

DEPARTMENT OF COMPUTER SCIENCE

RATHINAM COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)

Rathinam Techzone, Pollachi Road, Eachanari, Coimbatore - 641021



Curriculum for

M.Sc. Information Technology
(M.Sc. IT)

(I,II,III & IV Semester)

2019 - 2020 Batch

Vision and Mission of the Institution:

VISION

To emerge as a world renowned institution that is integrated with industry to impart knowledge, skills research culture and values in youth who can accelerate the overall development of India.

MISSION

To impart superior quality education at affordable cost, nurture academic and research excellence, maintain eco-friendly and future – ready infrastructure and create a team of well qualified teaching professionals who can build global competency and employability.

MOTTO

Transform the youth into National Asset.

Vision and Mission of the Department:

VISION

To be renowned it 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	:	To prepare the graduates as successful professionals ready for Industry, Government sectors, Academia, Research, Entrepreneurial Pursuit and Consultancy firms.
PEO2	:	Apply and continuously acquire knowledge, theoretical and applied, related to core areas of Information Technology.
PEO3	:	Demonstrate the ability to work effectively as a team member and/or leader in an ever-changing professional environment
PEO4	:	To prepare the graduates to adapt themselves for life-long learning through professional activities on latest technology and trends needed for a successful career
PEO5	:	To prepare graduates the ability to gain multidisciplinary knowledge through real-time projects and industry internship training and providing a sustainable competitive edge in R&D and meeting industry needs.

Program Outcomes (PO):

P01	:	Acquire knowledge of Computing Fundamentals, Basic Mathematics, Computing Specialization, and Domain Knowledge of proper computing models from defined problems.
P02	:	Apply Research based knowledge and methodologies to design, analyze and interpretation of data and find the solutions for complex problems by applying right tools
P03	:	Capable of evaluating personal and professional choices in terms of codes of ethics and ethical theories and understanding the impact of their decisions on themselves, their professions, and on society.
P04	:	Find out right opportunity for entrepreneurship and create and add value for the betterment of an individual and society at large
P05	:	Function effectively as a team member or a leader to accomplish a common goal in a multidisciplinary team
P06	:	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
P07	:	Engage in independent and life-long learning for continuous professional development.
P08	:	Confidence for self and continuous learning to improve knowledge and competence as a computing professional
P09	:	Identify, invent, research activities to provide solutions for complex computing problems using fundamental concepts of Mathematics, Computing Science and Relevant Domains

Correlation between the POs and the PEOs:

Program Outcomes		PEO1	PEO2	PEO3	PEO4	PEO5
P01	:		√			
P02	:	√				
P03	:		√	√	√	
P04	:					√
P05	:					√
P06	:		√		√	
P07	:			√		
P08	:		√	√	√	
P09		√			√	√

Components considered for Course Delivery is listed below:

1. Class room Lecture
2. Laboratory class and demo
3. Assignments
4. Project
5. Online Course
6. External Participation
7. Seminar
8. Internship

RATHINAM COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)

Scheme of curriculum for M.Sc. Information Technology

for the Batch admitted during 2019 - 2020

Board of Studies – Computer Science (PG)

S.No	Sem	Part	Type	Subject	Credit	Hour	Int	Ext	Total
1	1	III	Theory	Core- I – Advanced Java Programming	4	7	40	60	100
2	1	III	Theory	Core- II –Software Engineering	4	7	40	60	100
3	1	III	Theory	Core- III – Shell Programming	4	6	40	60	100
4	1	III	Practical	Core Practical – I – Java Programming Lab	4	5	40	60	100
5	1	III	Practical	Core Practical – II – Shell Programming Lab	4	5	40	60	100
1	2	III	Theory	Core- IV – Internet of things	4	5	40	60	100
2	2	III	Theory	Core- V – Advanced Database	4	5	40	60	100
3	2	III	Theory	Core- VI – Data Mining and Warehousing	4	5	40	60	100
4	2	III	Theory	Core- VII – Web Technology	4	5	40	60	100
5	2	III	Practical	Core Practical – III – Advanced Database Lab	4	5	40	60	100
6	2	III	Practical	Core Practical – IV – Web Technology Lab	4	5	40	60	100
1	3	III	Theory	Core- VIII – Python Programming	4	6	40	60	100
2	3	III	Theory	Elective - I	4	6	40	60	100
3	3	III	Theory	Elective - II	4	6	40	60	100
4	3	III	Practical	Core Practical – IV – Python Lab	4	6	40	60	100
5	3	III	Practical	Core Practical V – Elective Lab	4	6	40	60	100
6	3	III	Practical	Core Practical – VI – Industrial Training Report	2	-	50	-	50

1	4	III	Theory	Core- IX – Data Science	4	5	40	60	100
2	4	III	Theory	Elective- III	4	5	40	60	100
3	4	III	Theory	Elective- IV	4	5	40	60	100
4	4	III	Practical	Core Practical – VII – Elective Lab	4	5	40	60	100
5	4	III	Project	Core Project	8	10	80	120	200
					90	120			2250

List of Electives:

Elective	Subject Name
Elective - I	Principles of Multimedia
	Software Reliability
	Wireless Sensor Network
Elective - II	Multimedia - 3D Software
	Software Quality Assurance
	Information Hiding Techniques
Elective - III	Adobe illustrator & After Effects
	Software testing
	Cryptography
Elective - IV	Ajax Programming
	Agile testing
	Mobile Communications

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
	Core- I – Advanced Java Programming	S	M		S		M	M	
	Core- II –Software Engineering	M	S		S			M	M
	Core- III – Shell Programming		M	M	M		M	M	M
	Core Practical – I – Java Programming Lab	M	S		S			M	M
	Core Practical – II – Shell Programming Lab	M	M				M	M	
	Core- IV – Internet of things	S	M		S		M	M	
	Core- V – Advanced Database	M	S		S			M	M
	Core- VI – Data Mining and Warehousing		M	S	M		M	S	M
	Core- VII – Web Technology	S	M	M	S		M	M	
	Core Practical – III – Database Management System Lab	S	M	M	S		M	M	M
	Core Practical – IV – Web Technology Lab	S	M		S		M	M	
	Core- VIII – Python Programming	M	S		S			M	M
	Elective - I		M	M	M		M	M	M
	Elective - II	M							
	Core Practical – IV – Python Lab	S	M	M	M		M	M	
	Core Practical V – Elective Lab-I	S	M	M	M		M	M	
	Core Practical – VI – Industrial Training Report		M	M	M	M	M	S	M

SEMESTER – I

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core– I – Advanced Java Programming	4	7	0	0	Theory

Introduction : Learning the java Programming with oops concepts and other methodology for the purpose of practicing.

Unit I: **[12 Periods]**

Introduction to Java -Features of java -JDK Environment & tools like(java, javac, appletviewer, javadoc, jdb) -OOps Concepts Class, Abstraction , Encapsulation, Inheritance, Polymorphism - Memory allocation for objects -Constructor -Implementation of Inheritance Simple, Multilevel-Interfaces -Abstract classes and methods -Implementation of Polymorphism -Method Overloading, Method Overriding -Nested and Inner classes-Modifiers and Access Control.

Unit II: **[12 Periods]**

Packages -Packages Concept -Creating user defined packages -Java Built in packages - java.lang->math -java.util->Random, Date, Hashtable -Wrapper classes .Collection: Interfaces -Collection -List -Set-SortedSet-Enumeration -Iterator-ListIterator. Working with maps -Map interface-Map classes - HashMap -TreeMap.

Unit III: **[12 Periods]**

File and Exception Handling :Exception -Exception types -Using try catch and multiple catch Nested try, throw , throws and finally -Creating user defined Exceptions .File Handling :Stream ByteStream Classes -CharacterStream Classes -File IO basics -File operations -Creating file -Reading file(character, byte) - Writing file (character, byte).

Unit IV: **[12 Periods]**

JDBC Object: The Concept of JDBC- JDBC Driver Types- JDBC Packages- Database Connection. JDBC and Embedded SQL: Model Programs- Tables- Indexing- Inserting Data into Tables- Inserting Data into Tables.

Unit V: **[12 Periods]**

Introducing Swing- The Origins and Design Philosophy of Swing- Components and Containers- Layout Managers- A First Simple Swing Program- Use JButton- Create a JCheckBox- Create a Swing Applet. JQuery: Introduction to JQuery -Validation using JQuery -JQuery Forms -JQuery Examples. AJAX: Introduction to AJAX -Servlet and JSP with AJAX -Interacting with database .

Reference Books :

1. Herbert Schildt ,”The Complete Reference – JAVA”, Seventh Edition,MGH.
2. E Balgurusamy , “Programming with JAVA-3e” third Edition TMH, 2014
3. James Keogh ,”J2ME: The Complete Reference”, McGraw-Hill/Osborne,2008.
4. James Gosling, Bill Joy, Guy Steele, Gilad Bracha, and Alex Buckle,”The Java Tutorials”, Sixth Edition ,TMH ,2004
5. Bruce Eckel,”Thinking in Java ',3rd edition,TMH,2002

Course Outcome:

CO1	:	To understand and explore the basics of JDK Environment & tools also with OOPs
CO2	:	Understand the basics of java, control structure and Array concepts in java.
CO3	:	To learn the functions of Classes and Objects.
CO4	:	To familiarize the Packages also collections
CO5	:	Understanding the File and Exception Handling methods in java environment.

Mapping of Courses and POs:

S- Strong Coorelation M – Medium Coorelation B – Blank

Course Code	Course Name	Program Outcomes											
		P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
	Core- I – Advanced Java Programming		S	M	S	M	M	M	M		M	S	S

Mapping of Courses and POs:

S- Strong Coorelation M – Medium Coorelation B – Blank

Course Code	Course Name	Program Outcomes							
		P01	P02	P03	P04	P05	P06	P07	P08
	Core- I – Advanced Java Programming		S	S	M	M		S	S

SEMESTER – I

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core- II –Software Engineering	4	7	0	0	Theory

Introduction:

To give an introduction on the concepts of Software engineering and make the students to know the fundamentals of development of software.

Course Outcome:

CO1	:	To provide an insight into the processes of software development
CO2	:	Understand and practice the various fields such as analysis, design, development, testing of Software Engineering.
CO3	:	Develop skills to construct software of high quality with high reliability
CO4	:	To apply metrics and testing techniques to evaluate the software
CO5	:	Test Strategies for WebApp

Unit - I :

[12 Periods]

The Nature of Software - Defining Software - Software Application Domains - Legacy Software - The Unique Nature of WebApps - Software Engineering - The Software Process - Software Engineering Practice - The Essence of Practice - General Principles - Software Myths.

Unit - II :

[12 Periods]

A Generic Process Model - Defining a Framework Activity - Identifying a Task Set - Process Patterns - Process Assessment and Improvement - Prescriptive Process Models - The Waterfall Model - Incremental Process Models - Evolutionary Process Models - Concurrent Models - A Final Word on Evolutionary Processes - Specialized Process Models - The Unified Process - Personal and Team Process Models - Process Technology- Agile Process – Extreme Programming.

Unit - III:

[12 Periods]

Requirements Engineering - Establishing the Groundwork - Eliciting Requirements - Developing Use Cases - Building the Requirements Model - Negotiating Requirements - Validating Requirements - Requirements Analysis - Scenario-Based Modeling - UML Models That Supplement the Use Case - Data Modeling Concepts - Class-Based Modeling.

Unit – IV:

[12 Periods]

Design within the Context of Software Engineering - The Design Process - Design Concepts - The Design Model. Software - Architecture - Architectural Genres - Architectural Styles - Architectural Design - Assessing Alternative Architectural Designs - Architectural Mapping Using Data Flow - Designing Class-Based Components - User Interface Analysis and Design - Interface Design Steps - WebApp Interface Design.

Unit – V:

[12 Periods]

A Strategic Approach to Software Testing - Strategic Issues - Test Strategies for Conventional Software - Test Strategies for Object-Oriented Software - Test Strategies for WebApps - Validation Testing - System Testing - The Art of Debugging.

Reference Books:

1. Roger S. Pressman, “Software Engineering: A Practitioner Approach”, Seventh edition, McGrawHill, 2010.
2. Richard Fairley, “ Software Engineering Concepts”, Tata McGraw Hill Edition, 2008
3. Ali Behforrooz, Frederick J.Hudson, “Software Engineering Fundamentals”, Oxford Indian Reprint, 2012
4. Sommerville, “Software Engineering”, Sixth Edition, Addison Wesley-Longman, 2004.
5. Kassem A. Saleh, “Software Engineering”, First Edition, J.Ross Publishing, 2009.
6. Pankaj Jalote, “An Integrated approach to Software Engineering”, Third Edition, Springer Verlag, 2005.

Correlation between the POs and the PEOs

Program Outcomes		PEO1	PEO2	PEO3	PEO4	PEO5
P01	:	√		√		√
P02	:		√		√	
P03	:	√	√			√
P04	:		√		√	√
P05	:	√		√	√	
P06	:			√		√
P07	:	√	√		√	

SEMESTER - I

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	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 concept of web processing and file systems in linux.

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-Debugging the Script- Functions and arguments-reading the output of a sequence of commands in a variable- Reading n character without pressing the return key- Field separator and iterators.

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-Slicing filenames based on extension-Renaming and moving files in bulk-Spell checking and dictionary manipulation-Automating interactive input-Making commands quicker by running parallel processes.

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-Using head and tail for printing the last or first 10 lines-Listing only directories – alternative methods-Fast command-line navigation using pushd and popd-Counting the number of lines, words, and characters in a file-Printing the directory tree.

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- 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.

Unit-V :

[12 periods]

Downloading from a web page- Downloading a web page as plain text- A primer on cURL- Accessing unread Gmail e-mails from the command line- Parsing data from a website - Image crawler and downloader - Posting to a web page and reading response- Archiving with tar- Archiving with cpio- Compressing data with gzip- Archiving and compressing with zip- Faster archiving with pbzip2- Creating filesystems with compression- Backup snapshots with rsync.

Text Book :

1. "Linux Shell Scripting Cookbook", by ShantanuTushar&SarathLakshman, Published by Packt Publishing Ltd., Second Edition.

Reference Books:

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	P02	P03	P04	P05	P06	P07	P08
CO1	H	L	-	L	-	L	-	L
CO2	H	L	-	L	-	-	-	L
CO3	H	L	-	L	-	-	-	L
CO4	H	M	L	L	-	-	-	L
CO5	H	L	-	L	-	-	-	L

H - High ; M- Medium ; L- Low

SEMESTER - I

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core Practical – I – Java Programming Lab	4	0	0	5	Practical

Course Outcome:

CO1	: Implement and know the concept of Java Data Base Connectivity.
CO2	: Development of web based components using Servlets.
CO3	: Java application development using Java Beans.
CO4	: Using JSP to dynamically generate HTML, XML or other types of documents in response to a Web client request.
CO5	: The server and the client communicate and pass information back and forth by using RMI.

Lab Experiments:

1. Write a Program to insert, update and delete Student Information using JDBC.
2. Write a java program for two way TCP communication for server and client. It should look like a simple chat application.
3. Write a simple servlet program which displays cookie id.
4. Write a JSP program for basic arithmetic functions.
5. Write a JSP program to display a String.
6. Write a program to generate plain text using java beans?
7. Write a program to create a simple calculator application that demonstrates the use of RMI.
8. Write a java program for to implement Quick Sort algorithm.
9. Write a java Program for to find shortest paths to other vertices using Dijkstra's algorithm.
10. Write a Java program for to Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm.
11. Write a Java program for to Implement N Queen's problem using Back Tracking.
12. Write a Java program for to Implement All-Pairs Shortest Paths Problem using Floyd's algorithm.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	P02	P03	P04	P05	P06	P07	P08
C01	M	-	H	H	M	-	M	H
C02	L	-	M	L	M	-	M	H
C03	M	-	L	H	H	-	M	H
C04	M	-	H	M	L	-	-	H
C05	H	-	L	L	M	-	M	H

H - High ; M- Medium ; L- Low

Mapping of Courses and POs:

S- Strong Coorelation M – Medium Coorelation B – Blank

Course Code	Course Name	Program Outcomes							
		P01	P02	P03	P04	P05	P06	P07	P08
	Core Practical – I – Java Programming Lab	S	M	S	M		M	S	S

SEMESTER – I

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

Course Outcome:

C01	:	Comfortably use basic UNIX/Linux commands from the command line
C02	:	Organize and manage their files within the UNIX/Linux file system. And organize and manage their processes within UNIX/Linux
C03	:	Usefully combine UNIX/Linux tools using features such as filters, pipes, redirection, and regular expressions.
C04	:	Customize their UNIX/Linux working environment
C05	:	Know how to use UNIX/Linux resources to find additional information about UNIX/Linux commands

Lab Experiments:

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.
11. write a shell script that will take an input file and remove identical lines (or duplicate lines from the file)
12. Write a shell script that takes a name of a folder, and delete all sub folders of size 0

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	P02	P03	P04	P05	P06	P07	P08
C01	M	-	H	H	M	-	M	H
C02	L	-	M	L	M	-	M	H
C03	M	-	L	H	H	-	M	H
C04	M	-	H	M	L	-	-	H
C05	H	-	L	L	M	-	M	H

SEMESTER – II

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core-IV Internet of Things	4	5	-	-	Theory

Course Outcome:

C01	:	Students can understand and develop their knowledge of Internet of Things
C02	:	Analyze basic protocols in wireless sensor network
C03	:	Students can develop their knowledge of applications related with IOT.
C04	:	Design IoT applications in different domain and be able to analyze their performance
C05	:	Implement basic IoT applications on embedded platform.

UNIT- I

Introduction to IoT

[12 periods]

Defining IoT - Characteristics of IoT - Physical design of IoT – Logical design of IoT - Functional blocks of IoT - Communication models & APIs - Machine to Machine - Difference between IoT and M2M - Software define Network.

UNIT-II Network & Communication aspects

[12 periods]

Wireless medium access issues - MAC protocol survey - Survey routing protocols - Sensor deployment & Node discovery - Data aggregation & dissemination.

UNIT-III Challenges in IoT

[12 periods]

Design challenges - Development challenges - Security challenges - Other challenges.

UNIT-IV Domain specific applications of IoT

[12 periods]

Home automation - Industry applications - Surveillance applications - Other IoT applications.

UNIT-V Developing IoTs

[12 periods]

Introduction to Python - Introduction to different IoT tools - Developing applications through IoT tools - Developing sensor based application through embedded system platform - Implementing IoT concepts with python

Text Books:

1. Vijay Madisetti, Arshdeep Bahga, "Internet of Things: A Hands-On Approach"
2. Walteneus Dargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice"

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	P02	P03	P04	P05	P06	P07	P08
C01	H	H		L	L	H	L	H
C02	H	H		H	L	L	L	H
C03	H	H	L	H	H	H	L	H
C04	H	H		H	L	L		H
C05	H	H	L	L	L	L	L	H

SEMESTER – II

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core- V – Advanced Database	4	5	-	-	Theory

Course Outcome:

C01	:	To understand the terminology, features, classifications, and characteristics embodied in database systems.
C02	:	To understand and apply the Relational Data Model and Relational model concepts.
C03	:	To gain knowledge in data models and schemas in DBMS. To understand the features of database management systems and Relational database.
C04	:	To gain basic Concepts and appreciate the applications Of database systems.
C05	:	To use the Relational model and how it is supported by SQL and PL/SQL.

UNIT-I

Object Based Databases: Overview, Complex data types, Structured types and inheritance in SQL, Table inheritance, Array and multiset Types in SQL, Object –identity and reference Types in SQL, Implementing O-R features, Persistent programming languages, Object-relational mapping, Object-oriented versus object-relational.

UNIT-II

XML: Motivation, Structure of XML data, XML document scheme, Querying and transformation, Application program interface to XML, Storage of XML data, XML applications.

UNIT-III

Query Processing: Overview, Measures of query cost, Selection Operation, Sorting, Join Operation, Other Operations, Evaluation of Expressions.

Query Optimization: Overview, Transformation of relational expressions, Estimating statistics of expression results, Choice of evaluation plans, Materialized Views.

UNIT-IV

Parallel Databases: Introduction, I/O parallelism, Interquery Parallelism, Intraquery Parallelism, Intraoperation Parallelism, Interoperation Parallelism, Query Optimization, Design of Parallel Systems.

Distributed Databases : Homogeneous and heterogeneous database, Distributed data Storage, Distributed transactions, Commit protocols, Concurrency control in distributed databases, Availability, Distributed query processing, Heterogeneous distributed databases.

UNIT-V

Advanced Application Development: Performance tuning, Performance benchmarks, Other issues in application development, Standardization.Spatial and Temporal Data and Mobility: Motivation, Time in databases, Spatial and geographic data, Multimedia databases, Mobility and Personal databases.

Reference Books:

- 1.Abraham Silberschatz, Henry F Korth, S Sudarshan, Database System Concepts, McGraw Hill International Edition, 6th Edition, 2009.
- 2.Elmasri Navathe, Somayajulu, Gupta, Fundamentals of Databases Systems, Pearson Education, 4th Edition, 2006.
- 3.CJ Date, A Kannan, S Swamynathan, An Introduction to Database Systems, Pearson Education, 8th Edition, 2006.
- 4.Ramakrishna, Gehrke, Databases Management Systems, McGraw-Hill International Edition, 3rd Edition, 2003.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	P02	P03	P04	P05	P06	P07	P08
C01	H	H		L	L	H	L	H
C02	H	H		H	L	L	L	H
C03	H	H	L	H	H	H	L	H
C04	H	H		H	L	L		H
C05	H	H	L	L	L	L	L	H

SEMESTER – II

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core- VI – Data Mining and Warehousing	4	5	-	-	Theory

Course Outcome:

CO1	:	To introduce the concepts of data Mining and its applications
CO2	:	To understand investigation of data using practical data mining tools
CO3	:	To introduce Association Rules Mining
CO4	:	To introduce advanced Data Mining techniques

Unit -I

Data Mining:- Concepts and Applications, Data Mining Stages, Data Mining Models, Data Warehousing (DWH) and On-Line Analytical Processing (OLAP), Need for Data Warehousing, Challenges, Application of Data Mining Principles, OLTP Vs DWH, Applications of DWH

Unit -II

Data Preprocessing: Data Preprocessing Concepts, Data Cleaning, Data integration and transformation, Data Reduction, Discretization and concept hierarchy.

Unit -III

Classification Models: Introduction to Classification and Prediction, Issues regarding classification and prediction, Decision Tree- ID3, C4.5, Naive Bayes Classifier.

Unit -IV

Rule based classification- 1R. Neural Networks-Back propagation. Support Vector Machines, Lazy Learners-K Nearest Neighbor Classifier. Accuracy and error Measureevaluation. Prediction:-Linear Regression and Non-Linear Regression

Unit -V

Association Rules Mining: Concepts, Apriori and FP-Growth Algorithm. Cluster Analysis: Introduction, Concepts, Types of data in cluster analysis, Categorization of clustering methods. Partitioning method: K-Means and K-Medoid Clustering.

Text Books:

1. Dunham M H, "Data Mining: Introductory and Advanced Topics", Pearson Education, New Delhi, 2003.
2. Jaiwei Han and Micheline Kamber, "Data Mining Concepts and Techniques", Elsevier, 2006.

Reference Books:

1. M Sudeep Elayidom, "Data Mining and Warehousing", 1st Edition, 2015, Cengage Learning India Pvt. Ltd.
2. Mehmed Kantardzic, "Data Mining Concepts, Methods and Algorithms", John Wiley and Sons, USA, 2003
3. Pang-Ning Tan and Michael Steinbach, "Introduction to Data Mining", Addison Wesley, 2006.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	P02	P03	P04	P05	P06	P07	P08
C01	H	H		L	L	H	L	H
C02	H	H		H	L	L	L	H
C03	H	H	L	H	H	H	L	H
C04	H	H		H	L	L		H

SEMESTER – II

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core- VII – Web Technology	4	5	-	-	Theory

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 Book:

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	P02	P03	P04	P05	P06	P07	P08
C01	M	-	H	H	M	-	M	H
C02	L	-	M	L	M	-	M	H
C03	M	-	L	H	H	-	M	H
C04	M	-	H	M	L	-	-	H
C05	H	-	L	L	M	-	M	H

SEMESTER – II

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core Practical – III – Advanced Database Lab	4	-	-	5	Practical

Course Outcome:

C01	:	To understand database systems from file systems by enumerating the features provided by database systems and describe each in both function and benefit.
C02	:	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
C03	:	To understand the features of database management systems and Relational database
C04	:	To understand the functional dependencies and design of the database and to understand the concept of Transaction and Query processing
C05	:	To understand terminology, features, classifications, and characteristics embodied in database systems.

Lab Experiments:

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 Armstrong 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	P02	P03	P04	P05	P06	P07	P08
CO1	M	-	H	H	M	-	M	H
CO2	L	-	M	L	M	-	M	H
CO3	M	-	L	H	H	-	M	H
CO4	M	-	H	M	L	-	-	H
CO5	H	-	L	L	M	-	M	H

SEMESTER – II

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core Practical – IV – Web Technology Lab	4	-	-	5	Practical

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.

Lab Experiments:

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.

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	P02	P03	P04	P05	P06	P07	P08
CO1	M	-	H	H	M	-	M	H
CO2	L	-	M	L	M	-	M	H
CO3	M	-	L	H	H	-	M	H
CO4	M	-	H	M	L	-	-	H
CO5	H	-	L	L	M	-	M	H

SEMESTER – III

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core- VIII – Python Programming	4	5	-	-	Theory

Course Outcome:

C01	:	To understand the history and development of Python Programming Language
C02	:	To understand the data structures and looping concepts in Python Programming Language.
C03	:	To understand the important packages and functions in Python Programming Language
C04	:	To understand the importance of Python Programming Language in data wrangling or munging
C05	:	To understand the impact of Python Programming Language in statistical analysis

Unit -I

[12 periods]

Introduction to Python Environment:

History and development of Python, Why Python? Grasping Python's core philosophy, Discovering present and future development goals, Working with Python : Getting a taste of the language, Understanding the need for indentation, Working at the command line or in the IDE, Visualizing Power, Using the Python Ecosystem for Data Science, Accessing scientific tools using SciPy, Performing fundamental scientific computing using NumPy, Performing data analysis using pandas, Implementing machine learning using Scikit-learn, Plotting the data using matplotlib, Parsing HTML documents using BeautifulSoup, Setting Up Python for Data Science, Getting Continuum Analytics Anaconda, Getting Enthought Canopy Express, Getting pythonxy, Getting WinPython, Installing Anaconda on Windows, Linux and MAC

Unit -II

[12 periods]

Data Structures, Looping and Branching:

Working with Numbers and Logic, Performing variable assignments, Doing arithmetic, Comparing data using Boolean expressions, Creating and Using Strings, Interacting with Dates, Creating and Using Functions, Calling functions in a variety of ways, Using

Conditional and Loop Statements, Making decisions using the if statement, Choosing between multiple options using nested decisions, Performing repetitive tasks using for, Using the while statement, Storing Data Using Sets, Lists, and Tuples : Performing operations on sets, Working with lists, Creating and using Tuples, Defining Useful Iterators, Indexing Data Using Dictionaries.

Unit -III

[12 periods]

Data Management:

Working with Real Data, Working with Real Data, Uploading small amounts of data into memory, Streaming large amounts of data into memory, Sampling data, Accessing Data in Structured Flat-File Form, Sending Data in Unstructured File Form, Managing Data from Relational Databases, Interacting with Data from NoSQL Databases, Accessing Data from the Web, Juggling between NumPy and pandas, Validating Your Data, Removing duplicates, Manipulating Categorical Variables, Dealing with Dates in Your Data, Dealing with Missing Data, Slicing and Dicing: Filtering and Selecting Data, Concatenating and Transforming Working with HTML Pages, Working with Raw Text, Working with Graph Data

Unit -IV

[12 periods]

Data Transformation:

Understanding classes in Scikit-learn, Playing with Scikit-learn, Defining applications for data science, Performing the Hashing Trick, Using hash functions, Demonstrating the hashing trick, Working with deterministic selection, Considering Timing and Performance, Benchmarking with timeit, Working with the memory profiler, Performing multicore parallelism, Demonstrating multiprocessing.

Unit -V

[12 periods]

Python for Statistics:

Exploring Data Analysis, The EDA Approach, Defining Descriptive Statistics for Numeric Data, Measuring central tendency, Measuring variance and range, Working with percentiles, Defining measures of normality, Counting for Categorical Data, Understanding frequencies, Creating contingency tables, Creating Applied Visualization for EDA, Inspecting boxplots, Performing t-tests after boxplots, Observing parallel coordinates, Graphing distributions, Plotting scatterplots, Using covariance and correlation, Using nonparametric correlation, Considering chi-square for tables, Using the normal distribution, Creating a Z-score standardization, Transforming other notable distributions, Detecting Outliers in Data, Clustering, Reducing dimensionality.

Text Book:

1. Python for Data Science for Dummies - Luca Massaron and John Paul Mueller, John Wiley & Sons, Inc.

Reference Books:

1. Python for Data Analysis - Wes McKinney, O'Reilly Media, Inc.
2. Data Science from Scratch - Joel Grus, O'Reilly Media, Inc.
3. Python Scripting for Computational Science - Hans Petter Langtangen

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	P02	P03	P04	P05	P06	P07	P08
C01	M	-	H	H	M	-	M	H
C02	L	-	M	L	M	-	M	H
C03	M	-	L	H	H	-	M	H
C04	M	-	H	M	L	-	-	H
C05	H	-	L	L	M	-	M	H

SEMESTER – III

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Elective-I Principles of Multimedia	4	5	-	-	Theory

Course Outcomes:

C01	:	To understand the basic concept about multimedia
C02	:	To understand basic tools in multimedia
C03	:	Basic details about colour models in image
C04	:	To understand basic video and audio signals
C05	:	To understand audio and video compression techniques in multimedia

Unit - I:

Introduction to Multimedia: What is Multimedia? - Components of Multimedia- Multimedia Research Topics and Projects- Multimedia and Hypermedia- History of Multimedia- Hypermedia and Multimedia. World Wide Web: History of the WWW- Hypertext Transfer Protocol (HTTP- Hypertext Mark-up Language (HTML) - Extensible Mark-up Language (XML) Overview of Multimedia Software Tools: Music Sequencing and Notation- Digital Audio- Graphics and Image Editing- Video Editing- Animation- Multimedia Authoring.

Unit – II:

Multimedia Authoring and Tools: Multimedia Authoring- Multimedia Authoring Metaphors- Multimedia Production- Multimedia Presentation- Automatic Authoring. Some Useful Editing and Authoring Tools: Adobe Premiere- Macromedia Director- Macromedia Flash- Dreamweaver. VRML: Overview- Animation and Interactions- VR1 Specifics. Graphics and image Data Representations: Graphics image Data Types- 1-Bit images- 8-Bit Gray Level Images- Image Data Types- 24~Bit Color Images- 8-Bit Color Images.

Unit – III:

Color in Image and Video: Color Science: Light and Spectra- Human Vision- Spectral Sensitivity of the Eye- Camera Systems- Gamma Correction- Color Monitor Specification- Out-of-Gamut Colors- White-Point Correction- XYZ to RGB Transform- Transform with Gamma Correction.

Color' Models in Images: RGB Color Model for CRT Displays-Subtractive Color: CMY Color Model-Transformation from RGB to CMY-Printer Gamut's. Color Models in Video: Video Color Transforms- YUV Color Model-YIQ Color Model-Cyber Color Model.

Unit – IV:

Fundamental Concepts in Video: Types of Video Signals- Component Video- Composite Video- S-Video- Ana log Video- Digital Video.

Basics of Digital Audio: Digitization of Sound- MIDI: Musical Instrument Digital Interface- Quantization and Transmission of Audio.

Unit – V:

Basic Video Compression Techniques: Introduction to Video Compression- Video Compression Based on Motion Compensation-.Search for Motion Vectors- Sequential Search- 2D Logarithmic Search- Hierarchical Search. **Basic Audio Compression Techniques:** ADPCM in Speech Coding- ADPCM- ADPCM. Vocoders- Phase Insensitivity- Channel vocoder- Formant vocoder- Linear Predictive Coding.

TEXT BOOK:

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

REFEERENCE BOOK:

2. Principles of Multimedia 2nd Edition by Ranjan parekh.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	P02	P03	P04	P05	P06	P07	P08
C01	M	-	H	H	M	-	M	H
C02	L	-	M	L	M	-	M	H
C03	M	-	L	H	H	-	M	H
C04	M	-	H	M	L	-	-	H
C05	H	-	L	L	M	-	M	H

SEMESTER – III

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Elective-I Software Reliability	4	5	-	-	Theory

Course Outcomes:

C01	:	Attain the basic techniques of quality improvement, fundamental knowledge of statistics and probability
C02	:	Use control charts to analyze for improving the process quality
C03	:	Describe different sampling plans
C04	:	Acquire basic knowledge of total quality management
C05	:	Understand the concepts of reliability and maintainability

Unit -I

[12 periods]

Introduction to Reliability Engineering: Reliability, Repairable and Non-repairable Systems, Maintainability and Availability, Designing, Reliability, Repairable and Non-repairable Systems, MTBF, MTBF, MTTF, MDT, k out of n systems.

Unit -II

[12 periods]

Software Reliability: Software Reliability, Software Reliability Vs Hardware Reliability, Failures and Faults, Classification of Failures, Counting, System configuration, Components and Operational Models, Concurrent Systems, Sequential Systems, Standby Redundant Systems. Software Reliability Approaches: Fault Avoidance, Passive Fault Detection, Active Fault Detection, Fault Tolerance, Fault Recovery, Fault Treatment.

UNIT-III

[12 periods]

Software Reliability Modeling: Introduction to Software Reliability Modeling, Parameter Determination and Estimation, Model Selection, Markovian Models, Finite and Infinite failure category Models, Comparison of Models, Calendar Time Modeling

UNIT-IV

[12 periods]

Fault Tolerant Computers: General Purpose Commercial Systems, Fault Tolerant Multiprocessor and VLSI based Communication Architecture. Design – N – Version programming Recovery Block, Acceptance Tests, Fault Trees, Validation of Fault Tolerant Systems.

UNIT-V

[12 periods]

Fault Types: Fault Detection and Containment, Redundancy, Data Diversity, Reversal, Reversal Checks, Obtaining Parameter Values, Reliability Models for Hardware Redundancy, Software Error Models, Checks, Fault /Tolerant Synchronization, Synchronization in Software.

ReferenceBooks:

1. John D. Musa, Software Reliability, McGraw Hill, 1995.
2. Patrick O'Connor, Practical Reliability Engineering, 4th Edition, John Wesley & Sons, 2003.
3. C.M. Krishna, Kang G. Shin, Real Time Systems, McGraw Hill, 1997.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	P02	P03	P04	P05	P06	P07	P08
CO1	M	-	H	H	M	-	M	H
CO2	L	-	M	L	M	-	M	H
CO3	M	-	L	H	H	-	M	H
CO4	M	-	H	M	L	-	-	H
CO5	H	-	L	L	M	-	M	H

SEMESTER – III

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Elective-I Wireless Sensor Network	4	5	-	-	Theory

Course Outcome:

C01	:	To understand the basic sensor network technology
C02	:	To understand the wireless transmission technology
C03	:	To understand Mac protocols for wireless sensor networks
C04	:	To understand routing protocols for wireless sensor networks
C05	:	To understand the basic concept of middleware technologies.

Unit - I: Introduction and Overview of Wireless Sensor Networks: Background of Sensor Network Technology-Applications of Sensor Networks. Basic Overview of the Technology-Basic Sensor Network Architectural Elements-Brief Historical Survey of Sensor Networks-Challenges and Hurdles. Applications of Wireless Sensor Networks: Introduction-Range of Applications- Examples of Category 2 WSN Applications- Examples of Category 1 WSN Applications.

Unit - II: Basic Wireless Sensor Technology: Introduction-Sensor Node Technology-Overview-Hardware and Software-Sensor Taxonomy- WN Operating Environment- WN Trends. Wireless Transmission Technology and System: Introduction-Radio Technology Primer- Propagation and Propagation Impairments-Modulation. Available Wireless Technologies: Campus Applications- MAN/WAN Applications.

Unit - III: Medium Access Control Protocols for Wireless Sensor Networks: Fundamentals of MAC Protocols: Performance Requirements- Common Protocols. MAC Protocols for WSNs: Schedule-Based Protocols- Random Access-Based Protocols. Sensor-MAC Case Study-Protocol Overview- Periodic Listen and Sleep Operations-Schedule Selection and Coordination-Schedule Synchronization- Adaptive Listening- Access Control and Data Exchange- Message Passing.

Unit - IV: Routing Protocols for Wireless Sensor Networks: Introduction- Data Dissemination and Gathering- Routing Challenges and Design Issues in Wireless sensor networks. Network Scale and Time-Varying Characteristics- Resource Constraints-Sensor Applications Data Models. Routing Strategies in Wireless Sensor Networks: WSN Routing

Techniques-Flooding and Its Variants- Sensor Protocols for Information via Negotiation-Low-Energy Adaptive Clustering Hierarchy-Power-Efficient Gathering in Sensor Information Systems. Directed Diffusion-Geographical Routing

Unit – V: Transport Control Protocols for Wireless Sensor Networks: Traditional Transport Control Protocols- TCP (RFC 793)- UDP (RFC 768)- Mobile IP-Feasibility of Using TCP or UDP for WSNs-Transport Protocol Design Issues- Examples of Existing Transport Control Protocols. Middleware for Wireless Sensor Networks: Introduction- WSN Middleware Principles- Middleware Architecture- Data-Related Functions- Architectures. Existing Middleware-MiLAN (Middleware Linking Applications and Networks),- IrisNet (Internet-Scale Resource-Intensive Sensor Networks Services),- AMF (Adaptive Middleware Framework)- DSWare (Data Service Middleware),- CLMF (Cluster-Based Lightweight Middleware Framework),- MSM (Middleware Service for Monitoring). Network Management for Wireless Sensor Networks: Introduction- Network Management Requirements-Traditional Network Management Models: Simple Network Management Protocol-Telecom Operation Map-Network Management Design Issues.

Text Book:

1. WIRELESS SENSOR NETWORKS: Technology, Protocols, and Applications KAZEM SOHRABY DANIEL MINOLI TAIEB ZNATI A John willey & sons,INC,.Publications

Reference Books:

1. Wireless Sensor Networks: IAN F. AKYILDIZ SERIES IN COMMUNICATIONS AND NETWORKING Ian F. Akyildiz Georgia Institute of Technology, USA
2. Mehmet Can Vuran University of Nebraska-Lincoln, USA.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	P02	P03	P04	P05	P06	P07	P08
CO1	M	-	H	H	M	-	M	H
CO2	L	-	M	L	M	-	M	H
CO3	M	-	L	H	H	-	M	H
CO4	M	-	H	M	L	-	-	H
CO5	H	-	L	L	M	-	M	H

SEMESTER – III

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Elective-II Multimedia - 3D Software	4	5	-	-	Theory

Course Outcomes:

C01	:	To understand the basic concept about multimedia
C02	:	To understand basic tools in multimedia
C03	:	Basic details about colour models in image
C04	:	To understand basic video and audio signals
C05	:	To understand audio and video compression techniques in multimedia

Unit -I

[12 periods]

Introduction to Multimedia: 08 Hrs Definition of Multimedia, Multimedia objects: Text, Graphics, Animation, Audio, images, Video. Definition of HyperText and HyperMedia. Multimedia Applications in Education, Entertainment. Advertising world etc. Components of a Multimedia System, Desirable Features for a Multimedia System, requirements of Multimedia Communication.

Unit -II

[12 periods]

Concepts of Multimedia Editing: Digital Audio, Music Sequencing and Notation, Image/Graphics Editing, Video Editing (Linear, Non-linear), Subtitling

Unit -III

[12 periods]

Introduction to Compression Technology: Concept of lossy and lossless compression. Concept of rate-distortion characteristics, Basics image compression (JPEG, JPEG 2000), Basics of Audio compression (MP3, MP4), Basics of Video Compression (MPEG, H.264)

Unit -IV

[12 periods]

Multimedia Application Design: 06 Hrs Content design, technical design, visual design, design metaphors, example studies, interactivity

Unit -V

[12 periods]

Multimedia Authoring and Publishing: Definition of an Authoring System, uses of an authoring system, Definition and function of Authoring Metaphor, Different Metaphors.

Text Books:

1. Tay Vaughan, "Multimedia making it work", Tata McGraw-Hill, 2008.
2. Rajneesh Aggarwal & B. B Tiwari, "Multimedia Systems", Excel Publication, New Delhi, 2007.
3. Li & Drew, "Fundamentals of Multimedia", Pearson Education, 2009.

Reference Books:

1. Parekh Ranjan, "Principles of Multimedia", Tata McGraw-Hill, 2007
2. Anirban Mukhopadhyay and Arup Chattopadhyay, "Introduction to Computer Graphics and Multimedia", Second Edition, Vikas Publishing House.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	P02	P03	P04	P05	P06	P07	P08
C01	M	-	H	H	M	-	M	H
C02	L	-	M	L	M	-	M	H
C03	M	-	L	H	H	-	M	H
C04	M	-	H	M	L	-	-	H
C05	H	-	L	L	M	-	M	H

SEMESTER – III

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Elective-II Software Quality Assurance	4	5	-	-	Theory

Course Outcome:

C01	:	Understand the basic concepts of software quality Assurance. The ability to understand the software requirements.
C02	:	Know the theoretical concept of software quality factors. The ability to know the software life cycle
C03	:	Understand the planning stages of software quality assurance. To know about the reviews of software quality assurance.
C04	:	Know the software development methodologies. The ability to know the verification and validation process.
C05	:	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 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 Book:

1. Daniel Galin, “Software Quality Assurance”, Pearson Publication, 2009.

Reference Books:

1. Claude y. laporte alain april, “Software Quality Assurance”, Wiley Publication, 2017.
2. 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							
	P01	P02	P03	P04	P05	P06	P07	P08
C01	M	-	H	H	M	-	M	H
C02	L	-	M	L	M	-	M	H
C03	M	-	L	H	H	-	M	H
C04	M	-	H	M	L	-	-	H
C05	H	-	L	L	M	-	M	H

SEMESTER -III

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Elective-II Information Hiding Techniques	4	5	-	-	Theory

Course Outcome:

C01	:	Understand the subtle differences between the principles of abstraction, information hiding and encapsulation.
C02	:	Understand how these principles are expressed with traditional programming techniques such as: subprograms, data types, records, modules and abstract data types
C03	:	Be able to use the principle of abstraction to manage the complexity in a large software system
C04	:	Be able to use the principle of information hiding to find a high-quality modularization
C05	:	Understand how programming to abstractions can improve the quality of software

Unit - I:

[12 periods]

Introduction to Information Hiding: Technical Steganography, Linguistic Steganography, Copy Right Enforcement, Wisdom from Cryptography Principles of Steganography: Framework for Secret Communication, Security of Steganography System, Information Hiding in Noisy Data , Adaptive versus non-Adaptive Algorithms, Active and Malicious Attackers, Information hiding in Written Text.

Unit - II :

[12 periods]

A Survey of Steganographic Techniques: Substitution systems and Bit Plane Tools, Transform Domain Techniques: Spread Spectrum and Information hiding, Statistical Steganography, Distortion Techniques, Cover Generation Techniques. Steganalysis: Looking for Signatures: -Extracting hidden Information, Disabling Hidden Information.

Unit - III:

[12 periods]

Watermarking and Copyright Protection: Basic Watermarking, Watermarking Applications, Requirements and Algorithmic Design Issues, Evaluation and Benchmarking of Watermarking system.

Unit – IV:

[12 periods]

Transform Methods: Fourier Transformation, Fast Fourier Transformation, Discrete Cosine Transformation, Mellin-Fourier Transformation, Wavelets, Split Images in Perceptual Bands. Applications of Transformation in Steganography

Unit – V:

[12 periods]

Fingerprinting - Introduction - Examples of Fingerprinting - Terminology and Requirements - Classification - Object Based Classification - Detection Sensitivity-Based Classification -Fingerprinting Method Based Classification -Fingerprint-Based Classification - Research History -Fingerprinting Schemes - Statistical Fingerprinting - Collusion Secure Fingerprinting - Asymmetric Fingerprinting - Traitor Tracing - Anonymous Fingerprinting.

Text Book :

1. Katzendbisser, Petitcolas, "Information Hiding Techniques for Steganography and Digital Watermarking", Artech House, 2014.

Reference Book :

2. Peter Wayner, "Disappearing Cryptography: Information Hiding, Steganography and Watermarking 2/e", Elsevier, 2011.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	P02	P03	P04	P05	P06	P07	P08
C01	M	-	H	H	M	-	M	H
C02	L	-	M	L	M	-	M	H
C03	M	-	L	H	H	-	M	H
C04	M	-	H	M	L	-	-	H
C05	H	-	L	L	M	-	M	H

SEMESTER-III

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core Practical – IV – Python Lab	4	-	-	5	Practical

Lab Experiments:

1. Write and run a Python program that asks the user for a temperature in Celsius and converts and outputs the temperature in Fahrenheit. (Use the formula given in the example above and solve for tempFin terms of tempC.)
2. Modify the program above using a while loop so it prints out all of the factorial values that are less than 1 billion.
3. Modify the first program so it finds the minimum in the array instead of the maximum.
4. (Harder) Modify the first program so that it finds the index of the maximum in the array rather than the maximum itself.
5. Modify the bubble sort program so it implements the improvements discussed in class. (HINT: To exit the main loop if the array is already sorted, simply change the loop variable to equal the last value so the loop ends early.)
6. Reading from a CSV file of the given data using pandas library.
7. For the given data, plot the scatter matrix for males only, and for females only. Do you think that the 2 sub-populations correspond to gender?
8. For the given data, using python environment, apply, 1-sample t-test: testing the value of a population mean.

SEMESTER-III

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core Practical V – 3D Animation Practical Lab	4	-	-	5	Practical

Lab Experiments:

1. Write a C program to study 3D transformations.
2. 3D Translation Program Using C Programming
3. Implement DDA Algorithm for drawing a line segment between two given end points A (x1, y1) and B(x2, y2).
4. 3D Scaling Program Using C Programming
5. 3D Rotation Program Using C Programming
6. Write a C program to implement Bresenham's circle generation algorithm.
7. Write a C program for animation.
8. Write a program to produce animation effect of triangle transform into square and then into circle.
9. Program for creating simple car shape.
10. Implement morphing using Adobe Photoshop

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	P02	P03	P04	P05	P06	P07	P08
C01	M	-	H	H	M	-	M	H
C02	L	-	M	L	M	-	M	H
C03	M	-	L	H	H	-	M	H
C04	M	-	H	M	L	-	-	H
C05	H	-	L	L	M	-	M	H

SEMESTER-III

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core Practical - VI - Industrial Training Report	4	-	-	5	Practical

Course Outcome:

C01	: To enable students gain an exposure to industry.
C02	: To gain and understand the company's history, details of its founders or shareholders, the nature of business, organizational structure, reporting relationships.
C03	: To indentify the real-time problem in the project.
C04	: To gain working experience in the industry.
C05	: 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 gain an exposure to industry and understand current and contemporary management practices by spending a minimum of three to four weeks in a company during their summer break
- 2) The internship training is done individually.
- 3) Students are required to indentify a company for their SIP in consultation with and approval of their faculty guide. The choice of the company should be intimated to the SIP coordinator before commencement of the Internship. Simultaneously, students should also have identified a guide within the company (industry guide) under whose supervision and guidance they would carry out their SIP.
- 4) During their stay with the company, students are required to gain and understand the company's history, details of its founders or shareholders, the nature of business, organizational structure, reporting relationships, working of the different management functions (such as finance, HR, marketing, sales and Operations), key issues and concerns, and nature and types of customers through observation, discussion, and interaction with the company personnel. This list is only indicative, and not exhaustive. Students should collect and gather as much as possible of written materials, published data, and related matter.

5) Obtain SIP completion certificate on company letterhead before leaving the organization. Maintain SIP diary with details on activities and personal learning during project period.

6) A committee, consisting of the Director, Head of the department, and another member of 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: one copy for submission to the college and one copy for the student. More copies may be prepared If the organization or the guide or both ask for one copy each. The report should clearly indicate the sources from which information was obtained. All pages should be numbered, and numbers should be placed at the centre of the bottom of the page. All tables, figures and appendices should be consecutively numbered or lettered, and suitably labeled. The report shall be printed and bound (preferably spiral bound) with not less than 50 A4 size pages.

7) The internship training report should be submitted to the department within a month from the date of commencement of third semester.

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

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

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	P02	P03	P04	P05	P06	P07	P08
C01	M	-	H	H	M	-	M	H
C02	L	-	M	L	M	-	M	H
C03	M	-	L	H	H	-	M	H
C04	M	-	H	M	L	-	-	H
C05	H	-	L	L	M	-	M	H

SEMESTER IV

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core- IX - Data Science	4	6	0	0	Theory

Course Outcome:

C01	:	Students will develop relevant programming abilities.
C02	:	Students will demonstrate proficiency with statistical analysis of data.
C03	:	Students will develop the ability to build and assess data-based models .
C04	:	Students will execute statistical analyses with professional. statistical software .
C05	:	students will demonstrate skill in data management.

Unit -I

[12 periods]

Introduction: What is Data Science? - Big Data and Data Science hype – and getting past the hype - Why now? – Datafication - Current landscape of perspectives - Skill sets needed. Statistical Inference - Populations and samples - Statistical modeling, probability distributions, fitting a model - Intro to R

Unit -II

[12 periods]

Exploratory Data Analysis and the Data Science Process - Basic tools (plots, graphs and summary statistics) of EDA - Philosophy of EDA - The Data Science Process - Case Study: RealDirect (online real estate firm) Three Basic Machine Learning Algorithms - Linear Regression - k-Nearest Neighbors (k-NN) - k-means

Unit -III

[12 periods]

One More Machine Learning Algorithm and Usage in Applications - Motivating application: Filtering Spam - Why Linear Regression and k-NN are poor choices for Filtering Spam - Naive Bayes and why it works for Filtering Spam - Data Wrangling: APIs and other tools for scrapping the Web. Feature Generation and Feature Selection (Extracting Meaning From Data) - Motivating application: user (customer) retention - Feature Generation (brainstorming, role of domain expertise, and place for imagination) - Feature Selection algorithms – Filters; Wrappers; Decision Trees; Random Forests

Unit –IV

[12 periods]

Recommendation Systems: Building a User-Facing Data Product - Algorithmic ingredients of a Recommendation Engine - Dimensionality Reduction - Singular Value Decomposition - Principal Component Analysis - Exercise: build your own recommendation system. Mining Social-Network Graphs - Social networks as graphs - Clustering of graphs - Direct discovery of communities in graphs - Partitioning of graphs - Neighborhood properties in graphs.

Unit-V

[12 periods]

Data Visualization - Basic principles, ideas and tools for data visualization 3 - Examples of inspiring (industry) projects - Exercise: create your own visualization of a complex dataset. Data Science and Ethical Issues - Discussions on privacy, security, ethics - A look back at Data Science - Next-generation data scientists.

Text Book:

1.Cathy O’Neil and Rachel Schutt. Doing Data Science, Straight Talk From The Frontline. O’Reilly. 2014.

Reference Book:

1.Jure Leskovek, Anand Rajaraman and Jeffrey Ullman. Mining of Massive Datasets. v2.1, Cambridge University Press. 2014. (free online)

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	P02	P03	P04	P05	P06	P07	P08
C01	M	-	H	H	M	-	M	H
C02	L	-	M	L	M	-	M	H
C03	M	-	L	H	H	-	M	H
C04	M	-	H	M	L	-	-	H
C05	H	-	L	L	M	-	M	H

SEMESTER IV

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Elective- III- Adobe illustrator & After Effects	4	6	0	0	Theory

Course Outcomes:

C01	: Identify elements of the Illustrator user interface and demonstrate knowledge of their functions.
C02	: Demonstrate knowledge of how to work with brushes, symbols, graphic styles, and patterns.
C03	: The usage of Color Tools and Shape tools
C04	: Demonstrate knowledge of how to use drawing and shape tools
C05	: Demonstrate knowledge of how to create the special effects.

Unit I :

[12 periods]

Workspace: Workspace Basics-Workspace overview-Customizing the workspace-Tools: Tool Panel Overview-Improved User Interface -Tool Galleries-Files and Templates-Using multiple-Art boards-Viewing Artwork.

Unit II:

[12 periods]

Drawing Basics-Drawing simple lines and shapes-Drawing Pixel aligned paths for web Workflows-Drawing with the pen, Pencil or Flare tool-Editing Paths-Adjust Path Segments-Symbolism tools and symbol sets-Symbols.

Unit III:

[12 periods]

Selecting Colors-Using and creating swatches-Color groups-Create color themes with kuler-Adjusting Colors. **Painting:** Painting with fills strokes-Live Paint groups-Brushes-Gradients-Meshes-Patterns.

Unit IV:

[12 periods]

Selecting objects-Grouping and expanding objects-Moving, aligning, and distributing objects-Rotating and reflecting objects-Layers. Reshaping objects: Transforming objects-Scaling, shearing, and distorting objects-Reshape using envelopes-Combining objects.

Unit V:

[12 periods]

Creating special effects: Appearance attributes-Working with effects-Summary of effects-Create a drop shadow-Drop shadows, glows, and feathering-Creating sketches and mosaics-Graphic styles.

Text Books :

1. Adobe Illustrator CC Classroom in a Book, 1edition, Pearson Education India.
2. Adobe Illustrator CC Classroom in a Book (2017 release) 1st Edition, Kindle Edition

Reference Book:

1. Adobe Illustrator CS6 Classroom in a Book by adobe create team

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	P02	P03	P04	P05	P06	P07	P08
C01	M	-	H	H	M	-	M	H
C02	L	-	M	L	M	-	M	H
C03	M	-	L	H	H	-	M	H
C04	M	-	H	M	L	-	-	H
C05	H	-	L	L	M	-	M	H

SEMESTER IV

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Elective- III- Software testing	4	6	0	0	Theory

Course Outcome:

C01	: Upon completion of this course, The student should understand the software test life cycle.
C02	: The relationship between testing, software quality and other verification techniques and theoretical limits of software testing
C03	: The concepts and techniques for black-box and white-box testing. The SPRAE (specification-premeditation-repeatability-accountability-economy) framework for testing practice.
C04	: Design patterns for test automation. The challenges of object-oriented testing
C05	: Test coverage measures such as statement, branch, and path coverage management procedures for software testing.

Unit - I:

[12 periods]

Testing : an Overview – what is software Quality? – Possible Definitions – New Approaches to quality – The overall course of a test – Planning – Execution – Evaluation – checking – List of Known errors – testing strategies – Exploratory Testing – Testing and improving – Automated Testing – Testing by using

Unit - II :

[12 periods]

Testing by Documenting – Regression Testing – Smoke Tests – Embedded Testing – Live Testing – Testing Methods – Black Box Testing – White Box Testing – Gray Box Tests – Requirements – Based Testing –Design Based Testing – code Based Testing – Performance Testing –Stress Testing – Robustness Testing – Long-Term Testing – Installation Testing – Security Testing

Unit – III:

[12 periods]

Random Data Testing – Spot Check Testing – Boundary value Testing – Phases of testing – The classic Test Planning Model – Integration of Phases in Rapid Application Testing – Design and code Reviews – Static code Analysis – Model Validation

Unit – IV:

[12 periods]

Risk Assessment – Setting Priorities – Various Risk Types – Risk assessment based on User Priorities – Function/risk Matrix – Testing Patterns , Patterns for Debugging – Best – Minimal, Maximal and Error Case- Equivalence Classes

Unit – V:

[12 periods]

Boundary Values – Cause and Effect Diagrams –Decision Trees – Unit Testing – Functional Testing –Structure Testing – Integration Testing – Transactions - Linking to the interface – synchronization – System Testing – Functional Completeness – Run -Time Behavior.

Text Book :

1.Galileo Computing Software Testing and Internationalization © 2003 Lemoine International and the Localization Industry Standards Association (LISA)

Reference Books:

1. Beginners Guide To Software Testing - Padmini C
2. The Art of Software Testing, Second Edition Glenford J. Myers Revised and Updated by Tom Badgett and Todd M. Thomas with Corey Sandler John Wiley & Sons, Inc.
3. Software Testing - Ron Patton Copyright © 2001 by Sams Publishing
4. Software Testing An ISTQB–ISEB Foundation Guide Second Edition
5. Introduction to Software Testing Paul Ammann George Mason University Jeff Offutt George Mason University

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	P02	P03	P04	P05	P06	P07	P08
C01	M	-	H	H	M	-	M	H
C02	L	-	M	L	M	-	M	H
C03	M	-	L	H	H	-	M	H
C04	M	-	H	M	L	-	-	H
C05	H	-	L	L	M	-	M	H

SEMESTER IV

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Elective- III- Cryptography	4	6	0	0	Theory

Course outcome:

CO1	:	Enable the students to learn fundamental concepts of computer security and cryptography and utilize these techniques in computing systems.
CO2	:	They will be able to combine these basics with their knowledge of experimental methodologies to identify, formulate, and solve engineering problems.
CO3	:	Function effectively in their discipline of practice, and will continue their education through graduate/professional studies and/or participation in professional seminars and societies.
CO4	:	Utilize their training and experience in creative and design processes toward their job functions.
CO5	:	A working knowledge of fundamentals. Graduates will have knowledge of math and science fundamentals.

UNIT I:

[12 periods]

Security trends - Attacks and services - Classical crypto systems - Different types of ciphers - LFSR sequences - Basic Number theory - Congruences - Chinese Remainder theorem - Modular exponentiation - Fermat and Euler's theorem - Legendre and Jacobi symbols - Finite fields - continued fractions.

UNIT II:

[12 periods]

Simple DES - Differential cryptanalysis - DES - Modes of operation - Triple DES - AES - RC4 - RSA - Attacks - Primality test - factoring.

UNIT III:

[12 periods]

Discrete Logarithms - Computing discrete logs - Diffie-Hellman key exchange - ElGamal Public key cryptosystems - Hash functions - Secure Hash - Birthday attacks - MD5 - Digital signatures - RSA - ElGamal - DSA.

UNIT IV:

[12 periods]

Authentication applications - Kerberos, X.509, PKI - Electronic Mail security - PGP, S/MIME - IP security - Web Security - SSL, TLS, SET.

UNIT V:

[12 periods]

System security - Intruders - Malicious software - viruses - Firewalls - Security Standards.

TEXT BOOKS:

1. Wade Trappe, Lawrence C Washington, "Introduction to Cryptography with coding theory", 2nd ed, Pearson, 2007.
2. William Stallings, "Cryptography and Network security Principles and Practices", Pearson/PHI, 4th ed, 2006.

REFERENCE BOOKS:

1. W. Mao, "Modern Cryptography - Theory and Practice", Pearson Education, Second Edition, 2007.
2. Charles P. Pfleeger, Shari Lawrence Pfleeger - Security in computing Third Edition - Prentice Hall of India, 2006

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	P02	P03	P04	P05	P06	P07	P08
CO1	M	-	H	H	M	-	M	H
CO2	L	-	M	L	M	-	M	H
CO3	M	-	L	H	H	-	M	H
CO4	M	-	H	M	L	-	-	H
CO5	H	-	L	L	M	-	M	H

SEMESTER IV

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Elective- IV- Ajax Programming	4	6	0	0	Theory

Course outcomes:

CO1	:	.Design and implement Object classes using class diagrams, constructors, encapsulation, inheritance, and polymorphism.
CO2	:	Write applications that manipulate the Document Object Model to fetch and display information using jQuery
CO3	:	Create anonymous functions and closures, and use them to store and access local data.
CO4	:	Apply the jQuery AJAX interfaces and JSON to upload data to a back-end web server, and to asynchronously retrieve and display responses
CO5	:	Test and debug JavaScript web applications.

Unit - I:

[12 periods]

AJAX and the future of web applications - Delivering functionality via the web - advantages of web applications - building websites since 1990 - HTTP and HTML - PHP and other server-side technologies - Javascript and other client side technologies - understanding AJAX - Building a Simple Application with AJAX.

Unit - II:

[12 periods]

Client-Side Techniques with Smarter JavaScript - JavaScript and the DOM - JavaScript Events and the DOM - Even more DOM - JavaScript, DOM, and CSS - Using the XMLHttpRequest Object - Working with XML Structures/

Unit - III:

[12 periods]

Server Side Techniques with PHP and MySQL - PHP and DOM - Passing parameters and Handling PHP errors - Connecting to Remote Servers and JavaScript Security- Using a Proxy Server Script- A Framework for making Repetitive Asynchronous Requests - Working with MySQL

Unit – IV: **[12 periods]**

AJAX Form Validation - Implementing Form Validation - Thread-Safe AJAX - AJAX CHAT
-AJAX Suggest and Auto Complete - Google Suggest

Unit – V: **[12 periods]**

AJAX Real-Time Charting and SVG - AJAX Grid -AJAX RSS Reader- Working with RSS - the
RSS Document Structure - Google Reader- Implementing AJAX RSS Reader.

Text Book :

1. Cristian Darie, Bogdan Brinzarea, Filip Chereches-Tosa, Mihai Bucica, "Building
Responsive Web Applications – AJAX and PHP", Packt Publishing, 2006.

Reference Book:

1. Ryan Asleson and Nathaniel T. Schutta, "Foundations of AJAX", Apress, 2006.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	P02	P03	P04	P05	P06	P07	P08
C01	M	-	H	H	M	-	M	H
C02	L	-	M	L	M	-	M	H
C03	M	-	L	H	H	-	M	H
C04	M	-	H	M	L	-	-	H
C05	H	-	L	L	M	-	M	H

SEMESTER IV

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Elective- IV- Agile testing	4	6	0	0	Theory

Course Outcomes:

CO1	:	The background to testing in an Agile project and the roles and responsibilities of a typical Agile testing team.
CO2	:	The definition of quality in an Agile project and Adapt existing testing experience and knowledge to Agile values and principles.
CO3	:	Apply relevant methods and techniques for testing in an Agile project and test automation activities.
CO4	:	Assist business stakeholders in defining understandable and testable user stories, scenarios, requirements and acceptance criteria as appropriate.
CO5	:	Work and share information with other team members using effective communication styles and channels, The various tools available to Agile test teams to facilitate the testing of the project.

Unit - I :

[12 periods]

What Is Agile Testing, Anyway? - Agile Values - What Do We Mean by “Agile Testing”? - A Little Context for Roles and Activities on an Agile Team - Customer Team - Developer Team - Interaction between Customer and Developer Teams - How Is Agile Testing Different?- Working on Traditional Teams - Working on Agile Teams - Traditional vs. Agile Testing - Whole-Team Approach

Unit - II :

[12 periods]

What’s an Agile Tester? - The Agile Testing Mind-Set - Applying Agile Principles and Values - Provide Continuous Feedback - Deliver Value to the Customer - Enable Face-to-Face Communication - Have Courage - Keep It Simple - Practice Continuous Improvement – Respond to Change - Self-Organize - Focus on People

Unit - III:

[12 periods]

Organizational Culture - Quality Philosophy - Sustainable Pace - Customer Relationships - Organization Size - Empower Your Team - Barriers to Successful Agile Adoption by

Test/QA Teams - Loss of Identity - Additional Roles - Lack of Training - Not Understanding Agile Concepts - Past Experience/Attitude - Cultural Differences among Roles

Unit – IV:

[12 periods]

Introducing Change - Talk about Fears - Give Team Ownership - Celebrate Success - Management Expectations - Cultural Changes for Managers - Speaking the Manager’s Language - Change Doesn’t Come Easy - Be Patient - Let Them Feel Pain - Build Your Credibility - Work On Your Own Professional Development - Beware the Quality Police Mentality - Vote with Your Feet

Unit – V:

[12 periods]

Team Logistics - Team Structure - Independent QA Teams - Integration of Testers into an Agile Project - Agile Project Teams - Physical Logistics – Resources - Tester-Developer Ratio - Hiring an Agile Tester - Building a Team - Self-Organizing Team - Involving Other Teams - Every Team Member Has Equal Value - Performance and Rewards - What Can You Do?

Text Book :

1. AGILE TESTING , A PRACTICAL GUIDE FOR TESTERS AND AGILE TEAMS Lisa Crispin Janet Gregory.

Reference Books:

1. Agile testing and testing in agile software development, Matti Vuori, www.mattivuori.net
2. Agile Software Development Quality Assurance Ioannis G. Stamelos Aristotle University of Thessaloniki, Greece Panagiotis Sfetsos Alexander Technological Educational Institution of Thessaloniki, Greece
3. Agile Development of Diagnostic Knowledge Systems.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	P02	P03	P04	P05	P06	P07	P08
C01	M	-	H	H	M	-	M	H
C02	L	-	M	L	M	-	M	H
C03	M	-	L	H	H	-	M	H
C04	M	-	H	M	L	-	-	H
C05	H	-	L	L	M	-	M	H

SEMESTER IV

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Elective- IV- Mobile Communications	4	6	0	0	Theory

Course Outcomes:

C01	:	Understanding the basic principles of mobile communication systems.
C02	:	An analysis of mobile communications with the interpretation of the call prints.
C03	:	The basic principles of the modern mobile and wireless communication systems.
C04	:	Understanding the radio interference and mobile communications systems.
C05	:	Understanding the operation of mobile communications systems and their generation divisions.

UNIT -I

[12 periods]

Mobile Communication Systems :Mobile communication systems: Two way mobile radio – cordless telephone – Cellular radio – Analog and Digital systems standards – Personal Communication systems (PCS) and Mobile personal Computers MPC – One way mobile.

UNIT -II

[12 periods]

Radio propagation : Radio Propagation Concepts: Fundamentals of radio propagation and system concepts – causes for prorogation path loss – fading – Doppler spread – time delay path loss – foliage loss – path loss measurement from point to point prediction model.

UNIT -III

[12 periods]

Frequency Management. : Frequency management – Frequency bands for mobile communication – frequency reuse techniques – FDMA. TDMA and CDMA techniques.- Comparison between GSM and CDMA

UNIT -IV

[12 periods]

Radio interference: Mobile radio interference: Noise limited and interference limited environment – co-channel and adjacent channel environment – inter-modulation – Near – end and far-end ratio.

UNIT -V

[12 periods]

Design Parameters: Design parameters: Design characteristic at base station and mobile unit- Mobile communication satellites – Mobile communication satellites at Geo-synchronous orbits – IRIDIUM satellites ODYSSEY satellites.

Reference Books:

1. William C.Y.Lee: Mobile Cellular Telecommunications Analog and Digital Systems, 2nd Edition, McGrawHill, 1995.
2. Kamilo Fether: Wireless digital communication modulation and spread spectrum applications Prentice Hall, 1995.
3. Tom Logsdon: Mobile communication satellites theory and applications – McGraw Hill, 1995.
4. William C.Y.Lee: Mobile Communication Design Fundamentals – McGraw Hill, 1993.
5. To Generate ASK and demodulate it. 6. To generate FSK and develop it.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	P02	P03	P04	P05	P06	P07	P08
C01	M	-	H	H	M	-	M	H
C02	L	-	M	L	M	-	M	H
C03	M	-	L	H	H	-	M	H
C04	M	-	H	M	L	-	-	H
C05	H	-	L	L	M	-	M	H

SEMESTER IV

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core Practical – VII – Agile Lab	4	0	0	6	Practical

List of Programs:

1. Using Selenium IDE, Write a test suite containing minimum 4 test cases.
2. Conduct a test suite for nay two web sites.
3. Install Selenium server and demonstrate it using a script in Java/PHP.
4. Write and test a program to login a specific web page.
5. Write and test a program to update 10 student records into table into Excel file.
6. Write and test a program to select the number of students who have scored more than 60 in any one subject (or all subjects).
7. Write and test a program to provide total number of objects present / available on the page.
8. Write and test a program to get the number of list items in a list / combo box.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	P02	P03	P04	P05	P06	P07	P08
C01	M	-	H	H	M	-	M	H
C02	L	-	M	L	M	-	M	H
C03	M	-	L	H	H	-	M	H
C04	M	-	H	M	L	-	-	H
C05	H	-	L	L	M	-	M	H

SEMESTER IV

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core Project	4	-	-	5	Project

GUIDELINES FOR PREPARING THE MINI PROJECT/PROJECT REPORT:

Core Main Project

- The project report should be submitted in **A4** size. Number of copies to be **submitted** : Three (One for Library, One for department, One for Internal Guide). The certificate should consist of names and roll numbers of all batch members for the above three copies. One copy for each batch member. The certificate should consist of batch member name and his/her roll number.

Paper, Typing, Format:

- Bond paper (A4 size) should be used for the preparation of the project report. Typing should be done on one side of the paper with character font in **size 12 of Times New Roman**.
- The layout should provide a margin of 1.50 Inches on the left, 1.00 Inches on the top, bottom and right.
- Fresh paragraph should commence after **five spaces. Double-spacing or One and half line** spacing shall be provided through the report.
- The page numbers should be indicated at the top-middle or bottom-middle of the each page.
- Should not underline the heading/subheadings and should not put colons (:) in headings or subheadings.

Appendices:

- Important programs, derivations, data and any other useful material may be shown in the appendices with proper numbering.
- The appendices should be numbered in capital Roman numbers or capital letters from first chapter to the last chapter in ascending order.
- Using same ascending order numbers, the appendices should be shown with details after the last chapter.
- All the appendices should be referred in the main text.

Bibliography or References:

- References should be numbered from 1st chapter to the last chapter in ascending order and should be shown in square brackets.