COURSE DESCRIPTION FORM

INSTITUTION FAST School of Computing, National University of Computer and Emerging Sciences, Islamabad

PROGRAM (S) TO BE EVALUATED BS-CY **Fall 2024**

Course Description

Course Code	CS4032
Course Title	Web Programming
Credit Hours	3
Prerequisites by Course(s) and Topics	NA
Grading Policy	Absolute Grading
Policy about missed assessment items in the course	Retake of missed assessment items (other than sessional/ final exam) will not be held. Student who misses an assessment item (other than sessional / final exam) is awarded zero marks in that assessment item i.e., late submission will not be accepted. For missed sessional/ final exam, exam retake/ pretake application along with necessary evidence are required to be submitted to the department secretary. The examination assessment and retake committee decide the exam retake/ pretake cases.
Course Plagiarism Policy	Plagiarism in project or midterm/ final exam may result in F grade in the course. Plagiarism in an assignment will result in zero marks in the whole assignments category.
Assessment Instruments with Weights (homework, quizzes, midterms, final, programming assignments, lab work, etc.)	100% Theory Assessment items of Theory and Lab Part

Assessment Item	**Number**	**Weight (%)**
Assignments	>=5	10
Quizzes/Tasks	>=5	12
Sessional	2	13
Project	1	12
Final Exam	1	40

Course Instructors	Dr. Sana Aurangzeb
Lab Instructors (if any)	NA
Course Coordinator	Dr. Sana Aurangzeb
URL (if any)	**Google Classroom**

Current Catalog Description	Web Development Technologies, Frontend & backend technologies, HTML/HTML5, CSS/CSS3, JavaScript, TypeScript, NodeJS, ReactJS, ExpressJS, MongoDB, MERN Stack, Serverless Stack Development and best practices in web programming.
Textbook (or **Laboratory Manual** for Laboratory Courses)	**Web Application Architecture Principles, protocols and practices** by Leon Shklar and Richard Rosen **The Missing Link: An Introduction to Web Development and Programming** by Michael Mendez
Reference Material	**Learning JavaScript**, 3rd Edition by Todd Brown **Full Stack JavaScript Development with MEAN** By Adam Bretz & Colin J. Ihrig **Full-Stack React Projects**, Second Edition by Shama Hoque
Course Learning Outcomes	**A. Course Learning Outcomes (CLOs)** After completion of the course, the students shall be able to: 1. Work on modern web Application development technologies 2. Able to design and develop front end and backend 3. Develop and design web applications using modern web development frameworks 4. Understand the best web development practices being followed in the industry and how to implement it in the systems 5. Well trained on industry-oriented web frameworks. 6. Work in a team to complete enterprise project and professional ethics and responsibilities. 7. Learn how to use different web frameworks to create a complete industry-oriented project 8. Able to develop web based on MERN Stack 9. Able to develop Serverless Stack web applications

B. Program Learning Outcomes

For each attribute below, indicate whether this attribute is covered in this course or not. Leave the cell blank if the enablement is little or non-existent.

1. Computing Knowledge:	Apply knowledge of mathematics, natural sciences, computing fundamentals, and a computing specialization to the solution of complex computing problems.	✔
2. Problem Analysis:	Identify, formulate, research literature, and analyze complex computing problems, reaching substantiated conclusions using first principles of mathematics, natural sciences, and computing sciences.	✔
3. Design/ Develop Solutions:	Design solutions for complex computing problems and design systems, components, and processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.	✔
4. Investigation; Experimentation:	Conduct investigation of complex computing problems using research based knowledge and research based methods	✔
5. Modern Tool Usage:	Create, select, and apply appropriate techniques, resources and modern computing tools, including	✔

	prediction and modelling for complex computing problems.	
6. Society Responsibility:	Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal, and cultural issues relevant to context of complex computing problems.	✔
7. Environment and Sustainability:	Understand and evaluate sustainability and impact of professional computing work in the solution of complex computing problems.	✔
8. Ethics:	Apply ethical principles and commit to professional ethics and responsibilities and norms of computing practice.	✔
9. Individual and Team Work:	Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.	✔
10. Communication:	Communicate effectively on complex computing activities with the computing community and with society at large.	✔
11. Project Management and Finance:	Demonstrate knowledge and understanding of management principles and economic decision making and apply these to one's own work as a member or a team.	✔
12. 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 changes.	✔

C. Mapping of CLOs on PLOs
(CLO: Course Learning Outcome, PLOs: Program Learning Outcomes)

		PLOs											
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CLOs	1	✔	✔	✔		✔							✔
	2	✔	✔	✔		✔							✔
	3	✔		✔									✔
	4	✔	✔	✔	✔	✔		✔				✔	✔
	5	✔		✔		✔							✔
	6	✔		✔			✔		✔	✔	✔	✔	
	7		✔		✔			✔				✔	✔

Topics Covered in the Course, with Number of Lectures on Each Topic (assume 15-week instruction and one-hour lectures)

Topics to be covered:

List of Topics	No. of Weeks	Contact Hours	CLO(s)
Introduction to Web Development Front-end vs Back-end Development	**1**	**3**	**1,2,7,12**
HTML, HTML5	**1**	**3**	**1,2,3,5,8**
CSS, CSS3	**1**	**3**	
JavaScript fundamentals, ES6	**3**	**9**	**1,2,3,5,8**
DOM	**1**	**3**	
Bootstrap, jQuery	**1**	**3**	
AJAX, FETCH, AXIOS	**1**	**3**	**1,2,3,5,8**
MongoDB	**1**	**3**	**5,12,6**
Introduction to Node	**1**	**3**	**1,2,3,5**
Introduction to Express	**1**	**3**	**1,2,3,5**
Introduction to React Asynchronous JavaScript	**2**	**6**	**1,2,3,5**
Advance topics- Serverless, API	**1**	**6**	**1,2,3,4, 5,12**
Deployment and Web Programming practices and Demos	**1**	**3**	**1,6,7,9,10,11**
Total	**16**	**48**	

Laboratory Projects/Experiments Done in the Course	Introduction to HTML/HTML5, CSS/CSS3, JavaScript, TypeScript, State Management Techniques, MVC/MVVM, NodeJS, MongoDB, ReactJS, Serverless Stack Development is managed with practical quizzes and project.
Programming Assignments Done in the Course	Web Programming using HTML, CSS, JavaScript, TypeScript, MVC/MVVM, NodeJS, ReactJS, Serverless Stack.

Class Time Spent on (in credit hours, Hrs/Min)

Theory	Problem Analysis	Solution Design	Social and Ethical Issues
20	25	50	5

Oral and Written Communications

Every student is required to submit at least __1___ written reports of typically _1____ pages and to make __1___ oral presentation of typically ____5___ minutes' duration.

Lab/ Practical Component of the course

COURSE CONTENTS (Lab/ Practical):			
Weeks	**Contents/Topics**	****Courseware Events** (MM/ IT Lab/Case Study/ Assignment/ Presentation etc.)	**Comments (if any)**
Week-01	Introduction to web technologies	Task0	
Week-02	Developing web pages using HTML and HTML5		
Week-03	Designing web pages using CSS and CSS3	Task 1	
Week-04	Application of Java Script for Web Application development	Assignment 1	
Week-05	State Management Techniques and Data binding	Task2	
Week-06	DOM		
Week-07	Bootstrap, jQuery	Assignment 2	
Week-08	Introduction to NodeJS	Task3	
Week-09	Programming with ExpressJS and NodeJS	Task 4	
Week-10	API (Endpoints)	Assignment 3	
Week-11	Developing database using MongoDB	Task 5	
Week-12	Mongoose	Task 6	
Week-13	Programming with ReactJS	Assignment 4, Project	
Week-14	Programming with ReactJS	Task 7	
Week-15	Hands on experience on MERN Stack	Assignment 5	

Practical/ Programming Work/ Tools: Visual Studio Code, Dreamweaver, Node, MongoDB.