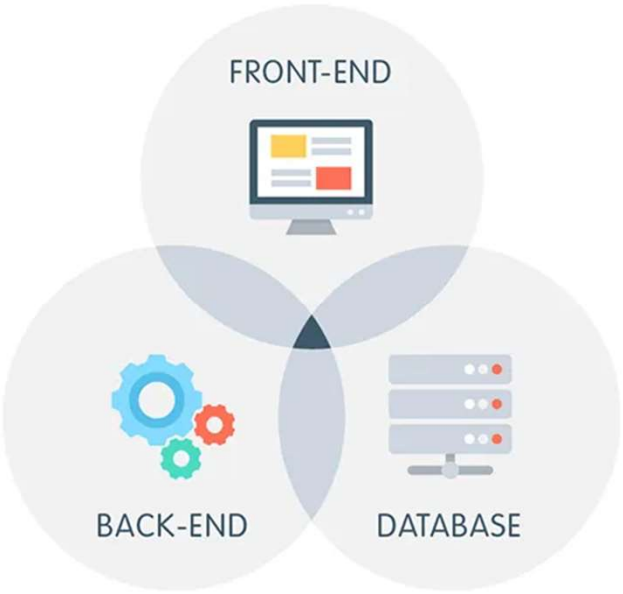
LJ University

University with a Difference

Diploma Engineering
Semester V

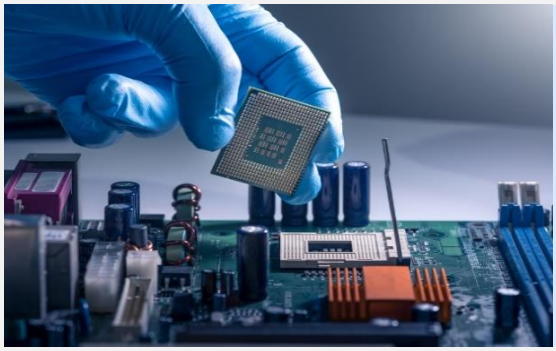


CE, IT, AIML, Cloud Computing & Big Data, Gaming & Animation

HANDBOOK

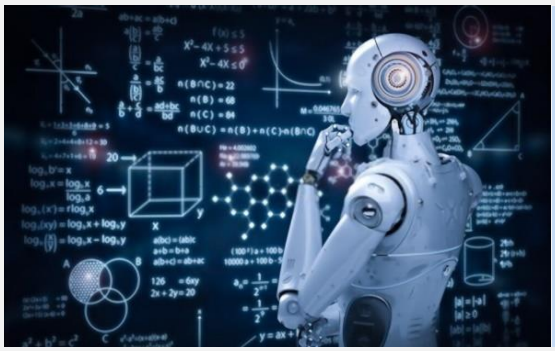
LJ Polytechnic

An Overview of Major Computer & Technology Disciplines



Computer Engineering is a branch of engineering that integrates several fields of computer science and electronic engineering required to develop computer hardware and software. Computer engineers design, test, implement and maintain computer software and hardware systems.

Information Technology (IT) is the use of computers to store or retrieve data and information. IT is typically used within the context of business operations as opposed to personal or entertainment technologies. You can find IT specialization in every branch of education, from IT & Software, Engineering, Aviation and Medicine to MBA and even Hospitality.



Artificial Intelligence (AI) is intelligence demonstrated by machines, as opposed to the natural intelligence displayed by humans or animals. AI applications include advanced web search engines, recommendation systems used by YouTube, Amazon and Netflix, Siri or Alexa, Tesla, and strategic game systems (such as chess and Go).

Cloud Computing & Big Data is the on-demand availability of computer system resources, especially data storage (cloud storage) and computing power, without direct active management by the user. Big data is a field that treats ways to analyze, systematically extract information from, or otherwise, deal with data sets that are too large or complex to be dealt with by traditional data-processing application software.

Gaming & Animation is the process of developing/designing a game. The effort is undertaken by a developer, ranging from a single person to an international team dispersed across the globe. Animation is a method in which figures are manipulated to appear as moving images. Various tools available in the market today, ease out the tasks of game development and animation.

Disclaimer

This handbook is compiled to provide subject information to the students. Every effort has been made to avoid errors & omissions and ensure accuracy. Any error noted may be brought to the notice of the compiler, which shall be taken care of in the updated edition of this handbook. The sources of information/material are provided in the appendix.

The information contained in this handbook is strictly for education and learning purposes and not for any commercial use.

Furthermore, The University reserves the right to unilaterally and without notice make changes to this handbook at any time.




Evaluation Methodology

Theory Marks

PA: Progressive Assessment

Units' examinations will be conducted during the semester. Each unit examination is compulsory. Unit examination may be taken from objectives, short questions, long questions, etc.

Unit-1 Exam:	Maximum Marks 10
Unit-2 Exam:	Maximum Marks 10
Unit-3 Exam:	Maximum Marks 10
Unit-4 Exam:	Maximum Marks 10
	Total Marks 40

ESE: End Semester Exam

End semester examination will be conducted from all Five (5) units and it is compulsory. It may be taken in the form of objectives, short questions, long questions etc.

End Semester Exam: Maximum Marks 50

CA: Continuous Assessment

Continuous assessment will be evaluated from the activity assigned in the semester and the attendance of that particular subject.

Activity Assessment / Attendance: Maximum Marks 10

Practical Marks

PV: Practical Viva

Practical viva will be conducted through group task. Thereafter viva will be conducted individually based on the given task of the concerned subject.

Practical Viva: Maximum Marks 30

TW: Term Work

Term work will be considered from the assignment and laboratory work done by the student during the semester of that particular subject.

Term Work: Maximum Marks 20

EVALUATION SCHEME

The performance of students is evaluated on the basis of continuous and semester-end examinations with letter grades O+++, O++, A++, B, etc. Which have numerical equivalents called grade points as indicated below:

Percentage		Grade Point	Grade	Class
95	100	10	O+++	First Class with Distinction
90	94	9.5	O++	
85	89	9	O+	
80	84	8.5	O	
75	79	8	A++	
70	74	7.5	A+	
65	69	7	A	First Class
60	64	6.5	B++	
55	59	6	B+	Higher Second Class
50	54	5.5	B	Second Class
45	49	5	C	
40	44	4.5	D	
35	39	4.0	E	Pass Class
less than 35		0	F	Fail

The performance of a student in a semester is indicated by a number called SPI (Semester Performance Index). The SPI is the weighted average of the grade points obtained in all the subjects taken by the student during the semester. Example: Suppose in a given semester a student has taken subjects having credits C1, C2, C3, C4, C5..... And the numerical equivalent of grades obtained in those subjects are G1, G2, G3, G4, and G5 respectively.

Then his/her $\text{SPI} = \frac{\text{Grade Points Earned}}{\text{Total Offered Credits}} = \frac{\sum_{i=1}^{n} Ci\ Gi}{\sum_{i=1}^{n} Ci}$

SPI will be calculated (after re-examination, if any) up to two decimal places on the basis of the final grades.

An overall assessment from the time the student entered the course is obtained by calculating PPI (Progressive Performance Index). The PPI is the weighted average of the grade points obtained in all the subjects taken by the student since he/she entered the course. It is calculated in the same manner as the SPI. The CGPA (Cumulative Grade Points Average) is the weighted average of the grade points obtained in all the subjects in the last six semesters of the course.

Detention:

Formula for conversion of equivalent percentage of PPI

An equation to find equivalence between PPI or CGPA may be obtained as follows:

Percentage Marks = (PPI or CGPA — 0.5) x 10. SPI or PPI or CGPA equivalent class shall be as follows:

Below 4.00 : Fail
4.00 – 4.49 : Pass Class
4.50 – 5.50 : Second Class
5.51 – 6.00 : Higher Second Class
6.01 – 7.49 : Firsrt Class
7.50 and above : First Class with Distinction

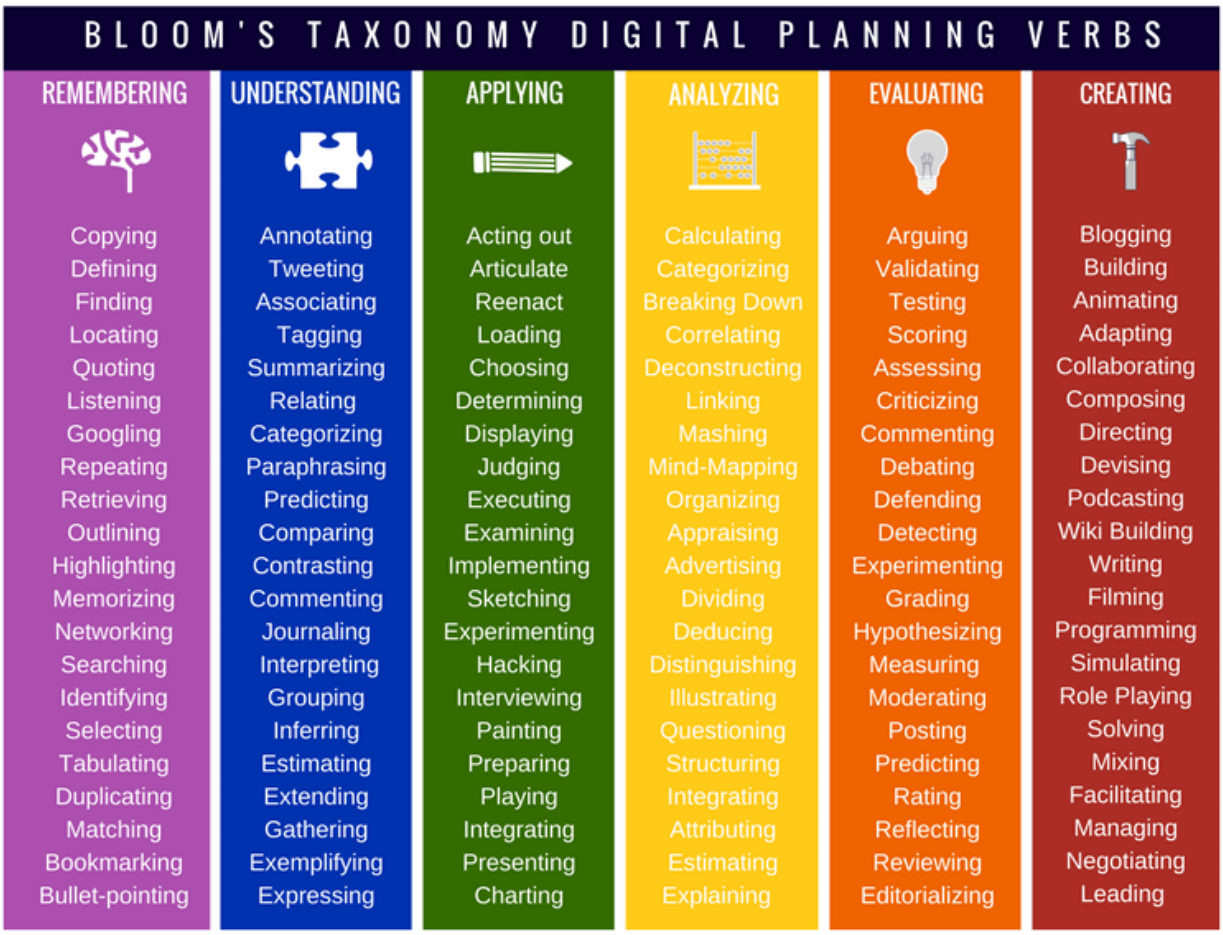
For all courses, where the duration of the course is more than 2 years, the degree shall be awarded to the students on the basis of CGPA of the last six semester's performance in the exams.

In case of the courses where duration is of two years, the degree shall be awarded to students based on PPI considering the performance in all four semesters.

About Bloom's Taxonomy

Bloom's Taxonomy is a classification of the different objectives and skills that educators set for their students (learning objectives). The taxonomy was proposed in 1956 by Benjamin Bloom, an educational psychologist at the University of Chicago. The terminology has been recently updated to include the following six levels of learning. These 6 levels can be used to structure the learning objectives, lessons, and assessments of your course.

1. **Remembering:** Retrieving, recognizing, and recalling relevant knowledge from long-term memory.
2. **Understanding:** Constructing meaning from oral, written, and graphic messages through interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining.
3. **Applying:** Carrying out or using a procedure for executing, or implementing.
4. **Analyzing:** Breaking material into constituent parts, determining how the parts relate to one another and to an overall structure or purpose through differentiating, organizing, and attributing.
5. **Evaluating:** Making judgments based on criteria and standards through checking and critiquing.
6. **Creating:** Putting elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure through generating, planning, or producing.



LJ University
University with a Difference

EMERGING TRENDS AND TECHNOLOGIES

Department of
Computer Engineering

LJ Polytechnic

Prepared and Compiled by
CE & IT Department

Course

Course Title	Emerging Trends and Technologies					
Course Type	HSSC	BSC	ESC	PCC	OEC	PEC

Legends: HSSC: Humanities and Social Sciences Courses
BSC: Basic Science Courses
ESC: Engineering Science Courses
PCC: Program Core Courses
OEC: Open Elective Courses
PEC: Program Elective Courses

Teaching and Evaluation Scheme

Teaching Hours / Week				Evaluation Scheme							
				Theory Marks				Practical Marks			Total Marks
L	**T**	**P**	**Total Credit**	**ESE**	**CA**	**PA**	**Total**	**PV**	**TW**	**Total**	
3	-	4	5	50	10	40	100	30	20	50	150

Legends: ESE: End Semester Exam
CA: Continuous Assessment (Attendance + Activity)
PA: Progressive Assessment
PV: Practical Viva
TW: Term Work

Contents

Unit No.	Topics	Sub-Topics	Learning Outcomes	% Weightage	Hours
1	**Introduction to Full Stack Web Development**	1.1. Introduction of Full Stack Development 1.2. Overview of Full Stack and pre-requisites 1.3. Introduction to Front-End Development 1.4. Basics of JavaScript 1.5. Installation for React 1.6. Create a New React App 1.7. JSX	• To understand what is full stack, its application and Installation of IDE • To understand the basic operations of JS • To create new ReactJS App • To understand Jsx concepts and its working in React	30	12
2	**React Basics**	2.1. Types of Components 2.2. Function 2.3. Class 2.4. Props 2.5. State 2.6. Events	• To understand usage of Components and Props • To understand creation of Class and calling different events • To understand the use of function components	15	7
3	**React for Front-End Development**	3.1. Lists and Keys 3.2. Hooks, useEffect, useState 3.3. Form 3.4. Pulling Data from an API 3.5. Build & Deploy App	• To understand render lists with some type of loops (map) • To understand the item updated with help of keys • To understand the Form	15	7

4	**Introduction to Node.js**	4.1. Back-End Development 4.2. Server-Side JavaScript 4.3. Introduction to Nodejs 4.4. Creating a Web Server 4.5. Nodejs Modules 4.6. Events 4.7. Asynchronous I/O with Callback Programming	• Installation of Nodejs • Development of various Modules in Nodejs • Understanding Database connection • Understanding the concepts of Events	20	8
5	**Back-End Development using Node.js**	5.1. Introduction to Web Frameworks 5.2. Express Framework 5.3. Create Application using Express 5.4. Middleware and Templating 5.5. HTTP Methods	• Understanding the Framework and Uses • Installing Express and its Features • Understanding the concepts of Middleware and Templating	20	8
				Total Hours	**42**

Suggested Specification Table with Hours

Unit No.	Chapter Name	Teaching Hours	Distribution of Topics According to Bloom's Taxonomy					
			R %	U %	App %	C %	E %	An %
1.	Introduction to Full Stack Web Development	12	30	25	20	5	10	10
2.	React Basic	7	25	30	20	10	5	10
3.	React for Front-End Development	7	20	30	20	10	10	10
4.	Introduction to Node.js	8	30	20	25	5	10	10
5.	Back-End Development using Node.js	8	25	30	25	10	5	5

Legends: R: Remembering U: Understanding
App: Applying C: Creating
E: Evaluating An: Analyzing

Textbooks

1) React: Up & Running - Building Web Applications, Stoyan Stefanov, Shroff/O'Reilly Publication.
2) NODE.JS Guidebook, Dhruti Shah, BPB

Reference Books

1) MERN Quick Start Guide: Build web applications with MongoDB, Express.js, React, and Node, Eddy Wilson Iriarte Koroliova, Packt Publishing.
2) Learning React: A Hands-On Guide to Building Web Applications Using React and Redux, Kirupa Chinnathambi, Addison-Wesley

Open Sources (Website, Video, Movie)

1) https://reactjs.org/docs/getting-started.html
2) https://nodejs.dev/en/learn/
3) https://egghead.io/courses/the-beginner-s-guide-to-React
4) https://www.youtube.com/watch?v=RLtyhwFtXQA

Introduction

Emerging trends and technologies include many aspects including Full Stack development, which is the development of both Front-End (client side) and Back-End (server side) portions of web application. React is a declarative, efficient, and flexible JavaScript library for building user interfaces for Front-End web development. In this course, you will explore the fundamental concepts that underpin the React library and learn the basic skills required to build a simple, fast, and scalable app. Node.js is an open source server environment for Back-End development. Node.js allows you to run JavaScript on the server. In this course, student will focus on Node.js and Express. Specifically, they will develop applications using asynchronous callbacks and promises - create APIs and perform CRUD operations. Throughout the course, you will complete numerous hands-on labs to gain practical experience in Front-End and Back-End web development. This course will help you succeed as a Full Stack developer.

Objectives

- ✓ Use reusable components in React to render views where data changes over time.
- ✓ Create dynamic and interactive web pages and apps using React.
- ✓ Use forms to allow users to interact with the web page.
- ✓ Create server-side applications using the Node.js JavaScript run time.
- ✓ Extend your Node.js applications with third-party packages and frameworks, including Express.

Subject's Learning Outcomes

This course is aimed to make students aware about what is full stack, its application and Installation of IDE. Students will learn to create dynamic and interactive web pages and apps using React. Students will get in-depth knowledge about Characteristics, Functionalities and flow of React. They can understand use of forms to allow users to interact with the web page. Students will learn to Create server-side applications using the Node.js JavaScript run time. They can get better understanding of API and how to deploy a Node App.

Introduction to Full Stack Web Development

Practical Lists

1. Write a program to demonstrate JavaScript variables.
2. Write a program to demonstrate basic operators in JavaScript.
3. Write a program to add two number using normal function and arrow function in JavaScript.
4. Installation and create a new React App from Scratch.
5. Write a program which has proper structure of project and make proper folder and files.

Short Questions

Q. No.	Sample Questions	Bloom's Taxonomy
1.	What is JavaScript?	Remember
2.	What are JavaScript Data Types?	Understand
3.	Define HTML and CSS.	Remember
4.	What are all the looping structures in JavaScript?	Understand
5.	Is JavaScript case sensitive? Explain with example.	Remember
6.	Define React and JSX.	Remember

Long Questions

Q. No.	Sample Questions	Bloom's Taxonomy
1.	Explain Operators in JavaScript with example.	Understand
2.	Enlist the step to create an React application .	Remember
3.	What is React? What are the features of React.	Understand
4.	What are the major advantages of React?	Understand

Essential Assignments

1. Explain Frontend Development.
2. Explain Backend Development.

3. Explain FullStack Development.
4. Which tools are used in Frontend Development. Expalin them in brief.
5. Which tools are used in Backend Development. Expalin them in brief.

Desirable Assignments

1. JavaScript Program to find the factorial of a number using arrow function.
2. How to remove duplicates number from an Array using JavaScript?
3. Write a program to check whether the given number is palindrome or not?
4. Write a program to find that given number is Armstrong or not using simple function?
5. Write a program to find out largest and second largest number in a given array using for loop in JavaScript?

Activities

1. With the help of the Internet, find out which website is made with help of React.
2. Prepare report on how can React actually create an single web application.
3. Prepare a ppt on JavaScript –Introduction, datatypes, function, and Array. PPT should contain explanations, images and at least 20 pages.

Learning Outcomes

- ❖ Stundets wiil get knowledge about Full Satck Web Development.
- ❖ Students will have better understanding of JavaScript.
- ❖ Students will get in-depth knowledge about Characteristics, Functionalities and flow of React.

2 React Basics

Short Questions

1. Write a program that shows inline, internal and external CSS.
2. Write a program to create a simple form(text box, edit text, radio button, checkbox, toggle button).
3. Write a program to show current Date and Time in React program by using JSX.
4. Write a program which has Maths as Class name and make calculator.

Short Questions

Q. No.	Sample Questions	Bloom's Taxonomy
1.	What is Components.	Remember
2.	Enlist the types of Components?	Understand
3.	Define Props and State.	Remember
4.	What is Function Components?	Understand
5.	What is Class Components?	Remember
6.	What is Events?	Remember

Long Questions

Q. No.	Sample Questions	Bloom's Taxonomy
1.	Define Components. Enlist it's types and explain any one in detail.	Understand
2.	What is Function Components and write basic syntax to create it.	Remember
3.	What is Class Components and write basic syntax to create it.	Understand
4.	What is Event and explain any one in detail?	Understand

Essential Assignments

1. What is props and state.
2. List steps to create a props and state.
3. Explain Components. Write a basic code to create Function Components .

4. Write a basic code to create Class Components.
5. Write a basic code to create Function and Components with props and state.

Desirable Assignments

1. Write a Program to demonstrate the creation of class-based components. Create a React app and edit the App.js?
2. Write a program that shows inline, internal and external CSS.
3. How to change states with onClick event in ReactJS using functional components ?
4. Write a program to check whether the given number is even or odd or prime number or any two of them using JSX.
5. Explain Differences between Functional Components and Class Components in React?
6. Write a Program to demonstrate the use of props in class-based components.
7. Write a Program to demonstrate the use of state in class-based components.

Activities

1. With the help of the Internet, find out more about React.
2. Prepare report on how can React actually create an single web application.
3. Prepare a ppt on React - Iintroduction, components, types of components, props and state. PPT should contain explanations, images and at least 20 pages.

Learning Outcomes

- Students will get knowledge about React Components.
- Students will have better understanding of React and flow of React.
- Students will get in-depth knowledge about States, Functions and Events of React.

3 React for Front-End Development

Practical Lists

1. Write a program which shows list of data (user name, contact number, Address) when state changes.
2. Write a program that shows name, id, address, contact number is passed as props to components.
3. Write a program that count button clicked Event with help of Hook.
4. Create a project to get the Employee name and other details, then add API in it and fetch data.

Short Questions

Q. No.	Sample Questions	Bloom's Taxonomy
1.	Define Lists and Keys.	Remember
2.	What is Hooks?	Understand
3.	List types of Hooks and define each.	Remember
4.	What is Form?	Understand
5.	Define API and write it's fullform.	Remember
6.	Write only syntax of useState and useEffect.	Remember

Long Questions

Q. No.	Sample Questions	Bloom's Taxonomy
1.	What is Lists and Keys? Why it is used?	Understand
2.	Write a code to create a Lists and Keys.	Remember
3.	What is Hooks? List its types and explain it in detail.	Understand
4.	What is API? Why we should use it?	Understand

Essential Assignments

1. Write a syntax to create a Hook using useEffect.
2. List the necessary step to create Lists and Keys.

3. Write a syntax to create a Hook using useState.
4. Explain how we can deploy React App.
5. Define API. Explain in brief.

Desirable Assignments

1. Write a code that uses Components (textbox, edittext, radio, button, checkbox, toggle button).
2. Create a program which has Maths as Class name and make calculator?
3. Write a program that count button clicked Event with help of Hook?
4. Write a program to build an React app and deploy it?
5. Write a program that count button clicked Event with help of Hook using useState and useEffect?

Activities

1. With the help of the Internet, collect more information about an API.
2. Prepare report on how to make a basic React app and how to deploy it.
3. Prepare a ppt on React –List and Keys , Hooks, useState and useEffect ,Form and API. PPT should contain explanations, images.

Learning Outcomes

- ❖ Students will get knowledge about Hooks and its methods.
- ❖ Students will get better understanding of API and how to deploy a React App.
- ❖ Students will get In-depth knowledge about Hooks, API and List and Keys.

Introduction to Node.js

Practical Lists

1. Create a project having Node js database which has id, name, number, address as basic detail.
2. Write a program using Anonymous Callback Functions in Node.js.
3. Write a program to demonstrate use of HTTP Methods.
4. Write a program to set navigation of the different pages.

Short Questions

Q. No.	Sample Questions	Bloom's Taxonomy
1.	What is Back End developer ?	Remember
2.	What is Node js ?	Understand
3.	What is server side scripting ?	Remember
4.	What is Node modules ?	Understand
5.	Explain types of Events in node js ?	Remember

Long Questions

Q. No.	Sample Questions	Bloom's Taxonomy
1.	Explain installation of node js ?	Understand
2.	Write a code to create a server in node js ?	Remember
3.	What is Back End development? Explain with Examples.	Understand
4.	What is Asynchronous Callback?	Understand

Essential Assignments

1. What is node js? Explain in detail.
2. Create a live server in node js. Set the port of localhost to 8080.
3. What is Asynchronous Input and Output Callback Programming with example.
4. Explain Events in node js with Example.
5. Write steps to install Node js.

Desirable Assignments

1. Write a code that to create a node js server ?
2. Connection of database in node js and react js in one application.
3. Create a Dummy API and fetch in node js server.
4. Create a project having Nodejs database which has id, name, number, address as basics detail
5. Create a Application which has a database on mongo db
6. Create the React js form and fetch the data in Node js

Activities

1. Steps to create the node js server.
2. Prepare report on how to make a basic Node app and how to deploy it.
3. Prepare a ppt on Node js – Events. PPT should contain explanations, images and at least 20 pages.

Learning Outcomes

- Students will get basic knowledge about Node js.
- Students will have better understanding of API and how to deploy an Node App.
- Studetns will get in-depth knowledge about Characteristics, Functionalities and flow of Node js, API and Server.

Back-End Development using Node.js

Practical Lists

1. Write a program using Anonymous Callback Functions in Node.js.
2. Create and configure an application using Express.
3. Create Middleware in Nodejs and setup Express Application.
4. Write a program to store data in JSON server.

Short Questions

Q. No.	Sample Questions	Bloom's Taxonomy
1.	What is framework in node js.	Remember
2.	List out Node js Frameworks.	Understand
3.	What is middleware ?	Remember
4.	What is templating ?	Understand
5.	What is HTTP Methods ?	Remember

Long Questions

Q. No.	Sample Questions	Bloom's Taxonomy
1.	Explain Framework of node js in details.	Understand
2.	Explain middleware in detail.	Remember
3.	Explain Templating in detail.	Understand
4.	Explain Rest API in detail.	Understand

Essential Assignments

1. Explain Node js Framework and Explain Express in details.
2. Explain Templating in detail with example.
3. Explain Middleware in detail with example.
4. Explain Use HTTP Methods in detail with example.
5. Explain setup of express in Node js

Desirable Assignments

1. Create Middleware in Node js and Setup Express Application
2. Create an Application using Express.
3. Explain Express in details and try to implement promises.
4. Give examples of Anonymous Callback Functions in Node js.

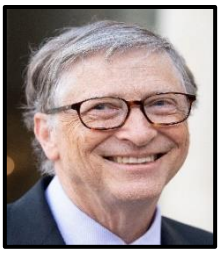
Activities

1. Steps to create Express server.
2. Prepare a report on how to make basic Node app using different framework.
3. Prepare a ppt on Express js. PPT should contain explanations, images and at least 20 pages.

Learning Outcomes

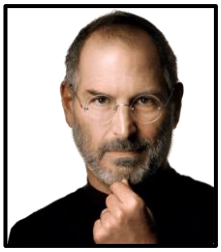
- Students will get knowledge about Different Frameworks in Node js.
- Students will have better understanding of HTTP and how to deploy in Express Node App.

Quotes from Pioneers



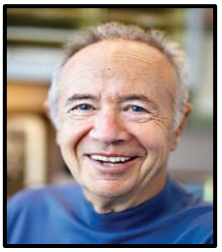
"The advance of technology is based on making it fit in so that you do not really even notice it, so it is part of everyday life."

- Bill Gates, Co-Founder, Microsoft.



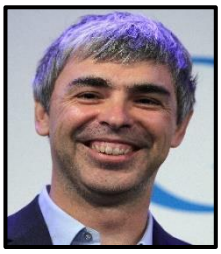
"Have the courage to follow your heart and intuition. They somehow already know what you truly want to become. Everything else is secondary."

- Steve Jobs, Co-Founder, Apple Inc.



"Success breeds complacency. Complacency breeds failure. Only the paranoid survives."

- Andy Grove, Former Chairman & CEO, Intel.

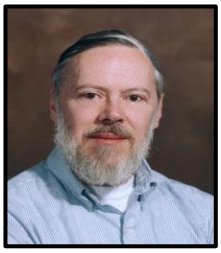


"If you are changing the world, you are working on important things. You're excited to get up in the morning."

- Larry Page, Co-Founder, Google & Alphabet Inc.

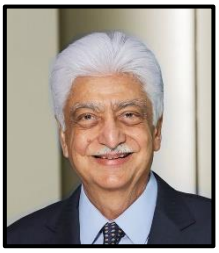
"Progress is often equal to the difference between mind and mindset."

- N. R. Narayana Murthy, Chairman Emeritus, Infosys.



"The only way to learn new programming language is by writing programs in it."

- Dennis Ritchie, Co-Creator of C Programming.



"Success is achieved twice. Once in the mind and the second time in the real world."

- Azim Premji, Founder Chairman, Wipro.

"The digital world has power because it has dynamic information, but it's important that we stay human instead of being another machine sitting in front of a machine."

- Pranav Mistry, President & CEO of STAR Labs.

LJ Polytechnic

Offers Diploma in

- Artificial Intelligence & Machine Learning
- Electronics & Communication Engineering
- Cloud Computing & Big Data
- Architectural Assistantship
- Automation & Robotics
- Gaming & Animation
- Automobile Engineering
- Mechanical Engineering
- Information Technology
- Computer Engineering
- Electrical Engineering
- Civil Engineering

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