and tables tag in HTML program
CO3	:	Design websites using appropriate frames
CO4	:	To practices in different types colors and font styles in HTML
CO5	:	To understand different layouts and different special tag in HTML

UNIT- I: **[6 periods]**

Getting Started: Introduction of HTML, Writing my first HTML Page Basic tags used in HTML , Elements In HTML , Attributes In HTML, Formatting In HTML , Meta Tags and their use.

UNIT - II: **[6 periods]**

Commenting a HTML Code Images and incorporating images , working with Tables , Working with Lists , Working with hyperlinks .

UNIT - III: **[6 periods]**

Frames and frame management, Working with Block elements.

UNIT - IV: **[6 periods]**

HTML Advanced: Background images, How to get a colour text and colour background, Working with fonts(Various fonts, size, colour).

UNIT - V: **[6 periods]**

Form designing and Form Management, Using Multimedia inside HTML, Marquee Tag, Headers, Working with Layouts, Role of Tags in Html, Attributes in Html, Event Handling, Mime Media Types

Text Book:

1. ThomasA. Powell," The Complete reference, HTML & CSS, ", McGrawHill, Fifth Edition

Reference Book:

1. L.Kathirvelkumaran and R. Muralidharan , "Web Technology Fundamentals in HTML, CSS, JAVASCRIPT ",Coimbatore Institute of Information Technology ,First Edition 2017.
2. Jennifer Niederst Robbins,"Learning Web Design",O'Reilly,2012.

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Semester IV:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core - V – Shell Programming	4	6	-	-	Theory

Introduction : To give students knowledge about File systems and use of basic Commands and Shell programming.

Course Outcome:

CO1	:	Understanding the basic set of commands and utilities in Linux/UNIX systems.
CO2	:	To learn to develop software for Linux/UNIX systems.
CO3	:	To learn the important Linux/UNIX library functions and system calls
CO4	:	To obtain a foundation for an advanced course in operating systems
CO5	:	To understand the inner workings of UNIX-like operating systems

Unit-I : [12 periods]

Introduction-Printing in the terminal-Playing with variables and environment variables-Function to prepend to environment variables-Math with the shell-Playing with file descriptors and redirection-Arrays and associative arrays-Visiting aliases-Grabbing information about the terminal-Getting and setting dates and delays-Grabbing information about the terminal-Getting and setting dates and delays.

Unit-II : [12 periods]

Concatenating with cat-Recording and playing back of terminal sessions-Finding files and file listing-Playing with xargs-Translating with tr-Checksum and verification-Cryptographic tools and hashes-Sorting unique and duplicates-Temporary file naming and random numbers-Splitting files and data.

Unit-III : [12 periods]

Generating files of any size-The intersection and set difference (A-B) on text files-Finding and deleting duplicate files-Working with file permissions, ownership, and the sticky bit-Making files immutable-Generating blank files in bulk-Finding symbolic links and their targets-Enumerating file type statistics-Using loopback files-Creating ISO files and hybrid ISO-Finding the difference between files, patching.

Unit-IV : [12 periods]

Using regular expressions-Searching and mining a text inside a file with grep-Cutting a file column-wise with cut-Using sed to perform text replacement-Using awk for advanced text processing-Finding the frequency of words used in a given file-Compressing or decompressing JavaScript-Merging multiple files as columns-Printing the nth word or column in a file or line.

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Unit-V :   **[12 periods]**

Printing text between line numbers or patterns-Printing lines in the reverse order-Parsing e-mail addresses and URLs from a text-Removing a sentence in a file containing a word-Replacing a pattern with text in all the files in a directory-Text slicing and parameter operations.

Text Book :

1. "Linux Shell Scripting Cookbook", by Shantanu Tushar & Sarath Lakshman,Published by Packt Publishing Ltd., Second Edition.

Reference Book:

1. Eric Foster Johnson, John C. Welch and Micah Anderson, " Beginning Shell Scripting",Wiley, 2005.
2. Carl Albing, JP Vossen and Cameron Newham,"Bash Cookbook", O'Reilly Media, 2007.
3. Richard Blum, "Linux Command Line and Shell Scripting Bible", Wiley, 2008.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes											
	P01	PO2	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
CO1	H	L	-	L	-	L	-	L	-	-	L	H
CO2	H	L	-	L	-	-	-	L	-	-	L	H
CO3	H	L	-	L	-	-	-	L	-	-	L	H
CO4	H	M	L	L	-	-	-	L	-	-	L	H
CO5	H	L	-	L	-	-	-	L	-	-	L	H

H - High ; M- Medium ; L- Low

Semester IV:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core Practical – V – Shell Programming Lab	4	-	-	5	Lab

Course Outcome:

CO1	:	Comfortably use basic UNIX/Linux commands from the command line
CO2	:	Organize and manage their files within the UNIX/Linux file system. And organize and manage their processes within UNIX/Linux
CO3	:	Usefully combine UNIX/Linux tools using features such as filters, pipes, redirection, and regular expressions.
CO4	:	Customize their UNIX/Linux working environment
CO5	:	Know how to use UNIX/Linux resources to find additional information about UNIX/Linux commands

1. Write a Shell program to identify the Current Shell and length of the String.

2. Write a Shell program to Count backwards for 100 to 0 Using Loops.

3. Write a Shell program to Search File name using regular Expression.

4. Write a Shell program for sorting unique and duplicate Text Files.

5. Write a Shell program to perform operation using intersection, difference and set difference.

6. Write a Shell program to find and duplicate File in a directory of files.

7. Write a Shell program to perform Silent output for grep.

8. Write a Shell program to Printing lines before and after text matches.

9. Write a Shell program for printing text between line numbers or patterns.

10. Write a Shell program for Parsing e-mail addresses and URLs from text.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes											
	P01	PO2	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
CO1	H	L	-	L	-	L	-	L	-	-	L	H
CO2	H	L	-	L	-	-	-	L	-	-	L	H
CO3	H	L	-	L	-	-	-	L	-	-	L	H
CO4	H	M	L	L	-	-	-	L	-	-	L	H
CO5	H	L	-	L	-	-	-	L	-	-	L	H

H - High ; M- Medium ; L- Low

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Semester IV:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Skill Enhancement Courses – II Information and Cyber Security	4	6	-	-	Theory

Introduction : To give students knowledge about information Vulnerability in the modern cyber environment and need of cyber Security preparations are essential.

Course Outcome:

CO1	:	The objective of this course is to provide students with a basic understanding of Information and Cyber Security issues and make them aware of the Challenges.
CO2	:	To provide components of the Information and Cyber Security Organization.
CO3	:	To achieve a basic understanding of information and Cyber Security.
CO4	:	To master information security governance, and related legal and regulatory issues
CO5	:	To be familiarity with information security awareness and a clear understanding ofits importance

Unit - I :   **[12 periods]**

Information Security Overview-The Importance of Information Protection-The Evolution of Information Security -Justifying Security Investment -Business Agility-Cost Reduction-Portability-Security Methodology -How to Build a Security Program -Authority -Framework -Assessment-Planning-Action -Maintenance -The Impossible Job-The Weakest Link-Strategy and Tactics-Business Processes vs. Technical Controls

Unit – II :   **[12 periods]**

Risk Analysis-Threat Definition-Threat Vectors-Threat Sources and Targets-Types of Attacks -Malicious Mobile Code -Advanced Persistent Threats (APTs) -Manual Attacks -Risk Analysis.

Unit – III: **[12 periods]**

Cyber Security Fundamentals -Network and Security Concepts - Information Assurance Fundamentals-Authentication-Authorization-Nonrepudiation-Confidentiality-Integrity-Availability-Basic Cryptography-Symmetric Encryption-Example of Simple Symmetric Encryption with Exclusive OR(XOR)-Improving upon Stream Ciphers with Block Ciphers -Public Key Encryption -The Domain Name System (DNS) -Security and the DNS-Firewalls-History Lesson-What's in a Name?-Packet-Filtering Firewalls-Stateful Firewalls-Application Gateway Firewalls

Unit – IV: **[12 periods]**

Virtualization- In the Beginning, There Was Blue … - The Virtualization Menu - Full Virtualization-Getting a Helping Hand from the Processor - If All Else Fails, Break It to Fix It -Use

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What You Have-Doing It the Hard Way-Biting the Hand That Feeds-Radio-Frequency Identification -Identify What?-Security and Privacy Concerns.

Unit – V: **[12 periods]**

Microsoft Windows Security Principles-Windows Tokens-Introduction-Concepts behind Windows Tokens-Access Control Lists-Conclusions-Window Messaging-Malicious Uses of Window Messages-Solving Problems with Window Messages-Windows Program Execution-Validation of Parameters-Load Image, Make Decisions-Creating the Process Object-Context Initialization-Windows Subsystem Post Initialization -Initial Thread-Down to the Final Steps-Exploiting Windows Execution for Fun and Profit-The Windows Firewall.

Text Books:
1. "Information Security - The Complete Reference", by Mark Rhodes-Ousley, 2nd Edition.
2. " Cyber Security Essentials", by James Graham, Richard Howard & Ryan Olson ,Published by CRC Press.

Reference Books:
1. John R. Vacca, "Computer and Information Security Handbook", Elsevier, Third Edition
2. Salvatorre J. Stolfo,Steven M. Bellovin, Shlomo Hershkop, Angelos Keromytis, Sara Sinclair, Sean W. Smith, "Insider Attack and Cyber Security beyond the Hacker", Springer Science, 2008.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes											
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P010**	**P011**	**P012**
CO1	L	M	M	H	H	L	H	L	M	L	L	
CO2	L			H	M	L	H		L	L	L	
CO3	L		L	H	H	L	H	M		M	M	
CO4	L		M	H	H	L	H				M	
CO5	L	M	M	H	M	M	H	L	L	L		

H - High ; M- Medium ; L- Low

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Semester IV:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Skill Lab – I - Computer Graphics and Animation	4	6	-	-	Theory

Course Outcome:

CO1	:	To provide Computer graphics is concerned with producing images and animations
CO2	:	Recognize and evaluate transformations effects
CO3	:	To provide basic understanding of Adobe Photoshop overview
CO4	:	To understand of interface for Adobe Photoshop
CO5	:	To understand layer and style concept in Adobe Photoshop

1. To implement Bresenham's algorithms for line, circle and ellipse drawing using C program

2. To perform 2D Transformations such as translation, rotation, scaling, reflection and sharing using C program.

3. To implement Cohen–Sutherland 2D clipping and window–viewport mapping using C program.

4. To perform 3D Transformations such as translation, rotation and scaling using C program.

5. To create sun flower using Adobe Photoshop.

6. To create plane flying in the clouds using Adobe Photoshop.

7. To createplastic surgery for the nose using Adobe Photoshop.

8. To create see through the text using Adobe Photoshop.

9. To create web page layout design in the Adobe Photoshop.

10. To change image into black and white using Adobe Photoshop.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes											
	P01	PO2	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
CO1	M	L	M	L				L	L	M	L	M
CO2	M	M	M	M		L		L	L	M	M	M
CO3	M	L		M							L	M
CO4	M	M	M	M		L	L	L	L		L	M
CO5	M	M		L				L		M		M

H - High ; M- Medium ; L- Low

Semester IV:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Skill Lab – I - Database Management	4	6	-	-	Theory

Course Outcome:

CO1	:	To understand database systems from file systems by enumerating the features provided by database systems and describe each in both function and benefit.
CO2	:	To analyze an information storage problem and derive an information model expressed in the form of an entity relation diagram and other optional analysis forms, such as a data dictionary
CO3	:	To understand the features of database management systems and Relational database
CO4	:	To understand the functional dependencies and design of the database and to understand the concept of Transaction and Query processing
CO5	:	To understand terminology, features, classifications, and characteristics embodied in database systems.

1.Database Schema for a customer-sale Scenario

Customer (Cust id: integer, cust_name:string)

Item(item id:integer, item_name:string, price:integer)

Sale(bill no:integer, bill_data:date, Cust_id:integer, item_id:integer, qty_sold:integer)

For the above schema, perform the following:

a.   Create the tables with the appropriate integrity constraints

b.   Insert around 10 records in each of the tables

c.   List all the bills for the current date with the customer names and item numbers

d.   List the total bill details with the quantity sold, price of the item and the final amount

e.   List the details of the customer who have bought a product which has a price>200

2. Database Schema for a Student Library Scenario

Student(Stud no:integer, Stud_Name:string)

Membership(Mem_no:integer, Stud_no:integer)

Book(book_no:integer, book_name:string, author:string)

Iss_rec(iss no:integer, iss_date:date, Mem_no:integer, book_no:integer)

For the above schema, perform the following:

a.   Create the tables with the appropriate integrity constraints

b.   Insert around 10 records in each of the tables

c.   List all the student names with their membership numbers

d.   List all the issues for the current date with student and book names

e.   List all the details of students who borrowed book whose author is CJDATE

3. Write a program to find largest number from the given three numbers

4. Write a program to check whether the given number is Amstrong or not

5. Write a program to generate all prime numbers below 100

6. Write a program to demonstrate predefined exceptions

7. Create a cursor, which displays all employee numbers and names from the EMP table

8. Create a cursor, which update the salaries of all employees as per the given data

9. Create a procedure to demonstrate IN,Out, and INOUT parameters.

10. Create a function to check whether the given string is palindrome or not

11. Create a function to check whether the given number is odd or not

12. Create a trigger before/after insert on employee table for each row/statement.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes											
	P01	PO2	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
CO1	L	H	L	L		L	L	M	M	L	L	M
CO2	H	M	L					M	M	L	L	M
CO3	M	M	M		L	L	L	M	M	L	L	M
CO4	M	H	M					L	L		M	H
CO5	M	H	H		L			L	L		M	H

H - High ; M- Medium ; L- Low

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Semester IV:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Value Added Course - IV Basic Multimedia - II	2	-	-	-	Theory

Course Outcome:

CO1	:	To provide basic understanding of Adobe Photoshop overview
CO2	:	To understand of interface for Adobe Photoshop
CO3	:	To understand layer and style concept in Adobe Photoshop
CO4	:	To provide basic understanding of Adobe Illustrator overview
CO5	:	To provide knowledge in the 2D illustration and creating creative works in 2D application

Introduction: An introduction to the study of multimedia design, Application, Basic Elements of Multimedia, Advantages and Disadvantages, Including principles of Animation, Morphing, and Jobs in Multimedia Industry.

Objective : After successful completion of this course students will be able to describe the key concepts in current multimedia technology and also develop dynamic & interactive multimedia software titles.

Unit - I :   **[6 periods]**

Adobe Photoshop CS6 : Correcting and Enhancing Digital Photographs : Getting started - About camera raw files - Applying advanced color correction - Correcting digital photographs in Photoshop - Correcting image distortion - Adding depth of field.

Unit – II :   **[6 periods]**

Adobe Photoshop CS6: Masks and Channels : Working with masks and channels - Getting started - Creating a mask -Refining a mask - Creating a quick mask - Manipulating an image with Puppet Warp - Working with channels - **Advanced Compositing :** Getting started - Assembling a montage of images - Applying filters - Applying Smart Filters.

Unit – III: **[6 periods]**

Adobe Illustrator CS5 : Getting To Know The Work Area : - Getting started - Understanding the workspace - Working with the Tools panel - The Control panel - Working with panels - Resetting and saving your workspace.

Unit – IV: **[6 periods]**

Adobe Illustrator CS5 : Selecting And Aligning - Getting started - Selecting objects - Using the Selection tool - Using the Direct Selection tool - Creating selections with a marquee - Creating selections with the Magic Wand tool - Selecting similar objects - Aligning objects - Align objects to each other - Aligning to a key object - Distributing objects - Aligning to the artboard - Working with groups .

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Text Books:

1. Adobe product team members, "Adobe Photoshop CS6, Classroom in a Book", Adobe Systems Incorporated, 2012.
2. Adobe product team members, "Adobe Illustrator CS5, Classroom in a Book", Adobe Systems Incorporated, 2010.

Reference Book:

1. Ze-Nian Li and Mark S. Drew," Fundamentals of Multimedia", Pearson Education International,2004.

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Semester IV:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Inter Department Learning – II Cyber Law	2	2	-	-	Theory

Introduction: The course intends to inculcate the significance of Cyber space and to enlighten the various legal, social and international issues and the various remedies available under the Information Technology Act for the breach and commission of offence in cyber space.

CO1	:	Ability to describe laws governing cyberspace and analyze the role of Internet Governance in framing policies for Internet security
CO2	:	Ability to explain the importance of jurisdictional boundaries and identify the measures to overcome cross jurisdictional cyber crimes
CO3	:	Ability to identify intellectual property right issues in the cyberspace and design strategies to protect your intellectual property
CO4	:	Ability to illustrate the importance of ethics in legal profession and determine the appropriate ethical and legal behavior according to legal frameworks
CO5	:	Ability to explain the importance of jurisdictional boundaries and identify the measures to overcome cross jurisdictional cyber crimes

Unit – I: **[6 periods]**

Understanding computer, Internet and cyber Law: The Modern Era, scene and problems- Need for cyber laws. Conceptual framework E-Commerce, E-governance:

Unit – II: **[6 periods]**

What is E-commerce? - Growth and development of E-commerce- various modes of E-commerce-Type of players in E-Commerce.

Unit – III: **[6 periods]**

The Basic role of electronic signature in E-commerce with reference of free market economy in India: Basic law of digital and electronic signature in India- Authentication of digital signature and Electronic Records- Authentication of Electronic signature and Electronic Records.

Unit – IV: **[6 periods]**

Legal Aspects of electronic Record/ Digital signature: Recognition of Electronic Records- UNCITRAL Model Law- The Legal recognition of Electronic/ Digital Signature-Retention of Electronic Records in India.

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Unit – V: **[6 periods]**

Roles and Regulations of certifying Authorities in India- Protection of Intellectual property rights in cyberspace in India: The cyberspace- The Relevance of domain names in intellectual property rights- Deception of squatting in cyberspace-Protection of copyright of cyberspace.

Text Book :

1. "Cyber Laws and IT Protection", by Harish Chander , PHI Learning Pvt., Ltd., publication.

Reference:

1. Justice Yatindra Singh, "Cyber Laws", Universal Law Publishing Co, New Delhi, (2012).
2. Kenneth Geers, "Strategic Cyber Security", CCD COE publication, 2011.

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Semester IV:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Inter Department Learning – II Animation Techniques	2	2	-	-	Theory

Introduction : This course introduces fundamental 3D theories and principles of computer modeling and animation.

Course Outcome:

CO1	:	To understand the animation history and how to related in real world
CO2	:	To understand this concept how related to industry and scientific
CO3	:	To understand this unit the basic concepts of video and image
CO4	:	To understand this unit animation 3D Modeling techniques
CO5	:	To understand the basic concept of 3D lighting

Unit - I :   **[6 periods]**

Understanding Maya : the user interface - Working in 3D - UV coordinate space -Views - Cameras - Image planes - The Dependency Graph : Nodes - Attributes - Connections - Pivots.

Unit – II :   **[6 periods]**

Modeling In Maya: NURBS curves - NURBS surfaces -Polygons - Construction history .

Unit – III: **[6 periods]**

Bouncing a Ball : Setting up Maya - Creating a new - Building Objects - Creating the ball - Moving the ball - Create a floor surface - Create a - Viewing the scene - Setting display options - Animating The Ball : Setting keys

Unit – IV: **[6 periods]**

Rendering : Hiding the general UI :Hotkeys :Shading Groups The Hypershade panel - Creating a shading group - Creating a texture map - Creating a ball material -Positioning the texture   - Lighting : Placing a spot light - Rendering the scene - Rendering animations .

Text Book :

1. Steve Christov, Deion Green, Bob Gundu, Robert Magee, Elizabeth Mastrotucci, Carla Sharkey,"LEARNING MAYA", Alias|Wavefront,1999.

Reference Books:

1. Todd Palamar, "Mastering Autodesk Maya 2016",John Wiley & sons, Inc., 2016.
2. Paul Naas, "Mastering Autodesk Maya 2014 Essentials",John Wiley & sons, Inc., 2014

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Semester IV:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Inter Department Learning – II E-Commerce	2	2	-	-	Theory

Introduction: This is one of the most exciting and dynamic areas in business and society today. Our task in this class is to jointly investigate how electronic commerce will change current as well as new business.

Course Outcome:

CO1	:	Demonstrate an understanding of the foundations and importance of E-commerce
CO2	:	Analyze the impact of E-commerce on business models and strategy, Internet trading relationships including Business to Consumer, Business-to-Business, Intra-organizational.
CO3	:	To gain legal issues and privacy in E-Commerce
CO4	:	To understand Assess electronic payment systems
CO5	:	To understand Recognize and global E-commerce issues

Unit - I :   **[6 periods]**

Introduction to Ecommerce: E-commerce: The revolution is just beginning, Ecommerce : A Brief History- Understanding E-commerce- organizing Themes.

Unit - II :   **[6 periods]**
E-commerce business models and concepts, The internet and World Wide Web: Ecommerce infrastructure.

Unit – III: **[6 periods]**
E-commerce Business Models- Major Business to Consumer (B2C) business models- Major Business to Business (B2B) business models- Business models in emerging E-commerce areas- How the Internet and the web change business: strategy, structure and process. The Internet: Technology Background- The Internet Today- Internet II- The Future Infrastructure.

Unit – IV: **[6 periods]**
Building an ecommerce web site, Security and payment: Building an E-commerce Web Site: A systematic Approach- The e-commerce security environment- Security threats in the e-commerce environment- Technology solution- Management policies- Business procedures- and public laws- Payment system- E-commerce payment system- Electronic billing presentment and payment.

Unit – V: **[6 periods]**
Social networks, auctions, and portals: Social networks and online communities- Online auctions- E-commerce portals.

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Text Book :

1. Kenneth C. Laudon, "E-Commerce : Business, Technology, Society",Pearson, 4th Edition.

Reference:

1. Efraim Turban, Jae Lee, David King, H.Michael Chung, "Electronic Commerce–A Managerial Perspective", Addison-Wesley.

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Semester IV:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Inter Department Learning – II E-Learning	2	2	-	-	Theory

Introduction: The student should be able to gain knowledge about modern technology for learning.

Objectives:

• To acquaint with the e-Learning Tools.

• To learn technologies involved in e-learning application development.

Course Outcome:

CO1	:	To understand e-learningQuality and delivery of a e-learning content
CO2	:	To Identifying and analyzing the course content and evaluating the content
CO3	:	To Applying the techniques and tools for the content
CO4	:	To evaluate and delivery of the e-content and to apply the tools in the e-learning
CO5	:	To work with technologies involved in e-Learning Applications

Unit - I :   **[6 periods]**

e-Learning: Promise and Pitfalls - The e-Learning Bandwagon - E-Learning - Self-Study Versus Virtual Classroom e-Learning - e-Learning Development Process - Two Types of e-Learning Goals: Inform and Perform.

Unit- II :   **[6 periods]**

Learn from e-Courses- E Lessons Affect Human Learning - Good Research in E Courses - Identify Relevant Research - Interpret Research Statistics .

Unit – III :   **[6 periods]**

Applying the Multimedia Principle: Use Words and Graphics - Rather Than Words Alone - Visuals Make a Difference - Multimedia Principle: Include Both Words and Graphics - Ways to Use Graphics to Promote Learning - Psychological Reasons for the Multimedia Principle - Evidence for Using Words and Pictures - The Multimedia Principle Works Best for Novices.

Unit - IV :   **[6 periods]**

Applying the Coherence Principle: Adding Interesting Material - Coherence Principles: Avoid e-Lessons with Extraneous Audio - Avoid e-Lessons with Extraneous Graphics - Avoid e-Lessons with Extraneous Words.

Text Book:

1. Ruth Colvin Clark & Richard E.Mayer, "E- Learning and the science of Instructions", John Wiley & Sons, Inc., 2008.

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Reference books:

1. Clark, R. C. and Mayer, R. E, "E-Learning and the Science of Instruction",John Wiley & Sons, Inc., 2011.
2. Means, B., Toyama, Y., and Murphy, R. (2010) Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies.

Semester V:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Android Application Development	**5**	**6**	**0**	**0**	**Theory**

Introduction :

This course is to enable the students to develop mobile based applications using activities and intents. To create rich user interfaces and to work with SMS, messaging APIs, and the Android SDK.

Course Outcome:

CO1	:	To understand about the need for android and the basics in it. To know about the installation of Java JDK and Android SDK.
CO2	:	To understand about the creation of android projects and user interfaces.
CO3	:	To code the android applications and to work with android framework classes.
CO4	:	To work with home screen widgets and app widgets in android.
CO5	:	To create a distributable file and outsourcing it in the market for the developed application.

Unit I   **[12 periods]**

Developing Spectacular Android Applications: Need of Develop for android - Android Programming Basics - Hardware Tools - Software Tools. Prepping Development Headquarters: Assembling Toolkit - Tuning Up the Hardware - Installing and Configuring Support Tools - Getting the Java Development Kit - Acquiring the Android SDK - Getting the Total Eclipse - Getting Acquainted with the Android Development Tools

Unit II :   **[12 periods]**

First Android Project: Starting a New Project in Eclipse - Deconstructing Project - Setting Up an Emulator - Creating Launch Configurations - Running the Hello Android App - Understanding Project Structure. Designing the User Interface: Creating the Silent Mode Toggle Application - Laying Out the Application - Developing the User Interface - Adding an Image to Application - Creating a Launcher Icon for the Application - Adding a Toggle Button Widget - Previewing the Application in the Visual Designer

Unit III :   **[12 periods]**

Coding Android Application: Understanding Activities - Creating the First Activity - Working with the Android Framework Classes- Installing and reinstalling the Application - Responding to Errors.

Unit IV: **[12 periods]**

Understanding Android Resources: Understanding Resources - Working with Resources. Turning the Application into a Home Screen Widget: Working with App Widgets in Android - Working with Pending Intents - Creating the Home Screen Widget - Placing the Widget on the Home Screen

Unit V: **[12 periods]**

Turning Publishing the App to the Android Market: Creating a Distributable File - Creating an Android Market Account - Pricing the Application - Getting Screen Shots for the Application - Uploading the Application to the Android Market - Watching the Installs Soar.

Textbooks:

1. Michael Burton, Donn Felker, "Android application development for dummies" ,Wiley

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publishing inc, 2ⁿᵈ Edition, 2012.

Reference Books:
1. Mark L. Murphy, "The Busy Coder's Guide to Advanced Android Development", Commons ware.
2. Reto Meier, "Professional Android 4 Application Development", 2008, ISBN 978-1-118-10227-5, 2012.
3. Soham Mondal, Kyle Mew, "Android Application Development and Design Patterns", Packt Publishing, 2017

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**
CO1	H	-	L	L	-	M	-	H
CO2	H	-	M	L	-	-	L	H
CO3	M	-	L	L	-	-	M	L
CO4	H	-	L	L	-	-	-	L
CO5	-	-	L	L	-	L	-	M

H - High ; M- Medium ; L- Low

Semester V:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Android Application Development Lab	**4**	**0**	**0**	**6**	**Practical**

Course Outcome:

To build a native application using GUI components and Mobile application development framework. To develop an application using basic graphical primitives and databases. To construct an application using multi threading and RSS feed. Make use of location identification using GPS in an application and model new applications to hand held devices.

List of Programs:

1. Getting Started with Mobile App Development

2. Create and validate a login application using username as Email ID else login button must remain disabled

3. Creating a Hello World program Experiment with the most basic features and mobile application interaction concepts lists, text boxes, buttons, graphics, etc)

4. Create a following menu items in mobile application programa. cut b. copy c. pasted. delete e. select all f. unselect all

5. Create an application to change screen color as per the user choice from a menu

6. Create an Android application with a combo box, spinner, toast message get selected item

7. Create an application to call a phone number entered by the user and edit Text

8. Develop a native application that uses GPS location information.

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Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Data Mining	5	6	0	0	Theory

INTRODUCTION

This subject gives the Knowledge of Fundamentals of Data warehousing, Data mining and Data Mining Techniques.

CO1	:	To explain the core concepts of the Data Warehousing. This Explain about the Concept of Different Types of Data warehouse and its features.
CO2	:	To discuss Data Mining Techniques and issues.
CO3	:	To analyze various Association Rules in Data Warehousing.
CO4	:	To understand various Clustering techniques.
CO5	:	To deploy applications of Web Mining.

UNIT I **[12 periods]**

Data Warehousing: Introduction – Definition – Multidimensional Data Model - OLAP Operations – Warehouse Schema – Data warehousing Architecture – Metadata – OLAP Engine - Data Warehouse Backend Process.

UNIT II **[12 periods]**

Data Mining: Definition – Comparison with other fields – DM Techniques – Issues - Application Areas.

UNIT III **[12 periods]**

Association Rules: Methods – A Priori algorithm – Partition Algorithm – Pincer-Search Algorithm – Border Algorithm – Generalized Association Rules with Item constraints.

UNIT IV **[12 periods]**

Clustering Techniques : Clustering Paradigms – Partitioning Algorithms – CLARA – CLARANS- Hierarchical Clustering – DBSCAN – Categorical Clustering Algorithms – STIRR. Decision Trees: Tree Construction Principle – Best Split – Splitting Indices – Splitting Criteria CART – ID3.

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UNIT V [12 periods]

Web Mining: Introduction – Web Content Mining – Web Structure Mining – Web Usage Mining – Text Mining – Hierarchy of Categories – Text Clustering.

Text Books:

1. Arun K Pujari , "Data Mining Techniques", Universities Press, Second Edition 2013.

Reference books:

1. Jewie Han, Michelins Kamber, Jian pei, "Data Mining: Concepts and Techniques", Morgan Kaufmann Publishers, Third Edition,2012.

2. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, "Introduction to Data Mining" , Pearson India Education Publishers, Second Edition, 2016.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes											
	P01	PO2	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
CO1	M	-	L	L	-	M	-	H	H	-	M	H
CO2	L	-	M	M	-	-	L	H	H	-	M	M
CO3	M	-	M	M	H	M	M	M	M	-	H	L
CO4	H	-	L	L	H	-	-	H	L	-	-	H
CO5	-	-	H	H	-	L	-	M	M	-	M	H

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Elective -Computer Networks	5	6	0	0	Theory

Introduction :

To Provides an introduction to fundamental concepts in the design and implementation ofcomputer communication networks, their protocols, and applications.

Course Outcome:

CO1	:	To understand and explore the basics of Computer Networks and Various Protocols.
CO2	:	Understand the basics of how data flows from one node to another.
CO3	:	To learn the functions of network layer and the various routing protocols.
CO4	:	To familiarize the functions and protocols of the Transport layer.
CO5	:	Understand the working of various application layer protocols.

Unit I: **[12 Periods]**

Introduction – Data Communication - Network Models- OSI Model - Physical Layer and Media- Digital Transmission - Transmission Media .

Unit II: **[12 Periods]**

Data Link Layer - Error Detection and Correction - Data Link Control - Wired LANs .

Unit III: **[12 Periods]**

Network Layer - Logical Addressing- Internet Protocol - :Address Mapping, Error Reporting, and Multicasting.

Unit IV: **[12 Periods]**

Transport Layer - Process - To- Process Delivery – UDP – TCP.

Unit V: **[12 Periods]**

Application Layer - Domain Name System - Remote Logging- Electronic Mail and File Transfer.

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Text Books :

1. Behrouz A. Forouzan, Data Communications and Networking, Fifth Edition TMH, 2013.
2. Nader F. Mir, Computer and Communication Networks, Second Edition, Prentice Hall, 2014.

Reference Books :

1. William Stallings, Data and Computer Communications, Tenth Edition, Pearson Education, 2013.
2. Ying-Dar Lin, Ren-Hung Hwang and Fred Baker, Computer Networks: An Open Source Approach, McGraw Hill Publisher, 2011.
3. L.Kathirvelkumaran and R. Muralidharan, "Networking and Data Communication ",Coimbatore Institute of Information Technology ,First Edition 2017.
4. James F. Kurose, Keith W. Ross, Computer Networking, A Top-Down Approach Featuring the Internet, Sixth Edition, Pearson Education, 2013

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**
CO1	H	-	L	L	-	M	-	H
CO2	H	-	M	L	-	-	L	H
CO3	M	-	L	L	-	-	M	L
CO4	H	-	L	L	-	-	-	L
CO5	-	-	L	L	-	L	-	M

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Elective -Human Computer Interface	5	6	0	0	Theory

Course Outcome:

CO1	:	To understand and explore the basics of human and computer
CO2	:	Knowing the interaction methods
CO3	:	To learn Interaction design basics
CO4	:	To functanize the design rules of interaction
CO5	:	Implementing Evaluation techniques

Unit I: [12 Periods]

The human -Introduction-Input–output channels-Design Focus: Getting noticed-Design Focus: Where's the middle?-Human memory-Thinking: reasoning and problem solving-Design Focus: Human error and false memories-Emotion-Individual differences-Psychology and the design of interactive systems. The computer -Introduction-Text entry devices-Design Focus: Numeric keypads, Positioning, pointing and drawing-Memory-Processing and networks.

Unit II: [12 Periods]

The interaction -Introduction-Models of interaction-Design Focus: Video recorder-Frameworks and HCI Ergonomics-Design Focus: Industrial interfaces-Interaction styles-Design Focus: Navigation in 3D and 2D Elements of the WIMP interface-Design Focus: Learning toolbars-Interactivity-The context of the interaction-Design Focus: Half the picture?

Unit III: [12 Periods]

Interaction design basics -Introduction-What is design?-The process of design-User focus-Design Focus: Cultural probes-Scenarios-Navigation design-Design Focus: Beware the big button trap-Design Focus: Modes.

Unit IV: [12 Periods]

Design rules -Introduction-Principles to support usability-Standards-Guidelines-Golden rules and heuristics-Implementation support -Introduction-Elements of windowing systems-Programming the application-Design Focus: Going with the grain.

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Unit V: [12 Periods]

Evaluation techniques-What is evaluation?-Goals of evaluation-Evaluation through expert analysis. User support -Introduction-Requirements of user support-Approaches to user support.

Text Books :

1. Alan Dix, Janet Finlay,Gregory D. Abowd, Russell Beale 'Human–Computer Interaction" Third Edition,Prentice Hall.

2. Shneiderman "Designing the User Interface: Strategies for Effective Human-Computer Interaction, 5e " – 2014 – Pearson Edition.

Reference Books :

1. Andrew Sears,Julie A. Jacko "Human-Computer Interaction Fundamentals (Human Factors and Ergonomics)" – Import, 7 Jun 2017 .CBC press.

2.BradBluMunthal,"Human-Computer Interaction"Springer-Verlag Berlin and Heidelberg GmbH & Co. K

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type

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| **Elective -Software Engineering** | **4** | **6** | **0** | **0** | **Theory** |

INTRODUCTION

This Subjects deals with the concept of present the role of software, system analysis, design concepts, testing methods and strategies.

CO1	:	This gives the Knowledge about various models in software engineering.
CO2	:	It gives the brief description about requirements.
CO3	:	To understand knowledge about Planning.
CO4	:	To analyze various testing in software testing
CO5	:	It deals the concept of Maintenance.

UNIT I   **[12 periods]**

The Evolving Role of Software – Definition of Software Engineering – The Changing Nature of Software – Software Myths – Terminologies – Software Life Cycle Models: Build and Fix Model – Evolutionary Process Models – Selection of a Life Cycle Model.

UNIT II   **[12 periods]**
Requirements: Analysis and Specifications: Type of Requirements–Feasibility Studies– Requirement Elicitation: interviews, brain storming sessions, FAST – Requirement analysis: Data flow diagram, Data Dictionaries - Requirements Validation

UNIT III   **[12 periods]**
Project Planning: Size Estimation–The Constructive Cost Model (COCOMO)–ThePutnam Resource Allocation Model.

UNIT IV   **[12 periods]**
Software Design: Design: Conceptual and Technical designs, Objectives of design– Modularity - Function Oriented Design – Software reliability: Basic concepts, software reliability, maturity levels.

UNIT V   **[12 periods]**
Software Testing: A Strategic Approach to Software Testing – Testing – Functional Testing – Structural Testing – Levels of Testing – Validation Testing.**Software Maintenance:** Categories of Maintenance–Problems during Maintenance–Maintenance is Manageable – Potential Solutions to maintenance problems – Maintenance process –Estimation of maintenance cost.

Text Book:

1. K.K.Aggarwal, Yogesh Singh, "Software Engineering", New Age International Publishers, Jan 2008

Reference Book:
2. Richard e.Fairley "Software Engineering Concepts", , McGrawHill,2012.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes											
	P01	PO2	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
CO1	-	M	L	L	-	M	-	H	H	-	M	H
CO2	L	-	M	H	-	-	L	H	H	-	M	M
CO3	-	M	M	M	H	M	M	M	M	-	H	L
CO4	H	-	L	L	H	-	-	H	L	-	-	H
CO5	-	-	H	H	-	L	-	M	M	-	M	H

H - High ; M- Medium ; L- Low

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Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Information Storage and Management	4	6	0	0	Theory

Introduction :

The Information Storage and Management (ISM) course provides a comprehensive understanding of the varied storage infrastructure components in classic and virtual environments. It enables participants to make informed decisions in an increasingly complex IT environment. It provides a strong understanding of underlying storage technologies and prepares students for advanced concepts, technologies, and products.

Course Outcome:

CO1	:	The student will understand the concept of data storage in distributed environment in datacentre, challenges in data storage and management technologies.
CO2	:	To discuss Storage devices principles including structure, host I/O processing, & core algorithms
CO3	:	To analyze various Storage classes (SAN, NAS. CAS), interconnection protocols, and management principles .
CO4	:	To understand various Storage network design principles .
CO5	:	To deploy applications over Backup, Business Continuity, and Disaster Recovery principles .

Unit - I :Introduction to Storage Technology [12 periods]

Introduction to Information Storage-Data Center Environment-Overview of storage infrastructure components- Evolution of storage-Information Lifecycle Management concept-Data categorization within an enterprise- Storage and Regulations.

Unit – II :Storage Systems Architecture [12 periods]

Data Protection RAID-Intelligent Storage Systems-Fiber Channel Storage Area Networks-IP SAN and FcoE-FC Login Types topologies.

Unit – III: Introduction to Networked Storage [12 periods]

Introduction to DAS and SCSI, SAN: Evolution -Components -Connectivity options -Ports -FC architecture -Zoning -FC topologies, SAN based virtualization: Block level -VSAN, IP SAN: iSCSI -FCIP components

Unit – IV:Introduction to Information Availability, Managing & Monitoring [12 periods]

Industry management standards (SNMP, SMI-S, CIM), Standard framework applications, Key management metrics (thresholds, availability, capacity, security, performance), Metric analysis methodologies & trend analysis, Reactive and pro-active management best practices, Provisioning & configuration change planning, Problem reporting, prioritization, and handling techniques, Management tools overview.

Unit – V: Security & Virtualization   [12 periods]
Storage Security-Securing Data Storage-Virtualization-Storage Virtualization -Block level virtualization, File level virtualization.

Textbooks :
1.Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill, New Delhi, 2006.
2.Somasundaram G, Alok Shrivastava, "ISM –Storing, Managing and Protecting Digital Information", EMC Education Services, Wiley India, New Delhi, 2012.

Reference Books:
1.Gerald J Kowalski, Mark T Maybury, "Information Storage and Retrieval Systems: Theory and Implementation", BS
Publications, New Delhi, 2009.
2.Marc Farley Osborne, "Building Storage Networks", Tata McGraw Hill, New Delhi, 2001.
3.Meeta Gupta, "Storage Area Network Fundamentals", Pearson Education, New Delhi, 2002.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes											
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P010**	**P011**	**P012**
CO1	H	-	L	L	-	M	-	H	H	-	M	H
CO2	H	-	M	L	-	-	L	H	H	-	M	H
CO3	M	-	L	L	-	-	M	L	M	-	M	H
CO4	H	-	L	L	-	-	-	L	L	-	-	H
CO5	-	-	L	L	-	L	-	M	M	-	M	H

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Elective -R Programming	5	6	0	0	Theory

Introduction :

To Provides an introduction to fundamental concepts of R programming language and software environment for statistical analysis, graphics representation and reporting.

Course Outcome:

CO1	:	To understand and explore the basics of R Programming language.
CO2	:	Understand the basics of operators for calculations on arrays, lists, vectors and matrices.
CO3	:	To learn the integrated collection of tools for data analysis.
CO4	:	Understand the working of various applications with lists and arrays.
CO5	:	To familiarize the graphical facilities for data analysis.

Unit 1:   [12 Periods]

R Overview and Evolution of R - Features of R and environment setup - Local Environment Setup - R basic syntax R Command Prompt - R Script File and Comments in R - R data types - R Vectors , Lists - R Matrices - Arrays , Factors - Data Frames - R variables ,Variable Assignment - Data Type of a Variable ,Finding Variables , Deleting Variables.

Unit 2:   [12 Periods]

R operators: Types of Operators - Arithmetic Operators , Relational Operators , Logical Operators - Assignment Operators, Miscellaneous Operators - R decision making : R If Statement - R If...Else Statement, The if...else if...else Statement - R Switch Statement - R loops: R Repeat Loop - R While Loop ,R For Loop - Loop Control Statements, R Break Statement, R Next Statement.

Unit 3:   [12 Periods]

R function: Function Definition Function Components - Built in Function , User defined Function , Calling a Function - Lazy Evaluation of Function. R strings: Rules Applied in String Construction - String Manipulation - R vectors: Vector Creation Accessing Vector Elements - Vector Manipulation.

Unit 4:   [12 Periods]

R lists: Creating a List , Naming List Elements - Accessing List Elements - Manipulating List Elements - Merging Lists - Converting List to Vector - R matrices: Accessing Elements of a Matrix - Matrix Computations. R arrays: Naming Columns and Rows , Accessing Array Elements - Manipulating Array Elements .

Unit 5:   [12 Periods]

R data frames: Extract Data from Data Frame - Expand Data Frame - R packages: R data reshaping - Joining Columns and Rows in a Data Frame.R csv files - R excel file - R pie charts - R histograms - R Regressions.

Text Books:

1. Tilman M. Davies, "The Book of R – A first Course in Programming and Statistics", 2016.

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Reference Books:
1.Roger D Peng, "R Programming for Data Science", 2015.
2.Chambers, "Software for Data Analysis: Programming with R", Springer, 2010.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes											
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P010**	**P011**	**P012**
CO1	H	M	L			L	L	H	M	L	L	M
CO2	M	M		L	H			M	M			M
CO3	L	M	M		H	L	L	M	H	L	L	M
CO4		L	M			H		L	L		L	H
CO5	L	L	H	L	M	M		L	L		M	L

H - High; M- Medium; L- Low

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Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Elective – Cryptography and Network Security	5	6	0		Elective

Introduction : The course emphasizes to give a basic understanding of previous attacks on cryptosystems with the aim of preventing future attacks.

Course Outcome:

CO1	:	Explain the concepts of Cyber security
CO2	:	Illustrate key management issues and solutions
CO3	:	Familiarize with Cryptography and very essential algorithms & Design and develop simple cryptography algorithms
CO4	:	Understand about IEE security related applications in networking.
CO5	:	Introduce cyber Law and ethics to be followed. Understand cyber security and need cyber Law

Unit I: [12 periods]
Introduction - Cyber Attacks, Defence Strategies and Techniques, Guiding Principles, Mathematical Background for Cryptography - Modulo Arithmetic's, The Greatest Comma Divisor, Useful Algebraic Structures, Chinese Remainder Theorem, Basics of Cryptography - Preliminaries, Elementary Substitution Ciphers, Elementary Transport Ciphers, Other Cipher Properties, Secret Key Cryptography – Product Ciphers, DES Construction.

Unit II : [12 periods]
Public Key Cryptography and RSA – RSA Operations, Why Does RSA Work?, Performance, Applications, Practical Issues, Public Key Cryptography Standard (PKCS), Cryptographic Hash - Introduction, Properties, Construction, Applications and Performance, The Birthday Attack, Discrete Logarithm and its Applications - Introduction, Diffie-Hellman Key Exchange, Other Applications..

Unit III : [12 periods]
Key Management - Introduction, Digital Certificates, Public Key Infrastructure, Identity–based Encryption, Authentication–I - One way Authentication, Mutual Authentication, Dictionary Attacks, Authentication – II – Centalised Authentication, The Needham-Schroeder Protocol, Kerberos, Biometrics, IPSec- Security at the Network Layer.

Unit IV: [12 periods]
IEEE 802.11 Wireless LAN Security - Background, Authentication, Confidentiality and Integrity, Viruses, Worms, and Other Malware, Firewalls – Basics, Practical Issues, Intrusion Prevention and Detection - Introduction, Prevention Versus Detection, Types of Instruction Detection Systems, DDoS Attacks Prevention/Detection, Web Service Security – Motivation, Technologies for Web Services, WS- Security, SAML, Other Standards.

Unit V: [12 periods]
Network and Internet Security - Transport Level Security - Web Security Issues - Secure Socket Layer (SSL) - Transport Layer Security (TLS) - HTTPS - Secure Shell (SSH) - Wireless

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Network Security - Electronic Mail Security - IP Security.

Textbooks:
  1.Cryptography, Network Security and Cyber Laws – Bernard Menezes, Cengage Learning, 2010 edition.
 Cryptography and Network Security- Behrouz A Forouzan, Debdeep Mukhopadhyay, Mc-GrawHill, 3rd Edition, 2015

Reference Books :
 1. Cryptography and Network Security- William Stallings, Pearson Education, 7th Edition
 2. Cyber Law simplified- Vivek Sood, Mc-GrawHill, 11th reprint , 2013
 3. Cyber security and Cyber Laws, Alfred Basta, Nadine Basta, Mary brown, ravindra kumar, Cengage learning

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	PO2	P03	P04	P05	P06	P07	P08
CO1	M	L	M	L	M	L	L	L
CO2	M	M	M	M	L	L	L	L
CO3	M	L		M	L	M	L	M
CO4	M	M	M	M	M	M	L	L
CO5	M	M		L				L

  H - High ; M- Medium ; L- Low

Subject Code	SubjectTitle	Credit	Lecture	Tutorial	Practical	Type
	Learning Maya	5	6			Theory

Introduction:

This subject covers in detail all aspects of thecommonly shortened to Maya is a 3D computer graphics application that runs on Windows, macOS and Linux, originally developed by Alias Systems Corporation (formerly Alias|Wavefront) and currently owned and developed by Autodesk, Inc. It is used to create interactive 3D applications, including video games, animated film, TV series, or visual effects.

Course Outcome:

CO1	:	Working in Autodesk Maya, Creating and editing using Hypergraph,Displaying and Creating projects
CO2	:	Animation, joint basics, creating animation using joints and constraints, creating key frames and basics on Driven keys.
CO3	:	To introduce specific modeling techniques including: smoothing, polygon, decimation, vertex merging, end edge loops selection and edge loop insets.
CO4	:	Explaining about organic modeling,shaping,tools used in modeling, Quad draw
CO5	:	Techniques for working with Deformers, animating the scenes, creating jiggle effect, editing and applying motion capture.

UnitI: **[12 periods]**

Working in Autodesk Maya-Color Management-Creating and Editing Nodes-Using the Hypergraph-Connecting Nodes with the Node Editor-Creating Node Hierarchies in the Outliner-Displaying Options in the Outliner-The Channel Box-The Attribute Editor-Working with Shader Nodes in the Hypershade-Creating Maya Projects-Creating New Project-Editing and Changing Projects.

UnitII: **[12 periods]**

Introduction to Animation -Using Joints and Constraints-Joint Basics-Point Constraints-Aim Constraints-Inverse Kinematics-IK Handle Tool-Creating a Master Control-Keyframe Animation-Creating Keyframes-Auto Keyframe-Moving and Scaling Keyframes on the Timeline-Copy, Paste, and Cut Keyframes-The Graph Editor-Animation Curves.

UnitIII: **[12 periods]**

Hard-Surface Modeling-Understanding Polygon Geometry-Polygon Vertices-Polygon Edges-Polygon Faces-Working with Smooth Polygons-Understanding NURBS-Understanding Curves-Understanding NURBS Surfaces-Surface Seams-NURBS Display Controls.

UnitIV:[12 periods]

Organic Modeling -Implement Box Modeling-Shaping Using Smooth Mesh Polygon Geometry-Multi-Cut with Edge Flow-Slide Edge Tool-Offset Edge Loops-Employ Build-Out Modeling-Extrude along a Curve-

Sculpt Polygons-Soft Select Tool-Sculpting Tools-Use Retopology Tools-Importing and Exporting-Alembic Cache Files-Slide on Surface-Quad Draw-Reduce.

UnitV:　　　　　　　　　　　　　　　　　　　　　　　　　**[12 periods]**
Animation Techniques -Working with Deformers-Shrink-wrapping Geometry-Using Textures to Deform Objects-Delta Mush-Animating Facial Expressions Using Blend Shapes-Creating Blend Shape Targets-Creating Blend Shapes-Painting Blend Shape Weights-Adding Targets.

Textbook:
　　1. Derakashani Dariush, "Introducing Autodesk Maya 2014", Sybex A Wiley Brand, Jan 2014

Reference Book:
1.John Wiley, "Autodesk Maya 2014 Essentials", Autodesk Official Pres, 2013

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**
CO1	H	-	L	M	-	H	-	H
CO2	H	M	-	L	-	-	L	H
CO3	M	-	L	L	-	-	M	L
CO4	H	L	-	L	-	-	-	M
CO5	-	-	L	L	-	L	-	M

H - High; M- Medium; L- Low

Subject Code	SubjectTitle	Credit	Lecture	Tutorial	Practical	Type
Elective -	Software Testing	5	6			Theory

introduction:This Subject gives the knowledge about software development Life Cycle Models and various testing Concepts.

CO1	:	To explain the core concepts of the software testing Basics. How and why this testing shift came about, the characteristics, advantages and challenges brought about by the various Testing and services in Software Testing.
CO2	:	To discuss various types of Testing and its features.
CO3	:	To analyze various Testing Technique which is directly implemented into real time application software?
CO4	:	To Analyze Performance and Functional of Real time Application Software.
CO5	:	To Plan Overall Software Development Process.

UNIT I: **[12 periods]**
Software Development Life Cycle Models: Phases of Software Project – Quality, Quality Assurance and Quality Control – Testing, Verification and Validation-Process Model to Represent Different Phases – Life cycle Models . White Box Testing: What is White Box Testing – Static Testing – Structural Testing – Challenges in White Box Testing.

UNIT II: [12 periods]

Black Box Testing: What is Black Box Testing? – Why Black Box Testing? – When to do Black Box Testing? – How to do Black Box Testing?. Integration Testing: What is Integration Testing? – Integration Testing as a Type of Testing– Integration Testing as a Phase of Testing – Scenario Testing – Defect Bash.

UNIT III: **[12 periods]**
System and Acceptance Testing: System Testing Overview – Why is System Testing Done?– Functional versus Non-Functional Testing – Functional Testing – Non-Functional Testing – Acceptance Testing – Summary of Test Phases.

UNIT IV: [12 periods]
Performance Testing: Introduction – Factors Governing Performance Testing – Methodology for Performance Testing – Tools for Performance Testing – Process for Performance Testing – Challenges. Regression Testing: What is Regression Testing? Types of Regression Testing – When to do Regression Testing? – How to do Regression Testing? – Best Practices in Regression Testing.

UNIT V:[12 periods]
Test Planning, Management, Execution and Reporting: Introduction – Test Planning – Test Management – Test Process – Test Reporting – Best Practices.Test Metrics and Measurements: Project Metrics – Progress Metrics – Productivity Metrics-Release Metrics.

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Text Book:

1. Srinivasan Desikan, Gopalaswamy Ramesh, "Software Testing Principles and Practices", Pearson India Education, First Edition, 2006.

Reference Books:

1. C.Kaner,J.Bach and Pettichord, "Lessons Learned in Software Testing" Willey Publishers , First Edition, 2002.
2. Boris Beizer, "Lessons Learned in Software Testing Technique", Wiley Publishers, Second Edition, 2008.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**
CO1	H	-	L	L	-	M	-	H
CO2	H	-	M	L	-	-	L	H
CO3	M	-	L	L	-	-	M	L
CO4	H	-	L	L	-	-	-	L
CO5	-	-	L	L	-	L	-	M

H - High ; M- Medium ; L- Low

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Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Elective – Grid Computing	5	6	-	-	Theory

Introduction: In this course students are enable to learn the concepts of the open grid service architecture of all the web services. On successful completion of the course the students would have the knowledge about, the trends and basic services on open grid services architecture. The students should learn the resource management and data management services.

Course Outcome:

CO1	:	To gain knowledge about evolution of grid computing. To understanding the Grid business areas and their roles in organizations.
CO2	:	To understand about Grid architecture and to analysis the difference between web serviced and grid service.
CO3	:	To understand the concepts of open grid services architecture and analysis its use cases.
CO4	:	To understand and gain knowledge in policy architecture and analysis the service domains used in grid computing.
CO5	:	To understand the concepts in resource management and storage allocation of the grid computing.

Unit - I: **[12 periods]**
Introduction to Grid computing: Early Grid activities- Current- Grid activities–Grid Business Areas– Grid applications –Grid computing organizations and their roles.

Unit – II: **[12 periods]**
The grid computing anatomy: the grid problem -Grid architecture-Virtual organizations -grid computing roadmap. Service oriented architecture -Web service architecture - XML messages and enveloping - Service message description mechanisms -relationship between web service and grid service.

Unit - III: **[12 periods]**
Open grid services architecture (OGSA)-OGSI–OGSA use cases: Commercial Data Center (CDC), National Fusion Collaborator (NFS), online media and entertainment –OGSA platform components.

Unit – IV: **[12 periods]**
OGSA basic services: Common Management Model (CMM) -Service Domains- Policy Architecture– security architecture- Meeting and Accounting -Common distributed logging –Distributed areas access and replication.

Unit – V: **[12 periods]**
Resource management on the grid -Grid resource management systems-work management layers of grid computing Globus gt3 toolkit: gt3 software architecture model - Resource allocation- Resource management services –Data management services.

Text Book:

1. Josh Joseph, Craig fellenstein, "GRID COMPUTING", IBM press, Pearson education Indian reprint, 2005.

Reference Books:

1. Ian foster, Carl kesselman, Morgan Kaufmann, "The grid2: blue print for a new computing infrastructure", II edition.
2. Frederic Magoules," Fundamentals of Grid Computing: Theory, Algorithms and Technologies"
3. Simon C. Lin , Edited by Eric Yen," Grid Computing: International Symposium on Grid Computing"
4. Abdelkader Hameurlain , Edited by MinA. Tjoa:" Data Management in Grid and Peer-to-Peer Systems"

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes											
	P01	PO2	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
CO1	H	M	L			L	L	H	M	L	L	M
CO2	M	M		L	H			M	M			M
CO3	L	M	M		H	L	L	M	H	L	L	M
CO4		L	M			H		L	L		L	H
CO5	L	L	H	L	M	M		L	L		M	L

H - High; M- Medium; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Elective- Big data Analytics	5	6	-	-	Theory

Introduction: In this course, students to understand more advanced tools used to wrangle and analyze big data. Through this course the students got guided in basic approaches to querying and exploring data using higher level tools built on the top of a Hadoop platform.

Course Outcome:

CO1	:	To understand the meaning of big data, need of big data and how worth to study by understands their characteristics of big data.
CO2	:	To gain knowledge in evolution of Hadoop, understanding the components of Hadoop. To analyze how to develop an application through Hadoop. To getting knowledge of data into Hadoop.
CO3	:	To understand the value of data analyst and how to implementing a big data in organization.
CO4	:	To analysis the big data in context, getting the knowledge of predictive analytics and big data.
CO5	:	To understanding the concepts of humanizing and consumerization of big data analytics.

Unit - I: **[12 periods]**

Big Data- Form the Business perspective: What is big data- Characteristics of big data- Can There be enough? The Volume of the Data- Variety Is the spice of Life- How Fast Is Fast?   The Velocity of Data- Data in the Warehouse and Data in Hadoop- Wrapping It Up.

Unit – II: **[12 periods]**

Big data- From the Technology perspective: All about Hadoop- The Histroy of Hadoop- Components of Hadoop- Application Development in Hadoop- Getting your Data into Hadoop.

Unit - III: **[12 periods]**

Getting Started with the big data Analytics- Changing Focus with big data- The role of the Data Analyst- Implementing Big Data Analytics within an Organization Using Alteryx- Blending Data from Multiple Sources- Looking at Alteryx Designer Desktop.

Unit – IV: **[12 periods]**

Analyzing big data in context: Focus on Context: Focus on Context, Not just Integration- Combining Big Data with Spatial Data- Leveraging External Data provider Resources. **Getting Value form predictive Analytics and big data:** Why do Predictive Analytics on Big data?- Moving predicative Analytics to the from predictive analysis.

Unit – V: **[12 periods]**

Humanizing Big Data Analytics: Putting Big Data in the Hands of Those Who Need it- Humanizing Data Design Principles- Humanizing Big Data Analytics Workflow- Considering Consumerization of Big Data Analytics- Getting an Alteryx Analytics Gallery overview-

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publishing Data and Analytics to Cloud Service- focusing on Consuming Applications- The Best platform for Strategic Analytics.

Text Books:

1. Understanding Big Data(Analytics for Enterprise Class Hadoop and Streaming Data), Chris Eaton, Drik Deroos, Tom Deutsch, George Lapis, Paul Zikopoulos, 2011(Unit-I, II).
2. Big Data Analytics for Dummies, Micheal Wessler, OCP & CISSP, 2012(Unit-III,IV,V)

Reference Books:

1. Big Data Analytics Using Splunk, Peter Zadrozny and Rahu Kodali, Apress 2013.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes											
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P010**	**P011**	**P012**
CO1	L	L	L	M		M		M	L	L	L	M
CO2	M	M	L	M	L			M	L	L		M
CO3	L	M	L		H	M	L	M	L	L	L	M
CO4	M	M	H					L		H	M	L
CO5	H	M	H		H			L	M		M	H

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Elective TCP/IP Protocol Suite	**4**	**6**	**-**	**-**	**Theory**

Introduction
To Understand the concept of TCP/IP Protocol, OSI Model, File Transferring

Course Outcome

CO1	Understanding the Concepts of TCP/IP Protocol
CO2	Analyzing the Packets and can get the knowledge of Routing protocols
CO3	Ability to analyze the how the File are transferring
CO4	An ability to understand the electronic mail working
CO5	Can analyze the how the network security are applying in message transferring

Unit I   **[12 periods]**
Introduction– The OSI Reference Mode- The TCP/IP Protocol Suite-Before We Begin- The Application Layer- Underlying Techniques - The Transport Layer- The Internet Layer- The Internet Protocol

Unit II :   **[12 periods]**
The Internet Protocol- IP Routing - Address Resolution Protocol – The Network Access Layer – Host Point-to-Point Protocol – Ethernet– A TCP/IP Networking.

Unit III :   **[12 periods]**
Wireless Fidelity - Worldwide Interoperability for Microwave Access -Frame Relay - Asynchronous Transfer Model - Multiprotocol Label Switching.

Unit IV: **[12 periods]**
World Wide Web and HTTP- Electronic Mail: SMTP –POP- IMAP – MIME - SNMP- UDP Ports – Email Security - Multimedia- RTP –RTCP- Integrated Service.

Unit V: **[12 periods]**
Cryptography and Network Security- Internet Security – Transport Layer Security – Application Layer Security- Firewalls.

Text Books:
1. Behrouz A.Forouzan "TCP/IP Protocol Suite"   Fourth Edition McGraw Hill.
2. High-Speed Networks and Internets, Performance and Quality of Service,Second Edition, William Stallings, Pearson

Reference Books:

1.Advance Computer Network, By Dayan and Ambawade, Dr. Deven shah,Prof. Mahendra Mehra, Wiley India.

2. TCP/IP Protocol Suite by Behrouz A. Forouzan.

4. Computer Networks, Andrew Tanenbaum, 5th Edition, Pearson Education.

Mapping of Course Outcomes with Program Outcomes

Course Outcomes	Program Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H	-	-	-	-	H	-	-
CO2	M	H	H	-	H	-	H	M
CO3	M	M	-	H	-	-	-	-
CO4	-	-		-	L	-	M	H
CO5	-	M	-	-	-	-	-	-

H : High   M : Medium L: Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	3D Animation Essentials	**4**	**5**	**1**	**0**	**Theory**

Introduction :

This course will focus on creating 3D spaces, and 2D & 3D animations. Students will learn to use Autodesk Maya, Adobe Flash, and Adobe Premiere.

Units will include:

      2D Animation - Timing, and walk cycles

      3D Design - Creating objects and characters

      3D Animation - Timing, walk cycles, camera movement

Students will also be introduced to the history of both 2D and 3D animation.

Course Outcome:

CO1	:	To know the basics of animation timing and How to design a character for both 2D and 3D animation.
CO2	:	To know about the importance of walk cycles and their basic construction
CO3	:	To understand about the purpose of keeping a sketchbook as an animator
CO4	:	To know about the drawing principles used to create a believable background.
CO5	:	To create an animation showreel and An introduction to the development and evolution of animation

Unit I   **[12 periods]**

3D Animation Overview : The history of 3D animation - Understanding the Production Pipeline's Components - Working in 3D Animation Preproduction - Working in 3D Animation Production - 2D Visual Effects/Motion Graphics - Color Correction - Folder Management and Naming Conventions.

Unit II :   **[12 periods]**

Understanding Digital Imaging and Video : Digital Imaging-Pixels-Raster Graphics vs. Vector Graphics-Basic Graphic-File Formats- Digital Video - Resolution, Device Aspect Ratio, and Pixel Aspect Ratio-Digital Image Capture-Using Principles of Fine Art and Traditional Animation-Building a Good Story.

Unit III :   **[12 periods]**

Understanding Modeling and Texturing : Modeling- Texturing -Rigging and Animation: Rigging – Parenting-Pivot Positions-Scripting-Expressions-The Basic Rigging Workflow-Animation-Key frame-Timeline-Dope Sheet-Workspace-Tracking Marks and Ghosting -FK and IK- Video Reference-The Basic Animation Workflow- Animation Techniques.

Unit IV: **[12 periods]**

Creating Visual Effects : Particles - Hair and Fur – Fluids - The Basic VFX Workflow – Lighting- Light Types- Light Attributes- Lighting Techniques -Rendering - Basic Rendering Methods- Global Illumination- Advanced Shader Functions- The Basic Rendering Workflow.

Unit V: **[12 periods]**

Hardware and Software Tools of the Trade : Choosing a Computer - Using

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Monitors/Displays - Working with Graphics Tablets- Using 3D Scanners- Setting Up Render Farms- Finding Data Storage Solutions- Choosing Software- Comprehensive 3D Animation Packages- CAD- Digital Imaging- Using Motion Capture- Working in Virtual Studios.

Textbook:
1. Andy Beane , "3D Animation Essentials", John Wiley & Sons , Inc, 2012.

Reference Book:
1. The Art of 3D Computer Animation and Effects 4th Revised & enlarged Edition.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**
CO1	H	-	M	L	-	M	-	H
CO2	L	-	M	H	-	-	L	H
CO3	M	L	-	M	-	H	-	M
CO4	M	-	H	-	M	-	L	-
CO5	-	L	-	M	-	H	-	L

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Software Quality Assurance	5	6	0	0	Theory

Introduction:

Software Quality Assurance (SQA) goal is to objectively evaluate software processes. This course introduces the concepts and methods required for effective and efficient SQA.

Course Outcome:

CO1	:	Understand the basic concepts of software quality Assurance. The ability to understand the software requirements.
CO2	:	Know the theoretical concept of software quality factors. The ability to know the software life cycle
CO3	:	Understand the planning stages of software quality assurance. To know about the reviews of software quality assurance.
CO4	:	Know the software development methodologies. The ability to know the verification and validation process.
CO5	:	The ability to understand the testing concepts. To understand the cost of the projects.

Unit - I :   **[12 periods]**

The uniqueness of software quality assurance - The environments for which SQA methods are developed - What is software? - Software errors, faults and failures - Classification of the causes of software errors - Software quality – definition - Software quality assurance – definition and objectives - Software quality assurance and software engineering - The need for comprehensive software quality requirements - Classifications of software requirements into software quality factors.
.

Unit – II :   **[12 periods]**

Product operation software quality factors - Product revision software quality factors - Product transition software quality factors - Alternative models of software quality factors - Who is interested in the definition of quality requirements? - Software compliance with quality factors - The SQA system – an SQA architecture - Pre-project components - Software project life cycle components - Infrastructure components for error prevention and improvement Management SQA components - SQA standards, system certification, and assessment components - Organizing for SQA – the human components - Considerations guiding construction of an organization's SQA system.

Unit – III: **[12 periods]**

The CFV Project completion celebration - The contract review process and its stages - Contract review objectives - Implementation of a contract review - Contract review subjects - Contract reviews for internal projects - Development plan and quality plan objectives - Elements of the development plan - Elements of the quality plan - Development and quality plans for small projects and for internal projects.

Unit – IV: **[12 periods]**

Classic and other software development methodologies - Factors affecting intensity of quality assurance activities in the development process - Verification, validation and qualification - A

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model for SQA defect removal effectiveness and cost - Review objectives - Formal design reviews (DRs) - Peer reviews - A comparison of the team review methods - Expert opinions.

Unit – V: **[12 periods]**

Definition and objectives - Software testing strategies - Software test classifications - White box testing - Black box testing - The testing process - Test case design - Automated testing - Alpha and beta site testing programs.

Text Books :

1. Daniel Galin, "Software Quality Assurance", Pearson Publication, 2009.

2. Claude y. laporte alain april, "Software Quality Assurance", Wiley Publication, 2017.

Reference Books:

1. Murali Chemuturi, "Mastering Software Quality Assurance", J.Ross publishing, 2010.

3. Kshirasagar Naik and Priyadarshi Tripathy, "Software Testing and Quality Assurance", Wiley Publication, 2008.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	H	-	L	L	-	M	-	H	L	L	M	-
CO2	H	-	M	L	-	-	L	H	M	L	-	L
CO3	M	L	L	L	-	-	M	L	L	L	-	M
CO4	H	-	L	L	-	-	-	L	L	L	-	-
CO5	-	L	L	L	-	L	-	M	L	L	L	-

H- High, M-Medium, L-Low

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Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Elective-Cloud computing	5	6	-	-	Theory

Introduction:

In this course, students gain knowledge of basics in cloud computing and to enable the students to learn the concepts of cloud computing, cloud technology and their security.

Course Outcome:

CO1	:	To understanding concepts about cloud computing and its types, to gain knowledge in cloud architecture.
CO2	:	To understanding cloud services and application based on the type of cloud. To Analyze the type of application based on the cloud type
CO3	:	To understanding the cloud abstraction and virtualization concepts. To know about the porting application.
CO4	:	To gain the knowledge in managing the cloud and their products. To exploring about the cloud infrastructure.
CO5	:	To understanding the cloud security and security mapping. To obtain knowledge to identify protocol standards.

Unit - I: [12 periods]

Defining cloud computing: defining cloud computing- cloud types- examining the characteristics of cloud computing- understanding cloud architecture: exploring the cloud computing stack- connecting to the cloud.

Unit – II: [12 periods]

Understanding Services and applications by type: defining infrastructure as a service (IaaS) - defining platform as a service (PaaS)- defining software as a service (SaaS) – defining identity as a service (IDaaS) - defining compliance as a service (CaaS).

Unit - III: [12 periods]

Using platforms: understanding abstraction and Virtualization using Virtualization technologies -load balancing and Virtualization -understanding hypervisors -understanding machine imaging -porting applications.

Unit – IV: [12 periods]

Exploring cloud infrastructures: managing the cloud: administrating the clouds - Management responsibilities-lifecycle management- cloud management products - emerging cloud management standards: DMTF cloud management standards- cloud commons and SMI.

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Unit – V: **[12 periods]**

Understanding cloud security: securing the cloud - the security boundary -security service boundary -security mapping -securing data -brokered cloud storage access -storage location and tenancy –encryption -auditing and compliance -establishing identity and presence – identity protocol standards-windows azure identity standards

Text Books:

1. Barrie Sosinsky, "Cloud Computing Bible" John Wiley& Sons Publications, First Edition,2011
2. Thomas, Cloud Computing: Concepts, Technology & Architecture ERL Published May 2013

Reference Books:

1.Bernard Golden, Published October 2013:"AWS for Dummies

2. Thomas Erl, Published May 2013:"Cloud Computing Concepts, Technology & Architecture

3. Michael J. Kavis, Published January 2014:" Architecting the cloud: design decisions for cloud computing service models (SaaS, PaaS, IaaS)

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes											
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P010**	**P011**	**P012**
CO1	M	M			L	L	L	M	L	L	L	H
CO2	L	M	L	H				M	M	M	L	M
CO3	L	H	M		H		L		M	L		
CO4	L	H	H	H				L	L		L	H
CO5	M	M	H		M	M		L	L		M	H

H - High ; M- Medium ; L- Low

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Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Hadoop Programming	4	5	1	0	Theory

Introduction :
The main goal of this course is to help students learn, understand, and practice big data analytics and machine learning approaches, which include the study of modern computing big data technologies and scaling up machine learning techniques focusing on industry applications.

Course Outcome:

CO1	:	To provide an overview of an exciting growing field of Big Data analytics.
CO2	:	To discuss the challenges traditional data mining algorithms face when analyzing Big Data
CO3	:	To introduce the tools required to manage and analyze big data like Hadoop, NoSql MapReduce
CO4	:	To teach the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.
CO5	:	To enable students to have skills that will help them to solve complex real-world problems in for decision support

Unit I   **[12 periods]**
Hadoop Fundamentals : Basics of Hadoop – Data – Data Storage and Analysis – Querying all your data – A brief history of apache hadoop – Map Reduce – Data Format – Analyzing data with Hadoop – Scaling out - Hadoop Streaming

Unit II :   **[12 periods]**
Hadoop Distributed File system (HDFS) : HDFS Concept – The command line interface - Hadoop Filesyatem – The java Interface – Data Flow – YARN : Anatomy of a YARN applications run – YARN compared to Mapreduce1 – scheduling in YARN.

Unit III :   **[12 periods]**
Map Reduce : Developing Map Reduce Application – The Configuration of API – Setting up the development environment – Writing the unit test with MR Unit – Running locally on test data – How Map Reduce work : Failure – Shuffle and Sort – Task Execution – Map Reduce type and format.

Unit IV: **[12 periods]**
Hadoop Operation : Setting up a hadoop cluster – Network topology – Cluster setup and Installation – hadoop configuration – security – Benchmarking a hadoop cluster –HDFS – Monitoring – Maintenance.

Unit V: **[12 periods]**
Avro : Avro Data types and scheme – Parquet – Flume – Installing flume – Sqoop – Sqoop Connectors – Working with imported data – Exports : A deeper lock – Pig – Installation and Running a pig – User defined functions – Data Processing operations – Hive –

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Running Hive – Hive QL – Tables – Querying data – Crunch – Spark : Installing spark – HBase – ZooKeeper.

Textbook:
1. Tom White foreword by Doug Cutting Tom White "Hadoop: The Definitive Guide" Fourth Edition ISBN: 978-1-491-90163-2
Reference :
1. Tom White foreword by Doug Cutting "Hadoop: The Definitive Guide" MapReduce for the cloud Editor: Mike Loukides Published by O'Reilly Media, Inc., 1005 Gravenstein Highway North, Sebastopol, CA 95472.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**
CO1	M	M	M	L	-	M	-	H
CO2	H	-	M	H	-	-	L	H
CO3	L	H	-	M	-	H	-	M
CO4	M	-	H	-	M	-	L	-
CO5	-	L	-	H	-	L	-	L

H - High ; M- Medium ; L- Low

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Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Wireless Sensor Networks	5	6			Theory

Introduction : The Syllabus also targeted toward networking professionals, managers, and practitioners who want to understand the benefits of this new technology and plan for its use and deployment. It can also be used to support an introductory course in the field of wireless sensor networks at the advanced undergraduate or graduate levels.

Course Outcome:

CO1	:	Students can understand the Basic Concepts of Wireless Sensor Networks.
CO2	:	Students can Analyse the basic systems in Wireless Technology.
CO3	:	Students can Apply the Technology with Real time Applications.
CO4	:	Students can Evaluate the Technology with Network Management.
CO5	:	Students can understand the availability of OS for Wireless Sensor Networks and High Performance Traffic Control Systems.

UNIT-1: [12 Periods]
Introduction & Overview : Introduction- Background of Sensor Network Technology- Basic Sensor Network Architectural Elements- Brief Historical Survey of Sensor Networks- Challenges and Hurdles.

UNIT-2: [12 Periods]
Basic Wireless Technology: Introduction-Sensor node Technology-Sensor Taxonomy-WN Operating Environment-WN Trends.

UNIT-3: [12 Periods]
Applications of Wireless Sensor Networks: Home Control Applications-Building Automation Applications-Industrial Automation Applications-Medical Applications-Sensor and Robotics Application- Highway Monitoring-Military Applications.

UNIT-4: [12 Periods]
Network Management for Wireless Sensor Networks: Network management Requirements-Traditional Network Management Models- Network Management Design Issues- MANNA- Naming & Localization.

UNIT-5: [12 Periods]
Operating Systems for Wireless Sensor Networks: Operating System Design Issues- Operating Systems: TinyOS, Mate, MagnetOS, MANTIS, OSPM, EYES OS and SenOS- EMERALDS- PicOS. **Performance and Traffic Control for Wireless Sensor Networks**: WSN Design Issues-Performance modelling of WSN.

Text Books:
1. Willey-interscience "wireless sensor networks", , a john wiley & sons, inc., publication

2. C.S. Raghavendra, krishna m. Sivalingam, taieb znati,"wireless sensor networks", tmh 2006

3. Waltenegus dargie, christian poellabauer," fundamentals of wireless sensor networks: theory and practice" 2010 Wiley publication.

References Books :

1. Carlo fischione, "an introduction to wireless sensor networks", version 1.8, 2014, thm.

2. Edgar h. Callaway, jr." Wireless sensor networks: architectures and protocols" , 2010,aubreach publication .

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**
CO1	H	H		L	M	H	L	H
CO2	H	H		H	L	L	L	M
CO3	H	M	M	H	H	H	L	H
CO4	H	H		H	L	L		M
CO5	H	H	L	L	L	M	L	H

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Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Elective – Adobe Illustrator & After Effects	5	6	0		Elective

Introduction: After Effects CC software lets you deliver cinematic visual effects and motion graphics faster than ever before with new Global Performance Cache. Extend your creativity with built-in text and shape extrusion, new mask feathering.

Course Outcome:

CO1	:	Explain the concepts of Graphics
CO2	:	Illustrate the animation techniques
CO3	:	Design and develop simple graphics using tools.
CO4	:	Implement the components of layer and its properties.
CO5	:	Understanding the concept rendering and similar tools

Unit I: **[12 periods]**
Fundamentals of Motion Graphics - RGB Color Model - Frame Size - Resolution - Pixel Aspect Ratio - Alpha Channels - Frame Rate - Time Code - Interpreting Footage. Getting to Know the Workflow - How After Effects Works - Overview of panels - Creating a project and importing footage - Creating a composition and arranging layers - Adding effects and modifying layer properties - Animating the composition - Previewing your work - Optimizing performance in After Effects - Customizing workspaces - Controlling the brightness of the user interface - Finding resources for using After Effects.

Unit II :   **[12 periods]**
Creating a Basic Animation Using Effects and Presets - Importing footage using Adobe Bridge - Importing video clips - Importing stills - Importing a sequence of stills (interpreting) - Importing multilayered photoshop and illustrator files - Creating a new composition - Applying effects to a layer - Changing parameters globally - Creating keyframes-Keyframe interpolation: auto, continuous, and bezier interpolation - Temporal and spatial Interpolation - Roving in time for spatial properties - Creating and applying an animation preset - Previewing your work.

Unit III: **[12 periods]**
Working With Masks - About masks - Creating a mask with the Pen tool - Editing a mask - Feathering the edges of a mask - Replacing the content of the mask - Mask interpolation - Using masks from Illustrator and Photoshop - Masks for spatial keyframes - Animating Text - About text layers - Creating and formatting point text vs paragraph text - Using a text animation preset - Text on a path - Animating imported Photoshop text - Animating text using a path animation preset - Using a text animators - Adding properties - Adding a range selector - Using a text animator group.

Unit IV: **[12 periods]**
Working with Shape Layers - Adding a shape layer - Creating custom shapes - Creating stars - Default properties of shape layers - Add properties - Creating Groups - Stack your shapes & properties - Using Brainstorm to experiment . Other Effects: Time remapping - Motion sketch - The smoother - The wiggler - Auto orient - Splitting a layer - Adjustment layers - The effects and presets panel.

Unit IV: **[12 periods]**
Distorting Objects with the Puppet Tools - About the Puppet tools - Adding Deform pins - Defining areas of overlap - Stiffening an area - Animating pin positions - Recording animation. Rendering and Output: Creating templates for the Render Queue - Exporting using the Render Queue - Rendering movies with

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Adobe Media Encoder. Parenting: Understanding Parenting - Simple Pickwhipping

Textbooks:
1.Adobe Lightroom CC - 1st Edition: A Complete Step by Step Tutorial Guide Ahsan H Hashim, Kindle edition.
2. Adobe Illustrator CC Classroom in a Book, Brain Wood, Adobe2017 release.

 Reference Books :
1. A Beginners Guide to Adobe Illustrator Kindle Edition, R. Emerson Hawkins (Author),2018.
2. Adobe Illustrator cs6, SharinShelder @adobe , 2013.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	PO2	P03	P04	P05	P06	P07	P08
CO1	H	L	M	L	M	L	L	L
CO2	L	M	M	M	L	L	L	L
CO3	L	L		M	L	M	M	H
CO4	M	M	L	M	M	L	L	L
CO5	M	M		L		H		L

 H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Elective -Tools for Software Testing	5	6	0	0	Theory

Course Objective: To study fundamental concepts in software testing tools, including software Quality, Patterns, Debugging, strategies, and methods. To learn how to planning a test project, design test cases and data, conduct testing operations, manage software tools problems and defects, generate a testing report.

Course Outcome:

CO1	:	Fundamental concepts in software testing tools, including software tools objectives, process, criteria, strategies, and methods.
CO2	:	Ability to design and conduct a software test process for a software testing project
CO3	:	Ability to apply software testing knowledge and engineering methods
CO4	:	Ability to know the concept of debugging and to learn about test cases
CO5	:	To learn about the concept of localization and Internationalization

Unit I :   **[12 Periods]**
Introduction – Test Design Tools – Test Case Tools – Database Tools –Data Generators – General Test Design – stubs and drives – GUI testing checklist – Text driven development – Functional gui testing – GUI Testing Techniques - GUI Testing Test Case.

Unit II:[12 Periods]
Software Quality – Possible Definitions - New Approaches to Quality – Planning - Execution - Evaluation – Testing Strategies – Exploratory Testing – Testing and Improving (Testing and Tuning) – Automated Testing – Testing by Using - Testing by Documenting – Regression Testing – Smoke Tests - Embedded Testing – Live Testing – Testing Methods - Black Box Testing - White Box Testing - Gray Box tests.

Unit III:[12 Periods]
Testing Patterns, Patterns for Debugging - Best, Minimal, Maximal and Error Case - Equivalence classes – Boundary Values – Cause and Effect Diagrams, Decision Trees – Integration Testing – System Testing – Performance Testing – Test Coverage – Classic Coverage Indices – Function Coverage – Generating Test Cases on the Basis of Use Cases – Test Coverage and Object-Oriented Languages.

Unit IV:[12 Periods]
Debugging—Another Use Case – The Test Case – Detecting Bugs – Error Accumulation – Isolating Bugs – Creating Bug Reports – Automating Testing Procedures – Integration and Systems Testing – Scripting under Windows - Application Interface Testing – Separation of Interface and Implementation – Handling Printouts – Interface-centric design – Data Access and Evaluation - Testing Distributed Systems .

Unit V:[12 Periods]

Internationalization and Localization Testing - Localization and Internationalization - International Planning and Architecture – Lack of International Focus in Project Plans – International Development Issues – Problems Working With Strings - Builds and Installers – Internationalization Testing – Keyboards – Sorting – Filtering and Searching functionality – Brand Names and Terminology.

Text books:
1. Manfred Ratzmann Clinton De Young, "Software Testing Tools" English Editionpublished by Lemoine International, Inc. Salt Lake City 2003
2. The Boeing Company, "Study of Qualification Criteria for Software Verification Tools, Phase 2 Position Paper," a contract deliverable to NASA under contract NAS1-00106, Task Order 1008, September 25, 2003.

Reference Book:
1. Chilenski, J.J., "An Investigation of Three Forms of the Modified Condition Decision Coverage (MCDC) Criterion," April 2001.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**
CO1	H	H		L	L	H	L	H
CO2	H	L	H	H	L	L	L	L
CO3	H	H	L	L	H	H	L	H
CO4	L	H		H	H	L		H
CO5	H	H	L	H	L	L	L	H

L-Low; H-High; M-Medium

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type

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Cloud Infrastructure and Service	5	6	0	0	Theory

Introduction :

The course presents a top down view of cloud computing, from applications and administration to programming,infrastructure,billing and security. The topics include: overview of cloud computing, cloud systems, Load balancing in AWS, distributed storage systems, virtualization, security in AWS, and management services and Billing. Students will study state-of-the-art solutions for cloud computing developed by Amazon. Students will also apply what they learn in one programming assignments and one project executed over Amazon Web Services.

Course Outcome:

CO1	:	To explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing
CO2	:	To discuss system virtualization and outline its role in enabling the cloud computing system model.
CO3	:	To analyze various cloud programming models and apply them to solve problems on the cloud.
CO4	:	To understand various management and other distinguish services of AWS.
CO5	:	To deploy applications over commercial cloud computing infrastructures such as Amazon

Unit - I :- Cloud Computing Fundamentals   [12 periods]
Cloud Computing definition, private, public and hybrid cloud. Cloud types; IaaS, PaaS, SaaS. Benefits and challenges of cloud computing, public vs private clouds, role of virtualization in enabling the cloud; Business Agility: Benefits and challenges to Cloud architecture. Application availability, performance, security and disaster recovery; next generation Cloud Applications.

Unit – II :Virtualization and Cloud Platforms   [12 periods]
Exploring virtualization, Load balancing, Hypervisors, Machine imaging, Cloud marketplace overview, Comparison of Cloud providers..

Unit – III:Management of Cloud Services   [12 periods]
Reliability, availability and security of services deployed from the cloud. Performance and scalability of services, tools and technologies used to manage cloud services deployment; Cloud Economics : Cloud Computing infrastructures available for implementing cloud based services.

Unit – IV:Introduction to AWS   [12 periods]
AWS history, AWS Infrastructure, AWS services, AWS ecosystem.

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Unit – V:Application Development   **[12 periods]**

Service creation environments to develop cloud based applications. Development environments for service development; Amazon, Azure, Google App.

Textbooks:

1. Ray J. Rafaels ,"Cloud Computing: From Beginning to End", April 2015.
2. Gautam Shroff, "Enterprise Cloud Computing Technology Architecture Applications", Cambridge University Press; 1 edition,[ISBN: 978-0521137355], 2010.

Reference Books:

1.Amazon Web Services For Dummies. Bernard Golden. For Dummies.
2 .Rajkumar Buyya, Cloud Computing: Principles and Paradigms, John Wiley & Sons, First Edition
3.Amazon Security overview whitepaper-https://aws.amazon.com/whitepapers

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	PO2	P03	P04	P05	P06	P07	P08
CO1	H	-	L	L	-	M	-	L
CO2	H	-	M	L	-	-	L	M
CO3	M	-	L	L	-	-	M	L
CO4	H	-	L	L	-	-	-	L
CO5	-	-	L	L	-	L	-	L

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Skill Enhancement Courses - PHP & MySQL	5	1	0	4	Theory

Course Outcome:

CO1	:	To provide an insight of PHP basics
CO2	:	Understand and practice the function and array handling in PHP
CO3	:	Understand and practice the the file handling and date functions
CO4	:	To provide an insight of MYSQL basics
CO5	:	Strategies of file handling and Cookies in MYSQL

UNIT I :   **[12 Periods]**
Introduction to PHP - The structure of PHP-Using comments, Basic syntax -The structure of PHP -Variable, operators, Variable assignment, Multiple line commands -Variable typing-Constants- Predefined constants- The Difference Between the echo and print Commands - Functions-Variable Scope Expressions and Control Flow in PHP - Expression, Operators – Conditionals –Looping -Implicit and Explicit Casting.

UNIT II :   **[12 Periods]**
PHP Functions and Objects -PHP Functions- Defining a Function- -Returning a Value-Returning an Array - PHP Functions - Do Not Pass Arguments by Reference- Returning Global Variables-Recap of Variable Scope -Including and Requiring Files -PHP Version Compatibility - PHP Objects- PHP Arrays- Basic Access- Numerically Indexed Arrays - Associative Arrays - Assignment Using the array Keyword.

UNIT III :   **[12 Periods]**
PHP Arrays- Basic Access- Numerically Indexed Arrays - Associative Arrays - Assignment Using the array Keyword - The foreach...as Loop - Multidimensional Arrays -Using Array Functions. Practical PHP- Using printf - Date and Time Functions -Date Constants - Using checkdate -File handling - System Calls - XHTML or HTML5?.

UNIT IV: **[12 Periods]**
Introduction to MySQL- Basics -Accessing MySQL via the Command Line –Indexes -MySQL Functions -Accessing MySQL via phpMyAdmin - Mastering MySQL -Database Design-Normalization – Relationships –Transactions -Using EXPLAIN - Backing Up and Restoring - Querying a MySQL - Database with PHP - A Practical Example - Practical MySQL - Practical MySQL - Preventing Hacking Attempts.

UNIT V: **[12 Periods]**
Form Handling- Building Forms -Retrieving Submitted Data -An Example Program- What's New in HTML5? - Features Awaiting Full Implementation -Cookies, Sessions, and Authentication- Using Sessions. Learning PHP, MySQL & JavaScript , 4th edition, Robin Nixon

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Text Book :

1.	Robin Nixon, "Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5", 4th edition, O'Reilly, 2014.

Reference Books:

1.	Luke welling, Laura Thomson, " PHP and MySQL Web Development", 4th edition, Developer's Library , 2015

2.	Joel Murach,"Murach's PHP and MySQL",3rd Edition,Mike Murach & Associates,2017

Reference Books:

1.Amazon Web Services For Dummies. Bernard Golden. For Dummies.

2 .Rajkumar Buyya, Cloud Computing: Principles and Paradigms, John Wiley & Sons, First Edition

3.Amazon Security overview whitepaper-https://aws.amazon.com/whitepapers

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	PO2	P03	P04	P05	P06	P07	P08
CO1	H	-	M	-	L	M	-	L
CO2	H	-	-	L	M	-	L	M
CO3	M	-	-	M	L	-	M	L
CO4	H	-	-	-	L	-	-	L
CO5	-	-	L	-	L	L	-	L

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Skill -Software Project Management	4	6	0	0	Theory

Introduction : To outline the need for Software Project Management also highlight different techniques for software cost estimation and activity planning.

Course Outcome:

CO1	:	To understand and explore the basics of Software Projects and Risks.
CO2	:	Understand the Methods and techniques of Software Projects.
CO3	:	To learn the functions of Classes and Objects.
CO4	:	To familiarize the Project schedules and activities
CO5	:	Implementing Framework and Management control

Unit I: [12 Periods]
Importance of Software Project Management – Activities Methodologies – Categorization of Software Projects – Setting objectives – Management Principles – Management Control – Project portfolio Management – Cost-benefit evaluation technology – Risk evaluation – Strategic program Management – Stepwise Project Planning.

Unit II: [12 Periods]
Software process and Process Models – Choice of Process models – mental delivery – Rapid Application development – Agile methods – Extreme Programming – SCRUM – Managing interactive processes – Basics of Software estimation – Effort and Cost estimation techniques.

Unit III: [12 Periods]
Objectives of Activity planning – Project schedules – Activities – Sequencing and scheduling – Network Planning models – Forward Pass & Backward Pass techniques – Critical path (CRM) method – Risk identification – Assessment – Monitoring – PERT technique

Unit IV: [12 Periods]
Framework for Management and control – Collection of data Project termination – Visualizing progress – Cost monitoring – Earned Value Analysis- Project tracking – Change control- Software Configuration Management – Managing contracts – Contract Management.

Unit V: [12 Periods]
Managing people – Organizational behavior – Best methods of staff selection – Motivation – The Oldham-Hackman job characteristic model – Ethical and Programmed concerns – Working in teams – Decision making – Team structures – Virtual teams – Communications genres – Communication plans.

Text Books :

1. Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management – Fifth Edition, Tata McGraw Hill, New Delhi, 2012.

2. Gopalaswamy Ramesh, "Managing Global Software Projects" – McGraw Hill Education (India), Fourteenth Reprint 2013.

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Reference :

1. Robert K. Wysocki "Effective Software Project Management" – Wiley Publication,2011.
2. Walker Royce: "Software Project Management"- Addison-Wesley, 1998.
3. Adolfo Villafiorita," Introduction to Software Project Management",Hoboken : CRC Press, 2014

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**
CO1	H	-	M	-	L	M	-	L
CO2	H	-	-	L	M	-	L	M
CO3	M	-	-	M	L	-	M	L
CO4	H	-	-	-	L	-	-	L
CO5	-	-	L	-	L	L	-	L

H - High ; M- Medium ; L- Low