# Course Plan

**A. Course Handout**

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|---|---|
| Institute/School Name | Chitkara University Institute of Engineering and Technology |
| Department Name | Department of Computer Science & Engineering |
| Programme Name | Bachelor of Engineering (B.E.), Computer Science & Engineering |

| | | | |
|---|---|---|---|
| Course Name | Front-End Engineering-II | Session | 2023-2024 |
| Course Code | 22CS014 | Semester/Batch | 4th /2022 |
| L-T-P (Per Week) | 2-0-4 | Course Credits | 04 |
| Course Coordinator | Dr. Shikha | | |

| | |
|---|---|
| **CLO01** | Understand the fundamental concept of Web Development. |
| **CLO02** | Understand the JavaScript advance concepts, JQuery, AJAX and ReactJS to develop web pages and retrieve data from the server. |
| **CLO03** | Apply different attributes to change the layout and position of elements on web pages. |
| **CLO04** | Analyse the dynamic changes and responses using advanced web concepts. |
| **CLO05** | Design the minor project and generate report using Front End Technologies. |

## 1. Objectives of the Course

This course covers all the emerging Web Technologies which are used by major private and public organization. The main objectives of the course are:

- To provide knowledge of Front-End Technologies like Advance JavaScript concepts, JQuery and React JS to enable students to build user friendly websites.
- To provide the required skills and project-based experience needed for entry into web design and development careers.
- To provide knowledge of variety of strategies and tools to create well-designed websites.
- with current topics such as network management, security and/or other topics.

## 2. Course Learning Outcomes

After completion of the course, student should be able to:

| | Course Learning Outcome | *POs | **CL | ***KC | Sessions |
|---|---|---|---|---|---|
| **CLO01** | Understand the fundamental concept of Web Development. | PO4, PO7, PO9, PO12 | K2 | Factual Conceptual | 20 |
| **CLO02** | Understand the JavaScript advance concepts, JQuery, AJAX and ReactJS to develop web pages and retrieve data from the server. | PO1, PO3, PO6, PO8, PO9, PO11 | K3 | Conceptual Procedural | 40 |
| **CLO03** | Apply different attributes to change the layout and position of elements on web pages. | PO1, PO2, PO5, PO7, PO10 | K3 | Conceptual Procedural | 40 |
| **CLO04** | Analyse the dynamic changes and responses using advanced web concepts. | PO2, PO11, PO12 | K4 | Procedural | 30 |
| **CLO05** | Design the minor project and generate report using Front End Technologies. | PO3, PO4, PO5, PO10 | K5 | Conceptual Procedural | 30 |
| **Total Contact Hours** | | | | | **160** |

Revised Bloom's Taxonomy Terminology
* PO's available at (shorturl.at/cryzF)
**Cognitive Level =CL
***Knowledge Categories = KC

| Course Learning Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CLO01 | | | M | | | | L | | H | | | M |
| CLO02 | L | M | | | H | | M | M | | M | | |
| CLO03 | M | L | | | L | | M | | | H | | |
| CLO04 | | M | | | | | | | | | L | L |
| CLO05 | | | M | M | H | | | | | L | | |

H=High, M=Medium, L=Low

3. **ERISE Grid Mapping**

| Feature Enablement | Level(1-5, 5 being highest) |
|---|---|
| Entrepreneurship | 1 |
| Research | 3 |
| Innovation | 2 |
| Skills | 5 |
| Employability | 4 |

4. **Recommended Books:**

**Text Books:**
**B01:** Learning web designing: a beginner's guide to HTML, CSS, JavaScript, and graphics by Niederst Robbins 4th edition, Oreilly Publications, 2012.
**BO2:** Learning JavaScript by Shelley Powers, Oreilly Publications, 2006.
**B03:** Learning React: Functional Web Development with React and Redux, by Alex Banks, Eve Porcello, Oreilly Publications, 2015.

**Reference Books:**
**B04:** Introduction to JavaScript Object Notation by Lindsay Bassett, Oreilly Publications, 2015.
**B05:** Node.js, MongoDB and Angular Web Development, 2nd Edition, Brad Dayley, Brendan Dayley, Caleb Dayley, Oreilly Publications, 2017.

**E-Resources:**
https://library.chitkara.edu.in/subscribed-books.php

5. **Other readings and relevant websites:**

| Serial No | Link of Journals, Magazines, websites and Research Papers |
|---|---|
| 1. | https://www.w3schools.com/jquery/ |
| 2. | https://www.javascript.com/ |

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| 3. | https://reactjs.org/ |
|----|----------------------|
| 4. | https://www.ics.uci.edu/~goodrich/teach/cs161/notes/ |

**6. Recommended Tools and Platforms**

React JS
Sublime Text/Notepad++/Visual Studio

**7. Course Plan:**

| Lecture Number | Topics | Text Book |
|----------------|--------|-----------|
| 1-10 | HTML: Create a programming project with a code editor, construct nested websites with HTML tags and elements, Troubleshoot and debug HTML errors and bugs | BO1-Chapter-2 |
| 11-20 | CSS: Style website components by ID, class, and type, Connect CSS to a website, Position and display website elements, Modify and control website typography, Troubleshoot and debug issues with stylesheets | BO1-Chapter-3 |
| 21-24 | Bootstrap: Introduction, features and installation. | BO1-Chapter-3 |
| 25-30 | JavaScript basics: Introduction, Syntax, Enabling in browser, Variables, Operators, Loops. | BO1-Chapter-4 |
| 31-40 | Arrays & Functions: Array properties, array methods and protypes. Function Hoisting, Function within Function, Function Expressions, Passing function as arguments, Mouse and Keyboard Events, Propagation of Event, Arrow Functions, Bindings in Arrow Function | BO1-Chapter-4 |
| 41-46 | Objects & JSON Objects, JSON & Web storage: Object properties, Object methods, JSON introduction, syntax, installation, usage. | BO4-Chapter-1 |
| 47-54 | Document Object Model: Describe and explain the Document Object Model for web browsers, Access page elements by ID, class, and type using JavaScript. | BO2-Chapter-4 |
| 55-62 | Asynchronous programming: Introduction, Ajax introduction and working and usage, Client server communication, API and JSON, Ajax Request, Ajax Request with JQuery, Handling Errors, Courses API, Authenticated API requests. | BO4-Chapter-7 BO4-Chapter-8 |
| 63-70 | ES6: introduction and working, ES6 Async-await, different ways of declaring async functions, error handling. | BO3-Chapter-2 |
| 71-74 | GIT- Version Control System, GIT clone, branch and merge. | |
| | Project Based Evaluation - 1 Spotify Clone | |
| 75-84 | Introduction to ReactJS: What is React, what are components? SPA vs MPAs, React vs others, Tools and Installation of tools, The terminal, Using React-I, Using React-II, Create-react-app, Folder structure, Installing react developer tools, Understanding JSX, JSX Restrictions, Creating a Functional Component | BO3-Chapter-5 |
| 85-90 | Webpack and babel Hierarchy: Introduction, Role of Webpack and babel Hierarchy in React application, how to use webpack and babel in React. | BO3-Chapter-5 |
| 91-100 | Events Handling in JS: Handling Events with Methods, Passing Arguments to Event Handlers, Events Listening, Difference Between Html and React Event Handling. | BO2-Chapter-6 |

| 101-104 | Components in ReactJS, class component, function component, rendering a component, components in files. | BO3-Chapter-7 |
|---|---|---|
| 105-110 | Component lifecycle Component lifecycle, Hooks. | BO3-Chapter-7 |
| 111-114 | Forms in ReactJS: Adding form, Handling Form, Submitting form. | BO4-Chapter-4 |
| 115-122 | React Props working with examples, Lists and keys, traversing list using key in React, NPM & Router, Steps to Create React Application and Install React Router. | BO3-Chapter-6 BO3-Chapter-11 |
| Project Based Evaluation - 2 Food App | | |
| 123-128 | React Hooks: State hook, Effect Hook, Hook rules. | BO3-Chapter-6 |
| 129-130 | Brief introduction to Redux | BO3-Chapter-8 |
| 131-138 | React advance concepts, SSR and CSR, and react app optimisation | BO3-Chapter-12 |
| 139-146 | React Project and Deploying App to the Web Deployment of the React APP on Heroku | BO3-Chapter-12 |
| 147-152 | MongoDB Atlas introduction and working with ReactJS | BO5-Chapter-1 |
| 153-160 | Introduction to Next JS, features, Steps to Install and Run Next.js Application. | BO5-Chapter-2 |
| Project Based Evaluation - 3 E-Commerce Website | | |

## 8. Delivery/Instructional Resources

| Lecture No. | Topics | Web References | Audio-Video |
|---|---|---|---|
| 01-10 | HTML: Create a programming project with a code editor, construct nested websites with HTML tags and elements, Troubleshoot and debug HTML errors and bugs | https://www.w3schools.com/html/ | https://www.udemy.com/topic/javascript/free/ |
| 11-20 | CSS: Style website components by ID, class, and type, Connect CSS to a website, Position and display website elements, Modify and control website typography, Troubleshoot and debug issues with stylesheets | https://www.w3schools.com/css/ | https://www.udemy.com/topic/javascript/free/ |
| 21-24 | Bootstrap: Introduction, features and installation. | https://www.w3schools.com/bootstrap/bootstrap_ver.asp https://developer.mozilla.org/en-US/docs/Web/JavaScript/Guide/Regular_Expressions | https://www.udemy.com/topic/javascript/free/ |
| 25-30 | JavaScript basics: Introduction, Syntax, Enabling in browser, Variables, Operators, Loops. | https://www.tutorialspoint.com/javascript/javascript_events.htm https://www.tutorialspoint.com/jquery/index.htm | https://www.udemy.com/topic/javascript/free/ |

| | | | |
|---|---|---|---|
| 31-40 | Arrays & Functions: Array properties, array methods and protypes. Function Hoisting, Function within Function, Function Expressions, Passing function as arguments, Mouse and Keyboard Events, Propagation of Event, Arrow Functions, Bindings in Arrow Function | https://www.tutorialspoint.com/ajax/index.htm<br>https://www.tutorialspoint.com/javascript/javascript_nested_functions.htm | https://www.udemy.com/topic/javascript/free/ |
| 41-46 | Objects & JSON Objects, JSON & Web storage: Object properties, Object methods, JSON introduction, syntax, installation, usage. | https://www.w3schools.com/js/js_json_intro.asp | https://www.youtube.com/watch?v=IWcUJLUAO2A |
| 47-54 | Document Object Model: Describe and explain the Document Object Model for web browsers, Access page elements by ID, class, and type using JavaScript. | https://www.geeksforgeeks.org/dom-document-object-model/ | https://www.youtube.com/watch?v=IWcUJLUAO2A |
| 55-62 | Async programming: Introduction, Ajax introduction and working and usage, Client server communication, API and JSON, Ajax Request, Ajax Request with JQuery, Handling Errors, Courses API, Authenticated API requests. | https://webreference.com/javascript/async/async-await/<br>https://www.w3schools.com/js/js_async.asp | https://www.youtube.com/watch?v=S_8BQNNVh8I |
| 63-70 | ES6 Async-await, different ways of declaring async functions, error handling, React - ES6: introduction and working. | https://www.geeksforgeeks.org/how-does-await-and-async-works-in-es6/ | https://www.youtube.com/watch?v=6Yei9waC-ok<br>https://www.youtube.com/watch?v=aFu9tIORzqE |
| 71-74 | GIT- Version Control System, GIT clone, branch and merge. | https://git-scm.com/ | |
| 75-84 | Introduction to ReactJS: What is React, what are components? SPA vs MPAs, React vs others, Tools and Installation of tools, The terminal, Using React-I, Using React-II, Create-react-app, Folder structure, Installing react developer tools, Understanding JSX, JSX Restrictions, Creating a Functional Component | https://www.javatpoint.com/react-introduction | https://www.udemy.com/course/introduction-to-reactjs/ |
| 85-90 | Webpack and babel Hierarchy: Introduction, Role of Webpack and babel Hierarchy in React application, how to use webpack and babel in React. | https://hashinteractive.com/blog/complete-guide-to-webpack-configuration-for-react/ | https://www.youtube.com/watch?v=RVFAyFWO4go |
| 91-100 | Events Handling in JS: Handling Events with Methods, Passing Arguments to Event Handlers, Events Listening, Difference Between Html and React Event Handling. | https://www.w3schools.com/js/js_events.asp | https://www.youtube.com/watch?v=RVFAyFWO4go |
| 101-104 | Components in ReactJS, class component, function component, rendering a component, components in files. | https://www.w3schools.com/react/react_components.asp | https://www.youtube.com/watch?v=lnV34uLEzis |
| 105-110 | Component lifecycle Component lifecycle, Hooks. | https://www.geeksforgeeks.org/reactjs-keys/ | https://www.youtube.com/watch?v=RVFAyFWO4go |

| 111-114 | React Props working with examples, Lists and keys, traversing list using key in React, NPM & Router, Steps to Create React Application and Install React Router. | https://www.tutorialspoint.com/reactjs/reactjs_component_life_cycle_react_hooks.htm https://react.dev/reference/react/Component | https://m.youtube.com/watch?v=z9QAROFaTV8 |
|---|---|---|---|
| 115-122 | Forms in ReactJS: Adding form, Handling Form, Submitting form. | https://reactjs.org/docs/jsx-in-depth.html https://reactjs.org/docs/create-a-new-react-app.html | https://www.youtube.com/watch?v=rsd4FNGTRBw |
| 123-128 | React Hooks: State hook, Effect Hook, Hook rules. | https://legacy.reactjs.org/docs/faq-ajax.html https://legacy.reactjs.org/docs/hooks-intro.html | https://www.youtube.com/watch?v=6yVUKPgwlOU |
| 129-130 | Brief introduction to Redux | https://redux.js.org/ | https://www.youtube.com/watch?v=poQXNp9ItL4 |
| 131-138 | React advance concepts, SSR and CSR, and react app optimisation | https://reactresources.com/topics/advanced-concepts https://www.geeksforgeeks.org/reactjs-advanced-guides-complete-reference/ | https://www.youtube.com/watch?v=cd3P3yXyx30 |
| 139-146 | React Project and Deploying App to the Web Deployment of the React APP on Heroku | https://dev.to/mrcflorian/how-to-deploy-a-react-app-to-heroku-44ig | https://www.youtube.com/watch?v=KjY94sAKLlw |
| 147-152 | MongoDB Atlas introduction and working with ReactJS | https://www.mongodb.com/atlas/database | https://www.youtube.com/watch?v=tA4Fl1dZgjc |
| 153-160 | Introduction to Next JS, features, Steps to Install and Run Next.js Application. | https://www.geeksforgeeks.org/next-js-introduction/ | https://www.youtube.com/watch?v=1EaOihoxyoE |

**9. Lab Component:**

| S. No. | Experiments | Learning Resource |
|---|---|---|
| 1 | Project Based Evaluation | https://www.coursera.org/courses?query=front%20end |

**10. Action plan for different types of learners**

| Slow Learners | Average Learners | Fast Learners |
|---|---|---|
| • Remedial Classes on Saturdays<br>• Encouragement for improvement using Peer Tutoring<br>• Use of Audio and Visual Materials<br>• Use of Real-Life Examples | • Workshops<br>• Formative Exercises used to highlight concepts and notions<br>• E-notes and E-exercises to read ahead of the pedagogic material. | • Engaging students to hold hands of slow learners by creating a Peer Tutoring Group<br>• Design solutions for complex problems<br>• Design solutions for complex problems<br>• Presentation on topics beyond those covered in CHO |

**11. Evaluation Scheme & Components:**

| Evaluation Component | Type of Component | No. of Assessments | Weightage of Component | Mode of Assessment |
|---|---|---|---|---|
| Component 2 | Project Based Evaluation | 02* | 50% | Offline |
| Component 3 | Final Project Based Evaluation | 01* | 50% | Offline |
| **Total** | | | **100%** | |

* Students will have to appear in all Project Based Evaluations.

**12. Syllabus of the Course:**

| S. No. | Topic (s) | No. of Sessions | Weightage % |
|---|---|---|---|
| 1 | **HTML:** Create a programming project with a code editor, construct nested websites with HTML tags and elements, Troubleshoot and debug HTML errors and bugs<br>**CSS:** Style website components by ID, class, and type, Connect CSS to a website, Position and display website elements, Modify and control website typography, Troubleshoot and debug issues with stylesheets<br>**Bootstrap:** Introduction, features and installation.<br>**JavaScript basics:** Introduction, Syntax, Enabling in browser, Variables, Operators, Loops.<br>**Arrays & Functions:** Array properties, array methods and protypes. Function Hoisting, Function within Function, Function Expressions, Passing function as arguments, Mouse and Keyboard Events, Propagation of Event, Arrow Functions, Bindings in Arrow Function<br>**Objects & JSON Objects, JSON & Web storage:** Object properties, Object methods, JSON introduction, syntax, installation, usage.<br>**Document Object Model:** Describe and explain the Document Object Model for web browsers, Access page elements by ID, class, and type using JavaScript.<br>**Async programming:** Introduction, Ajax introduction and working and usage, Client server communication, API and JSON, Ajax Request, Ajax Request with JQuery, Handling Errors, Courses API, Authenticated API requests.<br>**ES6**: Async-await, different ways of declaring async functions, error handling, React - ES6: introduction and working.<br>**GIT:** Version Control System, GIT clone, branch and merge. | 74 | 46 |
| | **Project Based Evaluation - 1** | | |
| 2 | **Introduction to ReactJS:** What is React, what are components? SPA vs MPAs, React vs others, Tools and Installation of tools, The terminal, Using React-I, Using React-II, Create-react-app, Folder structure, Installing react developer tools, Understanding JSX, JSX Restrictions, Creating a Functional Component<br>**Webpack and babel Hierarchy:** Introduction, Role of Webpack and babel Hierarchy in React application, how to use webpack and babel in React.<br>**Events Handling in JS:** Handling Events with Methods, Passing Arguments to Event Handlers, Events Listening, Difference Between Html and React Event Handling.<br><br>**Components** in ReactJS, class component, function component, rendering a component, components in files.<br>**Component lifecycle:** Component lifecycle, Hooks.<br>**React Props:** working with examples, Lists and keys, traversing list using key in React, NPM & Router, Steps to Create React Application and Install React Router.<br>**Forms in ReactJS:** Adding form, Handling Form, Submitting form. | 48 | 30% |
| | **Project Based Evaluation - 2** | | |

| 3 | **React Hooks**: State hook, Effect Hook, Hook rules. **Brief introduction to Redux** **React advance concepts**, SSR and CSR, and react app optimisation **Deploying App:** React Project and Deploying App to the Web Deployment of the React APP on Heroku **MongoDB** Atlas introduction and working with ReactJS **Next JS:** Introduction to Next JS, features, Steps to Install and Run Next.js Application. | 38 | 24% |
|---|---|---|---|
| **Project Based Evaluation - 3** | | | |

*As per Academic Guidelines minimum 85% attendance is required to become eligible for appearing in the End Semester Examination.

**This Document is approved by:**

| Designation | Name | Signature |
|---|---|---|
| **Course Coordinator** | Dr. Shikha | |
| **Head-Academic Delivery** | Dr. Vikas Khullar | |
| **Dean** | Dr. Rishu Chhabra | |
| **Dean Academics** | Dr. Monit Kapoor | |
| **Date** | 03.01.2024 | |