**A. Course Handout (Version 1.0) | Last updated on 5<sup>th</sup> March, 2022**

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

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|---|---|---|---|
| Course Name | Advanced Web Development | Session | 2021-2022 |
| Course Code | CS163 | Semester/Batch | 2nd/2021 |
| Lecture/Tutorial/Practical (Per Week) | 2-0-4 | Course Credits | 4 |
| Course Coordinator Name | Dr. Chetna | | |

## 1. Scope and 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. **2.**

## Course Learning Outcomes

After completion of the course, students will be able to do the following:

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

**CLO-PO mapping grid |Program outcomes (POs) are available as a part of Academic Program Guide (APG) :**

| Course Learning Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CLO1 | H | M | | | | | L | | | | | |
| CLO2 | H | | M | | L | | | | | | | |
| CLO3 | M | | H | | | | | | | | | |

| CLO4 | | | H | L | | | | | | H |
|------|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |

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### 3. Recommended Books (Reference Books/Textbooks)

**RB1:** 'Learning web designing: a beginner's guide to HTML, CSS, JavaScript, and web graphics' by Niederst Robbins, 4th Edition, Oreilly Publication, 2012
**RB2:** 'JQuery In Action' by De Rosa, Aurelio, et al. United States, Manning Publications, 2015.
**RB3:** 'React JS Fundamental: Learn fundamental React JS Single Page Application with Fetching Data from API and UseContext', Onesinus Saut Parulian, 2019.
**RB4:** 'React. Js Book: Learning React JavaScript Library from Scratch' by Sidelnikov, Greg., Independently Published, 2017.

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

### 5. Recommended Tools and Platforms

Sublime Text/Notepad++/Visual Studio
Coding Ninjas (online platform- https://www.codingNinjas.com/)

### 6. Course Plan:

| Lecture No. | Topic | Detailed Contents |
|-------------|-------|-------------------|
| 1-3 | Java scripting Advanced Concept/ Closure | ●Revising basic concept of JavaScript<br>●Function Hoisting<br>●Function within Function<br>●Function Expressions<br>●Passing function as arguments<br>●Mouse and Keyboard Events<br>●Propagation of Event<br>●Closures, const and let<br>●Let in for loops<br>●Arrow Functions<br>●Bindings in Arrow Function |

| | | |
|---|---|---|
| 4-6 | Constructors and Classes | ●This Keyword<br>●This in Strict Mode<br>●Function to create Objects<br>●Object constructor<br>●Adding Behaviour to Objects<br>●Objects<br>●Class, Properties and Methods<br>●Class Expressions and Hoisting<br>●Exports and Imports declaration |

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| | | |
|---|---|---|
| 7-8 | Regular Expressions | •Using the Test method, Match Literal Strings, Extract Matches, Match Anything with Wildcard Period, Match Single Characters Not Specified, Match Beginning String Patterns, Match EverythingbutLetters and Numbers, Match Whitespace,Check for<br>All or None, Remove Whitespace from Start and End.<br>●Form Validation: Data validation and constraintvalidation in HTML forms |
| 9-12 | JQuery-1 | ●Introduction to JQuery<br>●Writing Code Using jQuery Modifying CSS Using Query<br>●Event Handling Using JQuery: Understanding an Event, "Firing" Events, Event Handler Registration, Working with Event Handlers (Adding and Removing), Removing Event Handlers, Event Propagation.<br>●Animation<br>●DOM in JQuery |
| 13-16 | AJAX | • Client server communication<br>• Ajax- understanding the name<br>• HTTP, API and JSON<br>• Ajax Request<br>• Ajax Request with JQuery<br>• Handling Errors<br>• Courses API<br>●Authenticated API requests |
| 17-21 | Introduction to React | • What is React.<br>• What are components?<br>• SPA vs MPAs<br>• React vs others<br>• Tools and Installation of tools<br>• The terminal<br>• Using React-I<br>• Using React-II<br>• Create-react-app<br>• Folder structure<br>• Installing react developer tools<br>• Understanding JSX<br>• JSX Restrictions<br>• Creating a Functional Component |

| 22-24 | Styling React components and elements | • Working with Components & Re-Using Them<br>• Outputting Dynamic Content<br>• Working with Props<br>• Understanding the "children" Prop<br>• Understanding & Using State<br>• Props & State<br>• Handling Events with Methods<br>• Events Listening<br>• Manipulating the State<br>• Function Components Naming<br>• Using the useState() Hook for State Manipulation<br>• Stateless vs Stateful Components<br>• Passing Method References Between Components • Adding Two Way Binding<br>• Adding Styling with Stylesheets |

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| | | • Working with Inline Styles<br>• Working with list and conditions<br>• Outlining the Problem Set<br>• Setting Styles Dynamically<br>• Setting Class Names Dynamically<br>• Adding and Using Radium<br>• Using Radium for Media Queries<br>• Introducing Styled Components<br>• More on Styled Components<br>• Styled Components & Dynamic Styles<br>• Working with CSS Modules<br>• CSS Modules & Media Queries<br>• React Hooks |
| 25-26 | Mini project-starting the project | • Practice-project |

**7. Lab Plan**

| Sr. No. | Lab Number | Experiment Topics | Platform | Learning Resource |
|---|---|---|---|---|
| 1 | 1-4 | Java scripting Advanced concept/closure | Coding Ninjas | https://www.tutorialspoint.com/javascript/index.htm<br>https://www.tutorialspoint.com/javascript/javascript_e vents.htm<br>https://www.tutorialspoint.com/javascript/javascript_n ested_functions.htm |

| 2 | 3-8 | Constructors and Classes | Coding Ninjas | https://developer.mozilla.org/en US/docs/Web/JavaScript/Reference/Classes |
|---|-----|---------------------------|---------------|----------------------------------------------------------------------------|
| 3 | 9-14 | Regular Expressions | Coding Ninjas | https://developer.mozilla.org/en US/docs/Web/JavaScript/Guide/Regular_Expressions |
| 4 | 15-16 | JQuery-1 | Coding Ninjas | https://www.tutorialspoint.com/jquery/index.htm<br><br>https://www.tutorialspoint.com/jquery/jque ry events.htm |
| 5 | 17-32 | AJAX | Coding Ninjas | https://www.tutorialspoint.com/ajax/index.htm<br><br>https://developer.mozilla.org/en US/docs/Web/Guide/AJAX/Getting_Started |

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| 6 | 33-38 | Introduction to React | Coding Ninjas | https://www.javatpoint.com/react-introduction |
|---|-------|------------------------|---------------|------------------------------------------------|
| 7 | 39-42 | Create-react-app | Coding Ninjas | https://reactjs.org/docs/create-a-new-react-app.html |
| 8 | 43-44 | Styling React components and elements | Coding Ninjas | https://reactjs.org/docs/faq-styling.html |
| 9 | 45-46 | Handling Events with Methods, Events Listening, Manipulating the State, Function Components Naming | Coding Ninjas | https://reactjs.org/docs/handling-events.html |
| 10 | 47-48 | Using the useState() Hook for State Manipulation, Stateless vs Stateful Components, Passing Method References Between Components, Adding Two Way Binding, Adding Styling with | Coding Ninjas | https://codedcreatures.com/2019/12/24/using-t he usestate-hook-for-state-manipulation-in-react-js/<br><br>https://www.geekstrick.com/lesson/passing-meth od references-between-components/<br><br>https://reactjs.org/docs/two-way-binding-helpers.html<br><br>https://medium.com/technofunnel/4-ways-to-a dd styles-to-react-component-37c2a2034e3e |

| | | Stylesheets | | |
|---|---|---|---|---|

**8. Delivery/Instructional Resources**

| Lecture No. | Topics | PPT | Industry Expert Session | Web References | Audio-Video |
|---|---|---|---|---|---|
| 1-3 | Java scripting Advanced concept/c los ure | | | https://www.tutorialspoint.com/javascript/index.htm<br><br>https://www.tutorialspoint.com/javascript/javascri pt_ events.htm<br><br>https://www.tutorialspoint.com/javascript/javascri pt_ nested_functions.htm | Coding Ninjas Videos |
| 4-6 | Construct ors and Classes | | | https://developer.mozilla.org/en US/docs/Web/JavaScript/Reference/Classes | Coding Ninjas Videos |
| 7-8 | Regular Expressions | | | https://developer.mozilla.org/en US/docs/Web/JavaScript/Guide/Regular_Expressions | Coding Ninjas Videos |

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| 9-12 | JQuery-1 | | | https://www.tutorialspoint.com/jquery/index.htm<br><br>https://www.tutorialspoint.com/jquery/jque ry events.htm | Coding Ninjas Videos |
|---|---|---|---|---|---|
| 13-16 | AJAX | | | https://www.tutorialspoint.com/ajax/index.htm<br><br>https://developer.mozilla.org/en US/docs/Web/Guide/AJAX/Getting_Started | Coding Ninjas Videos |

| 17-21 | Introduction to React | | | https://www.javatpoint.com/react-introducti on https://reactjs.org/docs/jsx-in-depth.html  https://reactjs.org/docs/create-a-new-react-app.html | Coding Ninjas Videos |
|---|---|---|---|---|---|
| 22-24 | Styling React components and elements | | | https://reactjs.org/docs/faq-styling.html  https://reactjs.org/docs/handling-events.html  https://codedcreatures.com/2019/12/24/using-t he usestate-hook-for-state-manipulation-in-react-js/  https://www.geekstrick.com/lesson/passing-meth od references-between-components/  https://reactjs.org/docs/two-way-binding helpers.html  https://medium.com/technofunnel/4-ways-to-a dd styles-to-react-component-37c2a2034e3e | https://w ww .youtube. co m/watch? v=j 5P9FHiBV No  https://w ww .youtube. co m/watch ?v= e1IQAIBJi HQ |

## 9. 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 | • Formative Exercises used to highlight concepts and notions •<br>Pre-coded algorithms to illustrate concepts and notions<br>• E-notes and E-exercises to read ahead of the pedagogic material. | • Design solutions for complex problems<br>• Presentation on topics beyond those covered in CHO<br>• Engaging students to hold hands of slow learners by creating a Peer Tutoring Group |

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## 10. Evaluation Scheme & Components:

| Evaluation Component | Type of Component | No. of Assessments | Weightage of Component | Mode of Assessment |
|---|---|---|---|---|
| Component 1 | Formative Assessments (FAs) | 03* | 20% | Online |
| Component 2 | Subjective Test/Sessional Tests (STs) | 03** | 30% | Online |
| Component 3 | End Term Examinations | 01 | 50% | Online |
| **Total** | | | **100%** | |

*Out of 03FAs, the ERP system will automatically pick marks of the best 02 FAs for final marks evaluation of FAs.

** Out of 03STs, the ERP system will automatically pick marks of the best 02 STs for final marks evaluation of STs.

**11. Details of Evaluation Components:**

| Evaluation Component | Description | Syllabus Covered (%) | Timeline of Conduct | Weightage (%) |
|---|---|---|---|---|
| Component 01 | FA1 | Up to 25% | Week 4 | 20% |
| | FA2 | 26%-55% | Week 9 | |
| | FA3 | 55%-85% | Week 14 | |
| Component 02 | ST 01 | Up to 30% | 6th April'22 | 30% |
| | ST 02 | 31% - 70% | 11th May'22 | |
| | ST 03 | 71% - 100% | 8th June'22 | |
| Component 03 | End Term Examination* | 100% | | 50% |
| **Total** | | | | 100% |

*As per Academic Guidelines minimum of 75% attendance is required to become eligible for appearing in the End Semester Examination

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**Evaluation Components**

| Type of Assessment | Timeline of | Total | Question Paper Format |
|---|---|---|---|

| | Conduct | Marks | 1 Mark MCQ | 2 Mark MCQ | 5 Mark Algorithm/Coding | 10 Mark Algorithm/ Coding |
|---|---|---|---|---|---|---|
| Formative Assessment 1 | Week 4 | 20 | 15 | - | 1 | - |
| Sessional Test 1 | 29th April'22 | 30 | 5 | 5 | 1 | 1 |
| Formative Assessment 2 | Week 9 | 20 | 15 | - | 1 | - |
| Sessional Test 2 | 6th April'22 | 30 | 5 | 5 | 1 | 1 |
| Formative Assessment 3 | Week 14 | 20 | 15 | - | 1 | - |
| Sessional Test 3 | 8th June'22 | 30 | 5 | 5 | 1 | 1 |
| End Term Examination | | 50 | 10 | 5 | 4 | 1 |

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**12. Syllabus of the Course:**

| Lecture Number | Topic (s) | Content of Lectures | Weightage% |
|---|---|---|---|
| 1-5 | Java Scripting Advanced concept/closure | ●Revising basic concept of JavaScript<br>●Function Hoisting<br>●Function within Function<br>●Function Expressions<br>●Passing function as arguments<br>●Mouse and Keyboard Events<br>●Propagation of Event<br>●Closures, const and let<br>●Let in for loops<br>●Arrow Functions<br>●Bindings in Arrow Function | 10% |
| 6-10 | Constructors and Classes | ●This Keyword<br>●This in Strict Mode<br>●Function to create Objects<br>●Object constructor<br>●Adding Behaviour to Objects<br>●Objects<br>●Class, Properties and Methods<br>●Class Expressions and Hoisting<br>●Exports and Imports declaration | 10% |

| 11-15 | Regular Expressions | •Using the Test method, Match Literal Strings, • Forms Extract Matches, Match Anything with Wildcard Period, Match Single Characters Not Specified, Match Beginning String Patterns, Match Everything But Letters and Numbers, Match Whitespace, Check for All or None, Remove Whitespace from Start andEnd.<br>●Form Validation: Data validation and constraint validation in HTML | 10% |
|---|---|---|---|
| 16-25 | JQuery-1 | ●Introduction to JQuery<br>●Writing Code Using Jquery<br>●Modifying CSS Using Query<br>●Event Handling Using JQuery<br>●Explore JQuery!<br>●Animation<br>●DOM | 20% |
| 26-30 | AJAX | • Client server communication<br>• Ajax- understanding the name<br>• HTTP, API and JSON<br>• Ajax Request<br>• Ajax Request with JQuery<br>• Handling Errors<br>• Courses API<br>• Authenticated API requests | 10% |

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| 31-34 | Introduction to React | • What is React.<br>• What are components?<br>• SPA vs MPAs<br>• React vs others<br>• Tools and Installation of tools<br>• The terminal | 5% |
|---|---|---|---|
| 35-37 | Hello world | • Using React-I<br>• Using React-II<br>• Create-react-app<br>• Folder structure<br>• Installing react developer tools<br>• Understanding JSX<br>• JSX Restrictions<br>• Creating a Functional Component | 10% |

| 38-48 | Styling React Components and Elements | • Working with Components & Re-Using Them • Outputting Dynamic Content<br>• Working with Props<br>• Understanding the "children" Prop<br>• Understanding & Using State<br>• Props & State<br>• Handling Events with Methods<br>• Events Listening<br>• Manipulating the State<br>• Function Components Naming<br>• Using the useState() Hook for State Manipulation • Stateless vs Stateful Components<br>• Passing Method References Between Components<br>• Adding Two Way Binding<br>• Adding Styling with Stylesheets<br>• Working with Inline Styles<br>• Working with list and conditions<br>• Outlining the Problem Set<br>• Setting Styles Dynamically<br>• Setting Class Names Dynamically<br>• Adding and Using Radium<br>• Using Radium for Media Queries<br>• Introducing Styled Components<br>• More on Styled Components<br>• Styled Components & Dynamic Styles<br>• Working with CSS Modules<br>• CSS Modules & Media Queries<br>• React Hooks | 25% |
|-------|------|------|------|
| 49-52 | Mini project | • Practice- project | -- |

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**This Document is designed and approved by:**

| Designation | Name | Signature |
|-------------|------|-----------|
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| **Dean (Academic Affairs)** | Dr. Rajnish Sharma | |
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