III YEAR VI SEMESTER
(Cluster 1) Paper-VIII : Elective –A-2

BIG DATA TECHNOLOGY
Question Bank

1. What is distributed File System? Explain the significance of four V's in Big Data.
2. Explain Briefly about Big Data Analysis.
3. Explain Briefly about Big Data Application.
4. What is Big Data? Explain the characteristics and Proper APACHE Hadoop.
5. Explain how do we move data in and out of Hadoop.
6. Write about Map reduce and Data Serialization.
7. Explain briefly about Hadoop Architecture.
8. Explain Hadoop shell commands.
9. Write about HDFS administration, Monitoring and maintenance.
10. Explain Hive Architecture and Installation.
11. Compare Traditional Data Base with Hive.
12. Explain sorting and Aggregation in Hive & L.
13. Explain the concepts of HBase. Write its uses.
15. How a Zookeeper is used in monitoring a clusters.
III YEAR VI SEMESTER
(Cluster 1) Paper-VIII: Elective –A-1
Big Data Technology

Model Question Paper

Answer any Five Question.  5 X 15 = 75

1. What is distributed File System? Explain the significance of four V’s in Big Data.

2. Explain Briefly about Big Data Analysis.

3. What is Big Data? Explain the characteristics and Proper APACHE Hadoop.

4. Explain how do we move data in and out of Hadoop.

5. Explain briefly about Hadoop Architecture.

6. Explain Hadoop shell commands.

7. Explain Hive Architecture and Installation.

8. Compare Traditional Data Base with Hive.

9. Explain the concepts of HBase. Write its uses.

III YEAR VI SEMESTER
(Cluster 1) Paper-VIII: Elective – A-1
Foundations of Data Science

Question Bank

1. What is Data Science? What are its roles and stages in Data Science.

2. What are the different properties and characteristics of Relational Data Bases.

3. Explain the properties of NOSQL.

4. What is Machine Learning? What is its role in Data Science.


7. Explain the Characteristics of 'R' Language? How do we read Data into 'R'.

8. What are Data frames? Write its Significance in 'R'.

9. Explain the Construction of Arrays and Matrices in 'R' Language.

10. Explain probability Distribution and Discrete Poisson distribution.

11. Explain in detail about Binomial Distribution.

12. What is Normal Distribution? Explain the representation of Normal Distribution in 'R' Language with example.

13. Explain about Plot( ) function in 'R' Language.

14. Explain about Graph Exploration in 'R' Language.

15. What are Matrix Plots. Write its Significance.
Model Question Paper

Answer any **Five** Question. \[ 5 \times 15 = 75 \]

1. What is Data Science? What are its roles and stages in Data Science.

2. What are the different properties and characteristics of Relational Data Bases.

3. What is Machine Learning? What is its role in Data Science


5. Explain the Characteristics of ‘R’ Language? How do we read Data into ‘R’.

6. What are Data frames? Write its Significance in ‘R’.

7. Explain probability Distribution and Discrete Poisson distribution.

8. Explain in detail about Binomial Distribution.

9. Explain about Plot() function in ‘R’ Language.

10. Explain about Graph Exploration in ‘R’ Language.
WEB TECHNOLOGIES
MODEL PAPER

Answer any five of the following 5 x 15 = 75M

1. Explain the structure of HTML.
2. Explain briefly about forms in HTML.
3. Explain various properties and values in styles.
4. Explain cascading style sheet in HTML.
5. Explain various string manipulations in HTML.
6. Explain exception handling in detail.
7. Explain briefly about Roll-Over buttons.
8. Explain data validation concept in detail.
9. Explain DTD in XML.
10. Explain various web services.
### Andhra Pradesh State Council of Higher Education

**B.Sc. Computer Science/Information Technology (IT) Syllabus Under CBCS**

w.e.f.2015-2016 (Modified in April 2016)

#### Structure of Computer Science/Information Technology (IT) Syllabus

<table>
<thead>
<tr>
<th>Semester</th>
<th>Paper</th>
<th>Subject</th>
<th>Hrs.</th>
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Computer Fundamentals & Photoshop

Course Outcome
To explore basic knowledge on computers and Photoshop’s beauty from the practical to the painterly artistic and to understand how Photoshop will help you create your own successful images

UNIT-I:
Introduction to computers, characteristics and limitations of computer, Block diagram of computer, types of computers, uses of computers, computer generations. Number systems: binary, hexa and octal numbering system

UNIT-II:
Input and output devices: Keyboard and mouse, inputting data in other ways, Types of Software: system software, Application software, commercial, open source, domain and free ware software, Memories: primary, secondary and cache memory. Windows basics: desktop, start menu, icons.

Unit –III
Introduction to Adobe Photoshop, Getting started with Photoshop, creating and saving a document in photoshop, page layout and back ground, photoshop program window-title bar, menu bar, option bar, image window, image title bar, status bar, ruler, palettes, tool box, screen modes, saving files, reverting files, closing files.

Unit –IV
Images: working with images, image size and resolution, image editing, colour modes and adjustments, Zooming & Panning an Image, rulers, Guides & Grids- Cropping & Straightening an Image, image backgrounds, making selections.

Working with tool box: working with pen tool, save and load selection-working with erasers-working with text and brushes-Colour manipulations: colour modes- Levels – Curves - Seeing Colour accurately - Patch tool – Cropping-Reading your palettes - Dust and scratches- Advanced Retouching- smoothing skin

Unit-V
Layers: Working with layers- layer styles- opacity-adjustment layers
Filters: The filter menu, Working with filters- Editing your photo shoot, presentation-how to create adds, artistic filter, blur filter, brush store filter, distort filters, noise filters, pixelate filters, light effects, difference clouds, sharpen filters, printing.
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Structure of Computer Science/Information Technology (IT) Syllabus

Reference Books:
1. Fundamentals of Computers by Reema Thareja from Oxford University Press
2. Adobe Photoshop Class Room in a Book by Adobe Creative Team.
3. Photoshop: Beginner's Guide for Photoshop - Digital Photography, Photo Editing, Color Grading & Graphic...19 February 2016 by David Maxwell

Student Activity:
1. Design a poster for technical paper presentation.
2. Create a digital scrap book.

Photo Shop Lab

1. Create your Visiting card
2. Create Cover page for any text book
3. Create a Paper ads for advertising of any commercial agency
4. Design a Passport photo
5. Create a Pamphlet for any program to be conducted by an organization
6. Create Broacher for you college
7. Create Titles for any forthcoming film
8. Custom shapes creation
9. Create a Web template for your college
10. Convert colour photo to black and white photo
11. Enhance and reduce the given Image size
12. Background changes
13. Design Box package cover
14. Design Texture and patterns
15. Filter effects & Eraser effects
Paper-II : PROGRAMMING IN C

Course Objectives
1. Learn how to solve common types of computing problems.
2. Learn data types and control structures of C
3. Learn to map problems to programming features of C.
4. Learn to write good portable C programs.

Course Outcomes
Upon successful completion of the course, a student will be able to:
1. Appreciate and understand the working of a digital computer
2. Analyze a given problem and develop an algorithm to solve the problem
3. Improve upon a solution to a problem
4. Use the 'C' language constructs in the right way
5. Design, develop and test programs written in 'C'

UNIT I

UNIT II


UNIT III

UNIT IV


UNIT V

Files: Introduction to Files – Using Files in C – Reading Data from Files – Writing Data from Files – Detecting the End-of-file – Error Handling during File Operations – Accepting Command Line Arguments – Functions for Selecting a Record Randomly - Remove() – Renaming a File – Creating a Temporary File

REFERENCE BOOKS

1. Introduction to C programming by REEMA THAREJA from OXFORD UNIVERSITY PRESS

Student Activity:
1. Write a program for preparing the attendance particulars of students of your college at the end of semester according to following guidelines
   a. Above 75% promoted
   b. Above 65% condoned
   c. Below 65% detained
2. Write a program for creating timetable or your class taking work load of faculty into consideration.
PROGRAMMING IN C LAB

1. Find out the given number is perfect number or not using c program.
2. Write a C program to check whether the given number is Armstrong or not.
3. Write a C program to find the sum of individual digits of a positive integer.
4. 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 print the Fibonacci series.
5. Write a C program to generate the first n terms of the Fibonacci sequence.
6. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
7. Write a C program to find both the largest and smallest number in a list of integers.
8. Write a C program that uses functions to perform the following:
   a. Addition of Two Matrices
   b. Multiplication of Two Matrices
9. Write a program to perform various string operations
10. Write C program that implements searching of given item in a given list
11. Write a C program to sort a given list of integers in ascending order
Course Objectives
As the business environment becomes more sophisticated, the software development (software engineering is about managing complexity) is becoming increasingly complex. As of the best programming paradigm which helps to eliminate complexity of large projects, Object Oriented Programming (OOP) has become the predominant technique for writing software in the past decade. Many other important software development techniques are based upon the fundamental ideas captured by object-oriented programming.

Course Outcomes
At the end of this course student will:
1. Understand the concept and underlying principles of Object-Oriented Programming
2. Understand how object-oriented concepts are incorporated into the Java programming language
3. Develop problem-solving and programming skills using OOP concept
4. Understand the benefits of a well structured program
5. Develop the ability to solve real-world problems through software development in high-level programming language like Java
6. Develop efficient Java applets and applications using OOP concept
7. Become familiar with the fundamentals and acquire programming skills in the Java language.

UNIT-I
FUNDAMENTALS OF OBJECT – ORIENTED PROGRAMMING : Introduction, Object Oriented paradigm, Basic Concepts of OOP, Benefits of OOP, Applications of OOP, Java features: OVERVIEW OF JAVA LANGUAGE: Introduction, Simple Java program structure, Java tokens, Java Statements, Implementing a Java Program, Java Virtual Machine, Command line arguments. CONSTANTS, VARIABLES & DATA TYPES: Introduction, Constants, Variables, Data Types, Declaration of Variables, Giving Value to Variables, Scope of variables, Symbolic Constants, Type casting, Getting Value of Variables, Standard Default values; OPERATORS & EXPRESSIONS.

UNIT-II
DECISION MAKING & BRANCHING: Introduction, Decision making with if statement, Simple if statement, if. Else statement, Nesting of if. else statements, the else if ladder, the switch statement, the conditional operator. LOOPING: Introduction, The While statement, the do-while statement, the for statement, Jumps in loops.
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Structure of Computer Science/Information Technology (IT) Syllabus

CLASSES, OBJECTS & METHODS: Introduction, Defining a class, Adding variables, Adding methods, Creating objects, Accessing class members, Constructors, Method overloading, Static members, Nesting of methods;

UNIT-III

INHERITANCE: Extending a class, Overloading methods, Final variables and methods, Final classes, Abstract methods and classes;

ARRAYS, STRINGS AND VECTORS: Arrays, One-dimensional arrays, Creating an array, Two – dimensional arrays, Strings, Vectors, Wrapper classes;

INTERFACES: MULTIPLE INHERITANCE: Introduction, Defining interfaces, Extending interfaces, Implementing interfaces, Assessing interface variables;

UNIT-IV

MULTITHREADED PROGRAMMING: Introduction, Creating Threads, Extending the Threads, Stopping and Blocking a Thread, Lifecycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the ‘Runnable’ Interface.

MANAGING ERRORS AND EXCEPTIONS: Types of errors : Compile-time errors, Run-time errors, Exceptions, Exception handling, Multiple Catch Statements, Using finally statement,

UNIT-V

APPLET PROGRAMMING: local and remote applets, Applets and Applications, Building Applet code, Applet Life cycle: Initialization state, Running state, Idle or stopped state, Dead state, Display state.

PACKAGES: Introduction, Java API Packages, Using System Packages, Naming conventions, Creating Packages, Accessing a Package, using a Package.

MANAGING INPUT/OUTPUT FILES IN JAVA: Introduction, Concept of Streams, Stream classes, Byte Stream Classes, Input Stream Classes, Output Stream Classes, Character Stream classes: Reader stream classes, Writer Stream classes, Using Streams, Reading and writing files.

Reference Books:

1. E.Balaguruswamy, Programming with JAVA, A primer, 3e, TATA McGraw-Hill Company.
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Structure of Computer Science/Information Technology (IT) Syllabus
4. Java Programming: From Problem Analysis to Program Design- D.S Mallik

Student Activity:
1. Create a front end using JAVA for the student database created
2. Learn the difference between ODBC and JDBC

OBJECT ORIENTED PROGRAMMING USING JAVA LAB

1. Write a program to perform various String Operations
2. Write a program on class and object in java
3. Write a program to illustrate Function Overloading & Function Overriding methods in Java
4. Write a program to illustrate the implementation of abstract class
5. Write a program to implement Exception handling
6. Write a program to create packages in Java
7. Write a program on interface in java
8. Write a program to Create Multiple Threads in Java
9. Write a program to Write Applets to draw the various polygons
10. Write a program which illustrates the implementation of multiple Inheritance using interfaces in Java
11. Write a program to assign priorities to threads in java
Structure of Computer Science/Information Technology (IT) Syllabus

II YEAR IV SEMESTER

Paper-IV : DATA STRUCTURES

Course Objectives

To introduce the fundamental concept of data structures and to emphasize the importance of data structures in developing and implementing efficient algorithms.

Course Outcomes

1. Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms
2. Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs.
3. Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs
4. Demonstrate different methods for traversing trees
5. Compare alternative implementations of data structures with respect to performance
6. Compare and contrast the benefits of dynamic and static data structures implementations
7. Describe the concept of recursion, give examples of its use, describe how it can be implemented using a stack.
8. Discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing.

UNIT I

Concept of Abstract Data Types (ADTs)- Data Types, Data Structures, Storage Structures, and File Structures, Primitive and Non-primitive Data Structures, Linear and Non-linear Data Structures.

Linear Lists – ADT, Array and Linked representations, Pointers.
Arrays – ADT, Mappings, Representations, Sparse Matrices, Sets – ADT, Operations
Linked Lists: Single Linked List, Double Linked List, Circular Linked List , applications

UNIT II

Stacks: Definition, ADT, Array and Linked representations, Implementations and Applications
Queues: Definition, ADT, Array and Linked representations, Circular Queues, Dequeues, Priority Queues, Implementations and Applications.

UNIT III

UNIT IV
Graphs – Graph and its Representation, Graph Traversals, Connected Components, Basic Searching Techniques, Minimal Spanning Trees

UNIT V
Sorting and Searching: Selection, Insertion, Bubble, Merge, Quick, Heap sort, Sequential and Binary Searching.

REFERENCE BOOKS

Student activity:
1. Create a visible stack using C-graphics
2. Create a visible Queue using C-graphics
DATA STRUCTURES USING JAVA LAB

1. Write a Program to implement the Linked List operations
2. Write a Program to implement the Stack operations using an array.
3. Write Programs to implement the Queue operations using an array.
4. Write Programs to implement the Stack operations using a singly linked list.
5. Write Programs to implement the Queue operations using a singly linked list.
6. Write a program for arithmetic expression evaluation
7. Write a program to implement Double Ended Queue using a doubly linked list.
8. Write a program to search an item in a given list using Linear Search and Binary Search
9. Write a program for Quick Sort
10. Write a program for Merge Sort
11. Write a program on Binary Search Tree operations (insertion, deletion and traversals)
12. Write a program for Graph traversals
Course Objective:

Design & develop database for large volumes & varieties of data with optimized data processing techniques.

Course Outcomes

On completing the subject, students will be able to:
1. Design and model of data in database.
2. Store, Retrieve data in database.

UNIT I


UNIT II

Entity-Relationship Model: Introduction, the building blocks of an entity relationship diagram, classification of entity sets, attribute classification, relationship degree, relationship classification, reducing ER diagram to tables, enhanced entity-relationship model (EER model), generalization and specialization, IS A relationship and attribute inheritance, multiple inheritance, constraints on specialization and generalization, aggregation and composition, entity clusters, connection types, advantages of ER modelling.

UNIT III

Relational Model: Introduction, CODD Rules, relational data model, concept of key, relational integrity, relational algebra, relational algebra operations, advantages of relational algebra, limitations of relational algebra, relational calculus, tuple relational calculus, domain relational Calculus (DRC). QBE

UNIT IV

Structured Query Language: Introduction, History of SQL Standard, Commands in SQL, Data Types in SQL, Data Definition Language, Selection Operation, Projection Operation, Aggregate functions, Data Manipulation Language, Table Modification Commands, Table Truncation, Imposition of Constraints, Join Operation, Set Operation, View, Sub Query, Embedded SQL,
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**B.Sc. Computer Science/Information Technology (IT) Syllabus Under CBCS**  
w.e.f.2015-2016 (Modified in April 2016)  

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**Structure of Computer Science/Information Technology (IT) Syllabus**

**UNIT V**

**PL/SQL:** Introduction, Shortcoming in SQL, Structure of PL/SQL, PL/SQL Language Elements, Data Types, Operators Precedence, Control Structure, Steps to Create a PL/SQL Program, Iterative Control, Cursors, Steps to Create a Cursors, Procedure, Function, Packages, Exceptions Handling, Database Triggers, Types of Triggers.

**Reference Books**

4. “An Introduction to Database Systems” by Bipin C Desai  
5. “Principles of Database Systems” by J. D. Ullman  

**Student Activity:**

1. Create your college database for placement purpose.  
2. Create faculty database of your college with their academic performance scores
III YEAR V SEMESTER

DATABASE MANAGEMENT SYSTEMS LAB

1. Draw ER diagrams for train services in a railway station
2. Draw ER diagram for hospital administration
3. Creation of college database and establish relationships between tables
4. Write a view to extract details from two or more tables
5. Write a stored procedure to process students results
6. Write a program to demonstrate a function
7. Write a program to demonstrate blocks, cursors & database triggers.
8. Write a program to demonstrate Joins
9. Write a program d
10. Write a program to demonstrate of Aggregate functions
11. Creation of Reports based on different queries
12. Usage of file locking table locking, facilities in applications.
Course Objectives

The Objective of the course is to assist the student in understanding the basic theory of software engineering, and to apply these basic theoretical principles to a group software development project.

Course outcomes

1. Ability to gather and specify requirements of the software projects.
2. Ability to analyze software requirements with existing tools
3. Able to differentiate different testing methodologies
4. Able to understand and apply the basic project management practices in real life projects
5. Ability to work in a team as well as independently on software projects

UNIT I


UNIT II


UNIT III

SOFTWARE DESIGN: Software design - Abstraction - Modularity - Software Architecture - Effective modular design - Cohesion and Coupling - Architectural design and Procedural design - Data flow oriented design.

UNIT IV

USER INTERFACE DESIGN AND REAL TIME SYSTEMS: User interface design - Human factors - Human computer interaction - Human - Computer Interface design - Interface design - Interface standards.

UNIT V

SOFTWARE QUALITY AND TESTING: Software Quality Assurance - Quality metrics - Software Reliability - Software testing - Path testing – Control Structures testing - Black Box testing - Integration, Validation and system testing - Reverse Engineering and Re-engineering.

CASE tools –projects management, tools - analysis and design tools – programming tools - integration and testing tool - Case studies.
REFERENCE BOOKS:
2. Software Engineering Principles and Practice by Deepak Jain Oxford University Press

Student Activity:
1. Visit any financial organization nearby and prepare requirement analysis report
2. Visit any industrial organization and prepare risk chart.
Follow SDLC process for real time applications and develop real time application project

The objective of the project is to motivate them to work in emerging/latest technologies, help the students to develop ability, to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and research laboratories.

The project is of 2 hours/week for one (semester V) semester duration and a student is expected to do planning, analyzing, designing, coding, and implementing the project. The initiation of project should be with the project proposal. The synopsis approval will be given by the project guides.

The project proposal should include the following:

- Title
- Objectives
- Input and output
- Details of modules and process logic
- Limitations of the project
- Tools/platforms, Languages to be used
- Scope of future application

The Project work should be either an individual one or a group of not more than three members and submit a project report at the end of the semester. The students shall defend their dissertation in front of experts during viva-voce examinations.
III YEAR VI SEMESTER

Paper-VII: Elective-A

Operating Systems

Course Objectives

1. To understand the services provided by and the design of an operating system.
2. To understand the structure and organization of the file system.
3. To understand what a process is and how processes are synchronized and scheduled.
4. To understand different approaches to memory management.
5. Students should be able to use system calls for managing processes, memory and the file system.

Course Outcomes

1. Analyze the concepts of processes in operating system and illustration of the scheduling of processor for a given problem instance.
2. Identify the dead lock situation and provide appropriate solution so that protection and security of the operating system is also maintained.
3. Analyze memory management techniques, concepts of virtual memory and disk scheduling.
4. Understand the implementation of file systems and directories along with the interfacing of IO devices with the operating system.

UNIT - I


UNIT - II


UNIT - III


UNIT - IV


UNIT - V

Deadlocks - System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

REFERENCES BOOKS:


Student Activity:
1. Load any new operating system into your computer.
2. Partition the memory in your system
3. Create a semaphore for process synchronization
Objectives:

- To use linux operating system for study of operating system concepts.
- To write the code to implement and modify various concepts in operating systems.

Outcomes:

- The course objectives ensure the development of students applied skills in operating systems related areas.
- Students will gain knowledge in writing software routines modules or implementing various concepts of operating system.

List of Experiments:

1. Usage of following commands
   Ls,pwd, tty, cat, who, who am I, rm, mkdir, rmdir, touch, cd.
2. Usage of following commands
   Cal, cat(append), cat(concatenate), mv, cp, man, date.
3. Usage of following commands
   Chmod, grep, tput(clear, highlight), bc.
4. Write a shell script to check if the number entered at the command line is Prime or not.
5. Write a shell script to modify “cal” command to display calendars of the specified months.
6. Write a shell script to modify “cal” command to display calendars of the specified range of months.
7. Write a shell script to accept a login name. If not a valid login name display message “entered login name is invalid”
8. Write a shell script to display date in the mm/dd/yy format.
9. To implement the FCFS Algorithm.
10. To implement the shortest job First Algorithm.
11. To implement the priority algorithm.
12. To implement the round robin Algorithm.
13. To implement the FIFO page replacement algorithm.
14. To implement the LRU page replacement Algorithm.
15. To implement the Resource request Algorithm.
16. To implement the First-Fit, Best-Fit, Worst-Fit Algorithm.
17. To implement the sequential file organization.
18. To implement the Random file organization

19. Simulate Page Replacement Algorithms FIFO
20. Simulate Page Replacement Algorithms LRU
21. Simulate Page Replacement Algorithms OPTIMAL
22. Simulate Algorithm For Deadlock Prevention
Course Objectives

1. To provide an introduction to the fundamental concepts on data communication and the design of computer networks.
2. To get familiarized with the basic protocols of computer networks.

Course Outcomes
After this course, the student will be able to
1. Identify the different components in a Communication System and their respective roles.
2. Describe the technical issues related to the local Area Networks
3. Identify the common technologies available in establishing LAN infrastructure.

UNIT – I


The Physical Layer: The Theoretical Basis for Data Communication, Guided Transmission Media, Wireless transmission, the public switched telephone network

UNIT – II

The Data Link Layer: Data Link Layer Design Issues, Error Detection and Correction, Sliding Window Protocols.

The Medium Access Control Sub-layer: The channel allocation problem, Multiple Access Protocols, Ethernet, Data Link Layer Switching.

UNIT – III

The Network Layer: Network Layer Design Issues, Routing Algorithms, Congestion control algorithms, Quality of Service.

Internet Working, The Network Layer in the Internet
UNIT – IV:


UNIT – V:


Reference Books:

2. Bhushan Trivedi, Computer Networks, Oxford University Press

Student Activity:

1. Study the functioning of network devices available in your organization.
2. Prepare a pictorial chart of LAN connections in your organization.
OBJECTIVES:
1. Analyze the different layers in networks.
2. Define, use, and differentiate such concepts as OSI-ISO, TCP/IP.
3. How to send bits from physical layer to data link layer
4. Sending frames from data link layer to Network layer
5. They can understand how the data transferred from source to destination
6. They can come to know that how the routing algorithms worked out in network layer

List of Experiments:
1. Analyze the different layers in networks.
2. Define, use, and differentiate such concepts as OSI-ISO, TCP/IP.

List of Experiments:
1. Write a program to implement data link layer framing method bit stuffing.
2. Write a program to implement data link layer framing method character stuffing.
3. Write a program to implement data link layer framing method character count.
4. Write a program to implement Cyclic Redundancy Check (CRC 12, CRC 16 and CRC CCIR) on a data set of characters.
5. Write a program to implement Dijkstra’s algorithm to compute the shortest path through a graph.
6. Write a program to implement subnet graph with weights indicating delay between
7. Write a program to implement subnet
Course Objective
To provide knowledge on web architecture, web services, client side and server side scripting technologies to focus on the development of web-based information systems and web services.
To provide skills to design interactive and dynamic web sites.

Course Outcome
1. To understand the web architecture and web services.
2. To practice latest web technologies and tools by conducting experiments.
3. To design interactive web pages using HTML and Style sheets.
4. To study the framework and building blocks of .NET Integrated Development Environment.
5. To provide solutions by identifying and formulating IT related problems.

UNIT – I
HTML: Basic HTML, Document body, Text, Hyper links, adding more formatting, Lists, Tables using images. More HTML: Multimedia objects, Frames, Forms towards interactive, HTML document heading detail

UNIT – II
Cascading Style Sheets: Introduction, using Styles, simple examples, your own styles, properties and values in styles, style sheet, formatting blocks of information, layers.

UNIT – III
Introduction to JavaScript: What is DHTML, JavaScript, basics, variables, string manipulations, mathematical functions, statements, operators, arrays, functions. Objects in JavaScript: Data and objects in JavaScript, regular expressions, exception handling

UNIT – IV
DHTML with JavaScript: Data validation, opening a new window, messages and confirmations, the status bar, different frames, rollover buttons, moving images

UNIT – V
XML: defining data for web applications, basic XML, document type definition, presenting XML, document object model. Web Services
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References:
2. Uttam Kumar Roy, Web Technologies from Oxford University Press

Student Activities:
1. Prepare a web site for your college
2. Prepare your personal website
1. Write a HTML program illustrating text formatting.

2. Illustrate font variations in your HTML code.

3. Prepare a sample code to illustrate links between different sections of the page.

4. Create a simple HTML program to illustrate three types of lists.

5. Embed a calendar object in your web page.

6. Create an applet that accepts two numbers and perform all the arithmetic operations on them.

7. Create nested table to store your curriculum.

8. Create a form that accepts the information from the subscriber of a mailing system.

9. Design the page as follows:
11. Using “table” tag, align the images as follows:

![Image of Tweeties](image1.png)

Buy "Tweeties" On-line

12. Divide the web page as follows:

![Divided Web Page](image2.png)

13. Design the page as follows:

![Design of Page](image3.png)

This is the picture of my 1972 corvette. Working on this corvette is my hobby. The car is not a show car but is a direct. This is the car is in its original condition and used exclusively for short drives for a hobby car club to drive. And boy is it fun to drive...

More information can be found at [http://www.votro.com/USA](http://www.votro.com/USA)
14. Illustrate the horizontal rulers in your page.

15. Create a help file as follows:

16. Create a form using form tags (assume the form and fields).
17. Create a webpage containing your biodata (assume the form and fields).
18. Write a html program including style sheets.
20. Write a html program to layers of information in web page.
21. Create a static webpage.
Course Objectives
Modern scientific, engineering, and business applications are increasingly dependent on data, existing traditional data analysis technologies were not designed for the complexity of the modern world. Data Science has emerged as a new, exciting, and fast-paced discipline that explores novel statistical, algorithmic, and implementation challenges that emerge in processing, storing, and extracting knowledge from Big Data.

Course Outcomes
1. Able to apply fundamental algorithmic ideas to process data.
2. Learn to apply hypotheses and data into actionable predictions.
3. Document and transfer the results and effectively communicate the findings using visualization techniques.

UNIT I

INTRODUCTION TO DATA SCIENCE : Data science process – roles, stages in data science project – working with data from files – working with relational databases – exploring data – managing data – cleaning and sampling for modelling and validation – introduction to NoSQL.

UNIT II


UNIT III

INTRODUCTION TO R Language: Reading and getting data into R – ordered and unordered factors – arrays and matrices – lists and data frames – reading data from files.
UNIT IV

PROBABILITY DISTRIBUTIONS in R - Binomial, Poisson, Normal distributions. - Manipulating objects - data distribution.

UNIT V


Reference Books


Student Activity:

1. Collect data from any real time system and create clusters using any clustering algorithm
2. Read the student exam data in R perform statistical analysis on data and print results.
Objectives:
- R is a well-developed, simple and effective programming language which includes conditionals, loops, user defined recursive functions and input and output facilities.
- R has an effective data handling and storage facility,
- R provides a suite of operators for calculations on arrays, lists, vectors and matrices.
- R provides a large, coherent and integrated collection of tools for data analysis.

Outcomes:
1) At end student will learn to handle the data through R.
2) Student will familiar with loading and unloading of packages.

I. Installing R and R studio

II. Basic Operations in r

1. Arthematic Operations
2. Comments and spacing
3. Logical Operators - <, <=, >, >=, = , !=, &&, 1

III. Getting data into R, Basic data manipulation
2. Vectors, Materials, operation on vectors and matrices.

IV. Basic Plotting
2. Quantitative data
3. Frequency plots
4. Box plots
5. Scatter plot
6. Categorial data
7. Bar charts
8. Pie charts

V. Loops and functions

1. if, if else, while, for break, next, repeat.
2. Basic functions- Print(), exp( ), Log( ), sqrt( ), abs( ), sin( ), Cos( ), tan( ), factorial( ), rand ().
III YEAR VI SEMESTER
(Cluster 1) Paper-VIII : Elective – A-2

BIG DATA TECHNOLOGY

Course Objective
The Objective of this course is to provide practical foundation level training that enables immediate and effective participation in big data projects. The course provides grounding in basic and advanced methods to big data technology and tools, including MapReduce and Hadoop and its ecosystem.

Course Outcome
1. Learn tips and tricks for Big Data use cases and solutions.
2. Learn to build and maintain reliable, scalable, distributed systems with Apache Hadoop.
3. Able to apply Hadoop ecosystem components.

UNIT I

INTRODUCTION TO BIG DATA: Introduction – distributed file system – Big Data and its importance, Four V’s in bigdata, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce.

UNIT II

INTRODUCTION HADOOP: Big Data – Apache Hadoop & Hadoop EcoSystem – Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce - Data Serialization.

UNIT- III

HADOOP ARCHITECTURE: Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands , Anatomy of File Write and Read., NameNode, Secondary NameNode, and DataNode, Hadoop MapReduce paradigm, Map and Reduce tasks, Job, Tasktrackers - Cluster Setup – SSH & Hadoop Configuration – HDFS Administering – Monitoring & Maintenance.
UNIT IV

HIVE AND HIVEQL, HBASE: Hive Architecture and Installation, Comparison with Traditional Database, HiveQL - Querying Data - Sorting And Aggregating, Map Reduce Scripts, Joins & Subqueries.

UNIT V

HBase concepts - Advanced Usage, Schema Design, Advance Indexing - Zookeeper - how it helps in monitoring a cluster, HBase uses Zookeeper and how to Build Applications with Zookeeper.

Reference Books

2. Big Data Black Book( Covers Hadoop 2, Map Reduce, Hive, Yarn, Pig & Data Visualization)- Dream Tech Publications

Student Activity:

1. Collect real time data and justify how it has become Big Data
2. Reduce the dimensionality of a big data using your own map reducer
III YEAR VI SEMESTER
(Cluster 1) Paper-VIII : Elective –A-2

BIG DATA TECHNOLOGY LAB

Objectives:

- Understand what Hadoop is
- Understand what Big Data is
- Learn about other open source software related to Hadoop

Outcomes:

i) Get help on the various Hadoop commands
ii) Observe a Map-Reduce job in action

1. Implement the following Data Structures in Java
   a) Linked Lists
   b) Stacks
   c) Queues
   d) Set
   e) Map

2. (i) Perform setting up and Installing Hadoop in its three operating modes: Standalone
   Pseudo distributed
   Fully distributed
   (ii) Use the web based tools to monitor your Hadoop setup.

3. Implement the following file management tasks in Hadoop.
   Adding files and directories
   Retrieving files
   Deleting files
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III YEAR VI SEMESTER
(Cluster 2) Paper-VIII : Elective –B-1

Distributed Systems

Course Objectives
To expose the fundamentals of distributed computer systems, assuming the availability of facilities for data transmission.
To discuss multiple levels of distributed algorithms, distributed file systems, distributed databases, security and protection.

Course Outcomes
Create models for distributed systems.
Apply different techniques learned in the distributed system.

UNIT I
Introduction to Distributed Computing Systems, System Models, and Issues in Designing a Distributed Operating System, Examples of distributed systems.

UNIT II

UNIT III
Introduction, Design and implementation of DSM system, Granularity and Consistency Model, Advantages of DSM, Clock Synchronization, Event Ordering, Mutual exclusion, Deadlock, Election Algorithms.

UNIT IV

UNIT V
Reference Books

Student Activity

1. Implementation of Distributed Mutual Exclusion Algorithm.
2. Create a Distributed Simulation Environment.
Distributed Systems Lab

Objective:
It covers all the aspects of distributed system. It introduce its readers to basic concepts of middleware, states of art middleware technology

Outcomes:
1. Students will get the concepts of Inter-process communication
2. Students will get the concepts of Distributed Mutual Exclusion and Distributed Deadlock Detection algorithm.

1. To study client server based program using RPC.
2. To study Client server based program using RMI.
3. To study Implementation of Clock Synchronization (Logical/Physical)
4. To study Implementation of Election algorithm.
5. To study Implementation of Mutual Exclusion algorithms.
6. To write program multi-threaded client/server processes.
7. To write program to demonstrate process/code migration.
Cloud Computing

Course Objectives:
The student will learn about the cloud environment, building software systems and components that scale to millions of users in modern internet, cloud concepts capabilities across the various cloud service models including IaaS, PaaS, SaaS, and developing cloud based software applications on top of cloud platforms.

Course Outcomes
1. Compare the strengths and limitations of cloud computing
2. Identify the architecture, infrastructure and delivery models of cloud computing
3. Apply suitable virtualization concept.
4. Choose the appropriate cloud player, Programming Models and approach.
5. Address the core issues of cloud computing such as security, privacy and interoperability
6. Design Cloud Services and Set a private cloud

Unit I

Cloud Computing Overview – Origins of Cloud computing – Cloud components - Essential characteristics – On-demand self-service, Broad network access, Location independent resource pooling, Rapid elasticity, Measured service

Unit II


Unit III

Cloud architecture: Cloud delivery model – SPI framework, SPI evolution, SPI vs. traditional IT Model
Unit IV
**Infrastructure as a Service** (IaaS): IaaS service providers – Amazon EC2, GoGrid – Microsoft soft implementation and support – Amazon EC service level agreement – Recent developments – Benefits

**Cloud deployment model**: Public clouds – Private clouds – Community clouds - Hybrid clouds - Advantages of Cloud computing

Unit V

**Virtualization**: Virtualization and cloud computing - Need of virtualization – cost, administration, fast deployment, reduce infrastructure cost - limitations

**Types of hardware virtualization**: Full virtualization - partial virtualization - para virtualization

**Desktop virtualization**: Software virtualization – Memory virtualization - Storage virtualization – Data virtualization – Network virtualization

**Microsoft Implementation**: Microsoft Hyper V – Vmware features and infrastructure – Virtual Box - Thin client

**Reference Books**


**Student Activity**:

1. Prepare the list of companies providing cloud services category wise.
2. Create a private cloud using local server
Outcomes: Learner will be able to…
1. Appreciate cloud architecture
2. Create and run virtual machines on open source OS
3. implement Infrastructure , storage as a Service.

Use Eucalyptus or Open Nebula or equivalent to set up the cloud and demonstrate.
1. Find procedure to run the virtual machine of different configuration. Check how many virtual machines can be utilized at particular time.
2. Find procedure to attach virtual block to the virtual machine and check whether it holds the data even after the release of the virtual machine.
3. Install a C compiler in the virtual machine and execute a sample program.
4. Show the virtual machine migration based on the certain condition from one node to the other.
5. Find procedure to install storage controller and interact with it.

1. Introduction to cloud computing.
3. Creating an Application in Sales Force.com using Apex programming Language.
4. Implementation of SOAP web services in C# JAVA Applications.
5. Implementation of Para-Virtualization using VM ware’s workstation/ Oracle’s Virtual Box and Guest O.S.
6. Case study: PAAS ( Face book, Google App Engine)
7. Case Study: Amazon web services.
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III YEAR VI SEMESTER
(Cluster C) Paper-VIII : Elective – C-1
Paper-VIII : PHP & MySql, Wordpress

Course Objectives
To introduce the concept of PHP and to give basic Knowledge of PHP. Learn about PHP Syntax, Arrays, PHP Loops, PHP and MySQL connectivity, PHP form validation, PHP form handling. Overview of MySQL and PHPMyAdmin. Understand basic concepts of how a database stores information via tables, Understanding of SQL syntax used with MySQL, Learn how to retrieve and manipulate data from one or more tables, Know how to filter data based upon multiple conditions, Updating and inserting data into existing tables, Learning how the relationships between tables will affect the SQL, The advantages of store procedures with storing data using variables and functions, How SQL can be used with programming languages like PHP to create dynamic websites for visitors, Review of some sample PHP projects interacting with MySQL.

Course Outcomes
After completing this course satisfactorily, a student will be able to:
1. Introduction to web development with PHP
2. How to code a PHP application
3. Introduction to relational databases and MySQL
4. How to use PHP with a MySQL database
5. How to use the MVC pattern to organize your code
6. How to test and debug a PHP application
7. How to work with form data
8. How to code control statements
9. How to work with strings and numbers
10. How to work with dates
11. How to create and use arrays
12. How to work with cookies and sessions
13. How to create and use functions
14. How to use regular expressions, handle exceptions, and validate data

UNIT I
UNIT II
Working with Functions: What is function?, Calling functions, Defining Functions, Returning the values from User-Defined Functions, Variable Scope, Saving state between Function calls with the static statement, more about arguments. Working with Arrays: What are Arrays?, Creating Arrays, Some Array-Related Functions. Working with Objects: Creating Objects, Object Instance Working with Strings, Dates and Time: Formatting strings with PHP, Investigating Strings with PHP, Manipulating Strings with PHP, Using Date and Time Functions in PHP.

UNIT III
Working with Forms: Creating Forms, Accessing Form Input with User defined Arrays, Combining HTML and PHP code on a single Page, Using Hidden Fields to save state, Redirecting the user, Sending Mail on Form Submission, Working with File Uploads. Working with Cookies and User Sessions: Introducing Cookies, Setting a Cookie with PHP, Session Function Overview, Starting a Session, Working with session variables, passing session IDs in the Query String, Destroying Sessions and Unsetting Variables, Using Sessions in an Environment with Registered Users. Working with Files and Directories: Including Files with include(), Validating Files, Creating and Deleting Files, Opening a File for Writing, Reading or Appending, Reading from Files, Writing or Appending to a File, Working with Directories, Open Pipes to and from Process Using popen(), Running Commands with exec(), Running Commands with system() or passthru(). Working with Images: Understanding the Image-Creation Process, Necessary Modifications to PHP, Drawing a New Image, Getting Fancy with Pie Charts, Modifying Existing Images, Image Creation from User Input.

UNIT IV
Introduction to MySQL and Interfacing with Databases through PHP Understanding the database design process: The Importance of Good Database Design, Types of Table Relationships, Understanding Normalization. Learning basic SQL Commands: Learning the MySQL Data types, Learning the Table Creation Syntax, Using Insert Command, Using SELECT Command, Using WHERE in your Queries, Selecting from Multiple Tables, Using the UPDATE command to modify records, Using RELACE Command, Using the DELETE Command, Frequently used string functions in MySQL, Using Date and Time Functions in MySQL, Using Transaction and stored procedures in MySQL: What is Transaction?, What are Stored Procedures? Interacting with MySQL using PHP: MySQL Versus MySQLi Functions, Connecting to MySQL with PHP, Working with MySQL Data. Creating an Online Address Book: Planning and Creating Database Tables, Creating Menu, Creating Record Addition Mechanism, Viewing Records, Creating the Record Deletion Mechanism, Adding Sub-entities to a Record.

UNIT V
Word press: Introduction to word press, servers like wamp, bitnami e.tc, installing and configuring word press, understanding admin panel, working with posts and pages, using editor, text formatting with shortcuts, working with media-Adding, editing, deleting media elements, working with widgets, menus. Working with themes-parent and child themes, using featured images, configuring settings, user and user roles and profiles, adding external links, extending word press with plug-ins. Customizing the site, changing the appearance of site using css.
REFERENCE BOOKS


Student activity:

1. Creation of a webpage using wordpress
2. Creation of student database of the college

PHP, MySql & Wordpress LAB

MySQL Lab Cycle
Cycle -1
An Enterprise wishes to maintain the details about his suppliers and other corresponding details. For that he uses the following details.
Suppliers (sid: Integer, sname: string, address: string)
Parts (pid: Integer, pname: string, color: string)
Catalog (sid: integer, pid: integer, cost: real)

The catalog relation lists the prices charged for parts by suppliers.

Write the following queries in SQL:

1. Find the pnames of parts for which there is some supplier.
2. Find the snames of suppliers who supply every part.
3. Find the sname of supplier who supply every red part.
4. Find the pnames of parts supplied by London Supplier abd by no one else.
5. Find the sid’s of suppliers who charge more for some part than the average cost of that part.
6. For each part, find the name of the supplier who charges the most for that part.
7. Find the sid’s of suppliers who supply only red parts.
8. Find the sid’s of suppliers who supply a red and a green part.
9. Find the sid’s of suppliers who supply a red or green part.
10. Find the total amount has to pay for that supplier by part located from London.

Cycle – 2
An organisation wishes to maintain the status about the working hours made by his employees. For that he uses the following tables.

Emp (eid: integer, ename: string, age: integer, salary: real)
Works (eid: integer, did: integer, pct_time: integer)
Dept (did: integer, budget: real, managerid: integer)

An employee can work in more than one department; the pct_time field of the works relation shows the percentage of time that a given employee works in a given department.
Resolve the following queries.

1. Print the names and ages of each employee who works in both Hardware and Software departments.
2. For each department with more than 20 full time equivalent employees (i.e., where the part-time and full-time employees add up to at least that many full-time employees), print the did’s together with the number of employees that work in that department.
3. Print the name of each employee whose salary exceeds the budget of all of the departments that he or she work in.
4. Find the managerid’s of managers who manage only departments with budgets greater than 1,000,000.
5. Find the enames of managers who manage the departments with largest budget.
6. If a manager manages more than one department, he or she controls the sum of all the budgets for those departments. Find the managerid’s of managers who control more than 5,000,000.
7. Find the managerid’s of managers who control the highest amount.
8. Find the average manager salary.

**PHP Lab Cycle**

1. Write a PHP program to Display “Hello”
2. Write a PHP Program to display the today’s date.
3. Write a PHP Program to read the employee details.
4. Write a PHP Program to display the
5. Write a PHP program to prepare the student marks list.
6. Write a PHP program to generate the multiplication of two matrices.
7. Write a PHP Application to perform demonstrate the college website.
8. Write a PHP application to add new Rows in a Table.
9. Write a PHP application to modify the Rows in a Table.
10. Write a PHP application to delete the Rows from a Table.
11. Write a PHP application to fetch the Rows in a Table.
12. Develop an PHP application to make following Operations
    
    i. Registration of Users.
    ii. Insert the details of the Users.
    iii. Modify the Details.
    iv. Transaction Maintenance.
       a) No of times Logged in
       b) Time Spent on each login.
       c) Restrict the user for three trials only.
       d) Delete the user if he spent more than 100 Hrs of transaction.

**Wordpress Lab**

1. Installation and configuration of word press.
2. Create a site and add a theme to it.
Course Objective:
To impart knowledge in designing a webpage in a structured way by using advanced java script ie., using different scripting languages.

Course Outcomes
On completing the subject, students will be able to: create a dynamic website using advanced features of JavaScript and create a website with good and attractive design.

UNIT I

UNIT II

UNIT III
Intro to jQuery UI, Need of jQuery UI in real web sites, Downloading jQuery UI, Importing jQuery UI, Draggable, Resizable, Selectable, Sortable, Accordion, Auto Complete, Button Set, Date Picker, Dialog, Menu, Progress Bar, Slider, Spinner, Tabs, Tooltip, Color Animation, Easing Effects, addClass, removeClass, Effects, jQuery UI themes, Customizing jQuery UI widgets / plug-ins, jQuery UI with CDN, Consuming jQuery Plug-ins from 3rd party web sites jQuery Validations, Intro to jQuery validation plug-in, Using jQuery validation plug-in, Regular expressions.
UNIT IV
Intro to AJAX, Need of AJAX in real web sites, Getting database data using jQuery-AJAX, Inserting, Updating, Deleting database data using jQuery-AJAX Grid Development using jQuery-AJAX

Intro to JSON JSON syntax, Need of JSON in real web sites, JSON object, JSON array, Complex JSON objects, Reading JSON objects using jQuery.

UNIT V
Intro to AngularJS, Need of AngularJS in real web sites, Downloading AngularJS, AngularJS first example, AngularJS built-in directives, AngularJS expressions, AngularJS modules, AngularJS controllers, AngularJS scope AngularJS dependency injection AngularJS, bootstrapping AngularJS data bindings, AngularJS $watch, AngularJS filters, AngularJS events, AngularJS AJAX, Ng-repeat, AngularJS with json arrays, AngularJS registration form and login form, AngularJS CRUD operations, AngularJS Animations, AngularJS validations AngularJS $q, AngularJS custom values, AngularJS custom factories, AngularJS custom services, AngularJS custom directives, AngularJS custom providers, AngularJS Routing, AngularUI Routing.

Reference Books

1. jQuery UI 1.8: The User Interface Library for jQuery by Dan Wellman
2. jQuery Fundamentals by Rebecca Murphey
3. Ajax: The Complete Reference by Thomas A. Powell
4. Pro AngularJS by Adam Freeman Kindle Edition

Student Activity:

1. Creation of website for a small scale company
2. Creation of website for a student database
1. Using jQuery find all textareas, and makes a border. Then adds all paragraphs to the jQuery object to set their borders red.

2. Using jQuery add the class "w3r_font_color" and w3r_background to the last paragraph element.

3. Using jQuery add a new class to an element that already has a class.

4. Using jQuery insert some HTML after all paragraphs.

5. Using jQuery insert a DOM element after all paragraphs.

6. Convert three headers and content panels into an accordion. Initialize the accordion and specify the animate option

7. Convert three headers and content panels into an accordion. Initialize the accordion and specify the height.

8. Create a pre-populated list of values and delay in milliseconds between a keystroke occurs and a search is performed.

9. Initialize the button and specify the disable option.

10. Initialize the button and specify an icon on the button.

11. Initialize the button and do not show the label.

12. Create a simple jQuery UI Datepicker. Now pick a date and store it in a textbox.

13. Initialize the datepicker and specify a text to display for the week of the year column heading.
III YEAR VI SEMESTER

PROJECT-2

Follow SDLC process for real time applications and develop real time application project

The objective of the project is to motivate them to work in emerging/latest technologies, help the students to develop ability, to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and research laboratories.

The project is of 5 hours/week for one (semester VI) semester duration and a student is expected to do planning, analyzing, designing, coding, and implementing the project. The initiation of project should be with the project proposal. The synopsis approval will be given by the project guides.

The project proposal should include the following:

- Title
- Objectives
- Input and output
- Details of modules and process logic
- Limitations of the project
- Tools/platforms, Languages to be used
- Scope of future application

The Project work should be either an individual one or a group of not more than three members and submit a project report at the end of the semester. The students shall defend their dissertation in front of experts during viva-voce examinations.