COURSE PLAN

**Rev. No 9 Dated: Aug 2025**

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**School of Computer Science**

|  |  |
| --- | --- |
| Cluster | CSO |
| Program | BCA |
| Course | Advanced Web Technologies |
| Course Code | CSEG2071 |
| No. of credits | 4 |
| Semester | 3 |
| Session | 2025-26 |
| Academic Year | 2025 |
| Faculty Name | Prateek Raj Gautam |
| Faculty Email | prateek.gautam@ddn.upes.ac.in |

**COURSE PLAN**

|  |  |  |
| --- | --- | --- |
| **Prerequisite** | **Web Technologies** | |
| **Credit** | **4** | |
| **Lecture** | **Tutorial** | **Practical** |
| **3** | **0** | **1** |

1. **The expected Program Outcome are:**

|  |  |
| --- | --- |
| **PO No.** | **Program Outcome** |
| PO1 | Knowledge of Sciences: Apply the knowledge of mathematics, science, fundamentals to solution of real-life problems. |
| PO2 | Problem analysis: Identify, formulate, and analyze complex computing problems reaching substantiated conclusions using principles of mathematics, natural sciences, and computer sciences. |
| PO3 | Design/development of solutions: Design applications for complex computing problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. |
| PO4 | Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. |
| PO5 | Environment and sustainability: Understand the impact of the professional solutions/applications in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. |
| PO6 | Ethics: Apply ethical principles and commit to professional ethics, responsibilities, and norms of the computing practice. |
| PO7 | Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. |
| PO8 | Communication: Able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions. |
| PO9 | Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. |
| PO10 | Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. |

1. **Expected Program specific Outcome are:**

|  |  |
| --- | --- |
| **PSO No.** | **Program Specific Outcome** |
| PSO1 | Perform system and application programming using computer system concepts, the principles of data structures, algorithm development, problem-solving, and optimization techniques. |
| PSO2 | Apply software development and project management methodologies, integrating principles from both front-end and back-end development, and effectively utilize contemporary tools and technologies. |
| PSO3 | Exhibit a commitment to ethical practices, societal responsibilities, and continuous learning, contributing to the advancement of technology and addressing challenges in diverse computing domains. |

1. **The expected Course Outcomes are:**

|  |  |
| --- | --- |
| CO 1 | Write basic applications using HTML, CSS, and JS, understand use of jQuery and AngularJS. |
| CO 2 | Use and develop backend using NodeJS and express. |
| CO 3 | Use MongoDB for web application data storage. |
| CO 4 | Data visualization using D3.js. |

1. **CO-PO Relationship Matrix**

Indicate the relationships by1- Slight (low) 2- Moderate (Medium) 3-Substantial (high)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **COs \ POs & PSOs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PSO1** | **PSO2** | **PSO3** |
| **CO1** | 2 | 2 | 2 | 3 |  |  | 1 | 2 |  | 2 | 2 | 3 | 1 |
| **CO2** | 2 | 3 | 3 | 3 |  |  | 1 | 2 | 2 | 2 | 2 | 3 | 1 |
| **CO3** | 2 | 2 | 3 | 3 |  |  |  | 2 |  | 2 | 2 | 3 |  |
| **CO4** | 1 | 2 | 3 | 3 | 1 |  |  | 2 |  | 2 | 1 | 3 | 1 |
| **Average** | 1.8 | 2.3 | 2.8 | 3 | 0.3 | 0 | 0.5 | 2 | 0.5 | 2 | 1.75 | 3 | 0.75 |

1. **Course Outcomes assessment plan:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Components**  **Course Outcomes** | **Assignment** | **Test/Quiz** | **Mid Semester** | **End Semester** | **Any other** |
| **CO1** | Yes | Yes | Yes | Yes |  |
| **CO2** | Yes | Yes | Yes | Yes |  |
| **CO3** | Yes | Yes |  | Yes |  |
| **CO4** | Yes | Yes |  | Yes |  |

1. **Course Syllabus Template**

|  |  |
| --- | --- |
| **Unit Number** | **Content** |
| **Unit I** | **Introduction to jQuery** – Setting up jQuery code environment, linking to a jQuery file on CDN, understanding jQuery selectors, filters, event handling (click, hover, submit etc.), creating animations, applying CSS properties. |
| **Unit II** | **Front-End Development using AngularJS** – Role of AngularJS in web development, architecture and core concepts, creating AngularJS applications, built-in and custom directives, two-way data binding, filters, controllers, forms and events, form validation, debugging AngularJS apps. |
| **Unit III** | **Server-Side Development using NodeJS** – Introduction, advantages, traditional vs. Node.js process model, environment setup, console, NodeJS modules, functions, buffer, event-driven framework, event emitter, events and event loop, NPM usage. |
| **Unit IV** | **State Management and Working with Data** – Sessions and cookies, creating and destroying sessions, session variables, cookies (creation & deletion), query strings. **MongoDB**: setup, hosting, authentication, model creation, DB connections, basic CRUD operations. |
| **Unit V** | **Data Visualization with D3.js** – Creating charts with SVG & D3.js, shapes and controls, selecting and modifying elements, fetching data from CSV/JSON, interactive and dynamic data visualizations. |

**COURSE PLAN DELIVERY**

**UNIT-I**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Session Plan | Actual Delivery | | | |
| Lecture | Topics to be Covered | Lecture | Date | Topics Covered | CO covered |
| 1 | Introduction to jQuery, setting up environment, linking jQuery file |  |  |  | CO1 |
| 2 | jQuery Selectors & Filters |  |  |  | CO1 |
| 3 | Event Handling (click, hover, submit etc.) |  |  |  | CO1 |
| 4 | Creating Animations with jQuery |  |  |  | CO1 |
| 5 | Applying CSS properties dynamically |  |  |  | CO1 |
| 6 | Mini examples: DOM manipulation + validation with jQuery |  |  |  | CO1 |

**COURSE PLAN DELIVERY**

**UNIT-II**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Session Plan | Actual Delivery | | | |
| Lecture | Topics to be Covered | Lecture | Date | Topics Covered | CO covered |
| 7 | Role of AngularJS in modern web dev |  |  |  | CO1 |
| 8 | AngularJS architecture & setup |  |  |  | CO1 |
| 9 | Creating a simple AngularJS app |  |  |  | CO1 |
| 10 | Built-in directives |  |  |  | CO1 |
| 11 | Custom directives |  |  |  | CO1 |
| 12 | Two-way data binding |  |  |  | CO1 |
| 13 | Filters for data formatting |  |  |  | CO1 |
| 14 | Controllers and event handling |  |  |  | CO1 |
| 15 | Angular forms and validation |  |  |  | CO1 |

**COURSE PLAN DELIVERY**

**UNIT-III**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Session Plan | Actual Delivery | | | |
| Lecture | Topics to be Covered | Lecture | Date | Topics Covered | CO covered |
| 16 | Node.js Introduction & Advantages |  |  |  | CO2 |
| 17 | Node.js process model vs traditional model |  |  |  | CO2 |
| 18 | Node.js environment setup |  |  |  | CO2 |
| 19 | Node.js console programs |  |  |  | CO2 |
| 20 | Node.js modules (types) |  |  |  | CO2 |
| 21 | Functions & Buffers in Node.js |  |  |  | CO2 |
| 22 | Event-driven framework |  |  |  | CO2 |
| **—** | **[Break: Gandhi Jayanti + Mid-Sem Exams 02–11 Oct]** |  |  |  |  |
| 23 | EventEmitter class & Event loop |  |  |  | CO2 |
| 24 | |  | | --- | |  |  |  | | --- | | Node Package Manager (NPM) usage | |  |  |  | CO2 |

**COURSE PLAN DELIVERY**

**UNIT-IV**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Session Plan | Actual Delivery | | | |
| Lecture | Topics to be Covered | Lecture | Date | Topics Covered | CO covered |
| **—** | **[Break: Diwali 20–25 Oct]** |  |  |  |  |
| 25 | Session control – concepts & setup |  |  |  | CO3 |
| 26 | Creating & destroying sessions |  |  |  | CO3 |
| 27 | Session variables |  |  |  | CO3 |
| 28 | Cookies – creating, reading, deleting |  |  |  | CO3 |
| 29 | Query string management |  |  |  | CO3 |
| 30 | MongoDB setup & authentication |  |  |  | CO3 |
| 31 | Model creation in MongoDB |  |  |  | CO3 |
| 32 | Managing DB connections |  |  |  | CO3 |
| 33 | CRUD operations in MongoDB |  |  |  | CO3 |

**COURSE PLAN DELIVERY**

**UNIT-V**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Session Plan | Actual Delivery | | | |
| Lecture | Topics to be Covered | Lecture | Date | Topics Covered | CO covered |
| 34 | Intro to D3.js & SVG basics |  |  |  | CO4 |
| 35 | Creating bar charts in D3.js |  |  |  | CO4 |
| 36 | Drawing shapes (circles, rectangles) |  |  |  | CO4 |
| 37 | Making shapes interactive |  |  |  | CO4 |
| 38 | Selecting & modifying DOM elements |  |  |  | CO4 |
| 39 | Loading CSV/JSON data in D3.js |  |  |  | CO4 |
| 40 | Plotting graphs from datasets |  |  |  | CO4 |
| 41 | Interactive dashboards |  |  |  | CO4 |
| 42 | Revision + case study discussions and Projects. |  |  |  | CO4 |

**PERIODIC MONITORING**

**Actual date of completion and remarks, if any**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Components** | | **From** | **To** | **From** | **To** | **From** | **To** |
| **Duration (Mention from and to dates)** | |  |  |  |  |  |  |
| **Percentage of Syllabus covered** | |  |  |  |  |  |  |
| **Lectures** | **Planned** |  |  |  |  |  |  |
| **Taken** |  |  |  |  |  |  |
| **Tutorials** | **Planned** |  |  |  |  |  |  |
| **Taken** |  |  |  |  |  |  |
| **Test/quizzes** | **Planned** |  |  |  |  |  |  |
| **Taken** |  |  |  |  |  |  |
| **CO's Addressed** |  |  |  |  |  |  |
| **CO's Achieved** |  |  |  |  |  |  |
| **Assignments** | **Planned** |  |  |  |  |  |  |
| **Taken** |  |  |  |  |  |  |
| **COs Addressed** |  |  |  |  |  |  |
| **COs** |  |  |  |  |  |  |

**Observations(If any)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**Signature of Faculty Signature of Head**

**Date Date**

**PLANNING FOR REMEDIAL CLASSES**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sl. No.** | **Name of Student** | **Roll No.** | **Sap ID** | **Mid Sem Marks** | **Remedial Classes Held** | | | | | | | **Class test based on Remedial Classes** | **End Sem Marks** | **Improvement**  **(Y/N)** |
| **Date** |  |  |  |  |  |  |
| **Venue** |  |  |  |  |  |  |
| **Time** |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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**Signature of Faculty Signature of Head**

1. **Target**

|  |  |
| --- | --- |
| Target |  |
| Level-1 |  |
| Level-2 |  |
| Level-3 |  |

1. **Method of Evaluation\***

|  |  |
| --- | --- |
| **UG** | **PG** |
| Quizzes/Tests, Assignments (50%) | Quizzes/Tests, Assignments, seminar (50%) |
| Mid Examination (20%) | End semester (50%) |
| End examination (30%) |  |

\*It can be revised as per the assessment scheme of the respective School/Course

1. **Passing Criteria**

|  |  |  |
| --- | --- | --- |
| **Scale** | **PG** | **UG** |
| **Out of 10point scale** | SGPA – “6.00” in each semester  CGPA – “6.00”  Min. Individual Course Grade  –  “C”  Course Grade  Point –  “4.0” | SGPA – “5.0” in each semester  CGPA – “5.0”  Min. Individual Course Grade  –  “C”  Course Grade  Point –  “4.0” |

\*for PG, passing marks are 40/100 in a paper (Composite)

\*for UG, passing marks are 35/100 in a paper (Composite)

1. **References:**

|  |  |
| --- | --- |
| **Text Books** | 1. B. Green and S. Seshadri, AngularJS. “O’Reilly Media, Inc.,” 2013. |
| 2. M. Wandschneider, Learning Node.js : a hands-on guide to building Web applications in JavaScript. Upper Saddle River, Nj: Addison-Wesley, 2013. |
| 3. M. Dewar, Getting started with D3. Sebastopol, Ca: O’reilly Media, 2012. |
| 4. iCode Academy, Jquery for Beginners. Independently Published, 2017. |
| **Web resources** | https://upessocs.github.io/#dir=/Lectures/Advanced%20Web%20Technologies/&file=list.txt |
|  |
|  |
| **Journals** |  |
|  |
| **Reference books** | 1. J. Duckett, G. Ruppert, and J. Moore, JavaScript & JQuery: interactive front-end web development. Indianapolis, In: John Wiley & Sons, 2014.  2. F. Coury, A. Lerner, N. Murray, and C. Taborda, Ng-book : the complete guide to Angular. San Francisco, California: Fullstack.Io, 2018.  3. D. Herron, Node.js Web Development. Packt Publishing Ltd, 2018. |
|  |
| **MOOCs, Online courses** |  |

**SUGGESTIONS FOR FACULTY**

* Faculty should keep track of the students with low attendance and counsel them regularly.
* The course coordinator will arrange to communicate the short attendance (as per UPES policy) cases to the students and their parents monthly.
* Topics covered in each class should be recorded in the table of RECORD OF CLASS TEACHING (Suggested Format).
* Internal assessment marks should be communicated to the students twice in a semester.
* The file will be audited by respective IQAC members for theory as well as for lab as per schedule.
* The faculty is required to maintain these files for a period of at least three years.
* This register should be handed over to the head of department, whenever the faculty member goes on long leave or leaves the Colleges/University.
* For labs, continuous evaluation format (break-up given in the guidelines for result preparation in the same file) should be followed.
* The department should monitor the actual execution of the components of continuous lab evaluation regularly.
* Instructor should maintain record of experiments conducted by the students in the lab weekly.
* Instructor should promote students for self-study and to make concept diary, due weightage in the internal should be given under faculty assessment for the same.
* Course outcome assessment: To assess the fulfilment of course outcomes two different approaches have been decided. Degree of fulfillment of course outcomes will be assessed in different ways through direct assessment and indirect assessment. In Direct Assessment, it is measured through quizzes, tests, assignment, Mid-term and/or End-term examinations. It is suggested that each examination is designed in such a way that it can address one or two outcomes (depending upon the course completion). Indirect assessment is done through the student survey which needs to be designed by the faculty (sample format is given below) and it shall be conducted towards the end of course completion. The evaluation of the achievement of the Course Outcomes shall be done by analyzing the inputs received through Direct and Indirect Assessments and then corrective actions suggested for further improvement.
* At the completion of the course, course attainment and other documents should be shared with the program coordinator for computation of Program attainment.
* At the completion of the course Faculty members are suggested to share the innovative teaching techniques along with the course plan (format provided by IQAC).
* Faculties are encouraged to share the master/expert classes evidence (as per the event report format)
* Faculties are also encouraged to include MOOCs,,SWAYAM any other online content and share the evidence of MOOCs courses /online courses referred (as per the event report format).
* Faculties are encouraged to share the evidence related to interventions or initiatives focusing the unique/slow and Fast Leaners along with Course Completion files.

**INDIRECT ASSESSMENT**

**Sample format for Indirect Assessment of Course outcomes:**

|  |
| --- |
| NAME: |
| ENROLLMENT NO: |
| SAP ID: |
| COURSE: |
| PROGRAM: |

Please rate the following aspects of course outcomes of --------------------.

Use the scale 1-3\*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Course Outcomes | Statement | 1 | 2 | 3 |
| CO1 | Write basic applications using HTML, CSS, and JS, understand use of jQuery and AngularJS. |  |  |  |
| CO2 | Use and develop backend using NodeJS and express. |  |  |  |
| CO3 | Use MongoDB for web application data storage. |  |  |  |
| CO4 | Data visualization using D3.js. |  |  |  |
| CO5 |  |  |  |  |
| CO6 |  |  |  |  |
| CO7 |  |  |  |  |

MODERATE

3

STRONG

2

WEAK

1

**\***