ISLAMIC UNIVERSITY OF TECHNOLOGY

Course Outline and Course Plan

Name of the Teacher	Md. Nazmul Haque	Position	Assistant Professor
Department	Computer Science and Engineering	Programme	B. Sc. in SWE
Course Code	SWE 4637	Course Title	Web and Mobile Application Development.
Academic Year	2022-2023	Semester	Summer (6th)
Contact Hours	3.0	Credit Hours	3.0
Text books and Reference books (if any)	1. FullStack React 2. Learning React 3. Learning React Native	Authors of the books	1. Anthony Accomazzo 2. Alex Banks, Eve Porcello 3. Bonnie Eisenman
Prerequisites (If any)	SWE 4537: Server programming	Curriculum Requirement	Compulsory

Teaching Methods/ Approaches	☑ Lecture	☐ Group discussion	☑ Demonstration	☑ Problem solving
	☐ Project	☐ Others: Presentation by Students		
Teaching aids	☑ Multi-media	☐ OHP	☑ Board and Marker	☐ Others

Course Assessment Method								
Attendance (10%)	Quiz 15% of Total Marks (Best 3 out of 4)						Mid Semester (25%)	Semester Final (50%)
Evaluate based on the participation in the class	1st Quiz Week/Date	2nd Quiz Week/Date	3rd Quiz Week/Date	4th Quiz Week/Date	Others		Week/Date	Week/Date
					Assignment	Homework		
	3rd Week	6th Week	10th Week	13th Week	Will be given accordingly	Will be given accordingly	As per schedule of IUT	As per Schedule of IUT

Course Contents and Objectives	**Contents** **Web Application Development:** Frontend development with React JS. **React JS:** Forms and User Input, React Hooks, State Management **Next JS:** a React JS framework. Full stack development **Data Storage for Web Platform:** Local and Online Server Storage **Cross Platform Mobile App Development:** Android App Development **React Native:** Reusable Components Navigation, State Management, User Interface, Handling Notifications **Data Storage for Mobile Platform:** Local Storage, Firebase **Network Activities from Mobile App:** Using Outside API, Handling HTTP requests **Communication with the Outside World:** API Requests

	Objectives
	The course aims to provide the student with:
	- An understanding of the basic components and structures in web application development with React JS. - Developing a web app that handles user inputs, data storage, network communications, and inputs and notification handling - An understanding of the basic components and structures in mobile application development. - An in-depth understanding of the React Native components, navigation, state management, and user. - Developing a firm grip on the Cross-Platform App Features, Using Outside API and Fundamentals required for making Mobile Applications
Course Outcomes	**CO1 - Understand** the concept of front end (HTML, CSS, JS) with ReactJS and nextJS, Back End (NodeJS, ExpressJS), Database (MongoDB, MySQL), and Android Mobile application. **CO2 - Analyze and explain** the Data Flow, API Functionalities, and User Interface in Web and mobile Platform **CO3 – Recommend** solutions to real-life software projects and design custom hooks using the techniques of React and Android mobile applications languages for web and mobile applications, respectively, with Database (MongoDB, MySQL).

Weekly plan for course content		
Weeks	**Topics**	**Task/Reading**
1	Introduction to HTML, CSS, JavaScript	
2	React introduction, Building Components with React Props and State Management in React Components	Quiz 1 - CO1, CO2
3	Handling User Inputs and Forms Making API Request from React	
4	Understanding React Hooks Data Storage for React	
5	React Context API	
6	Deploying a React App	Quiz 2 – CO1, CO2
7	Next JS, a framework of React JS	
	MID Semester Examination	MID - CO1,CO2,CO3
8	Introduction to NodeJS, ExpressJS	
9	Authorization using JWT, Routing, API design using ExpressJS	Quiz 3 – CO2, CO3
11	Introduction to Android Mobile App development SDK, API, Version, and tools	
12		
13	Activities, services, broadcasts, intents, and UI layouts of Android	
14	Android permission management, data storage, cloud computation and storage mechanism, challenges, and design guidelines	Quiz 4 – CO4,CO5
15		

	Semester Final Examination	Final – CO3, CO4, CO5

Mapping of COs and POs

Course Outcome (CO)	Blooms Taxonomy	Program Outcomes (POs)											
		1	2	3	4	5	6	7	8	9	10	11	12
CO1 - Understand the concept of front end (HTML, CSS, JS) with ReactJS and nextJS, Back End (NodeJS, ExpressJS), Database (MongoDB, MySQL), and Android Mobile application.	C2	√											
CO2 Analyze and Explain the Data Flow, API Functionalities, and User Interface in Web and Mobile Platform.	C3	√	√										
CO3 – Recommend solutions to real-life software projects and design custom hooks using the techniques of React and Android mobile applications languages for web and mobile applications, respectively, with Database (MongoDB, MySQL).	C4			√									

Mapping of Course Outcomes (COs) and Program Outcomes (POs) and Evaluation Methods

Assessment Method	Marks	Mark distributions (as %) on COs and POs		
		CO1	CO2	CO3
		PO1	PO2	PO3
Quiz 1/Quiz 2/Quiz 3/Quiz 4	30%	15%	15%	
Attendance (Class Participation)	10%	10%	-	-
Midterm Exam.	25%	10%	15%	-
Final Exam.	25%	5%	5%	15%
VIVA	10%	5%	5%	
Total	100%	45%	40%	15%

Program Outcomes (POs : PO1 ~ PO12)

PO No.	Program Outcomes (POs)
	Students graduating from the Bachelor of Science in Software Engineering program, upon graduation students will have the ability to:
PO1	**Engineering Knowledge:** Apply knowledge of mathematics, natural science, engineering fundamentals and system fundamentals, software development, networking & communication, and information assurance & security to the solution of complex engineering problems in computer science and engineering.

PO2	**Problem Analysis:** Ability to identify, formulate and analyze complex Software Engineering problems in the areas of hardware, software, theoretical Computer Science and applications to reach significant conclusions by applying Mathematics, Natural sciences, Software Engineering principles.
PO3	**Design/ Development of Solutions:** Design solutions for complex computer science and engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
PO4	**Investigation:** Ability to use research based knowledge and research methods to perform literature survey, design experiments for complex problems in designing, developing and maintaining a computing system, collect data from the experimental outcome, analyze and interpret valid/interesting patterns and conclusions from the data points.
PO5	**Modern Tool Usage:** Ability to create, select and apply state of the art tools and techniques in designing, developing and testing a computing system or its component.
PO6	**The Engineer and Society:** Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice in system development and solutions to complex engineering problems related to system fundamentals, software development, networking & communication, and information assurance & security.
PO7	**Environment and Sustainability:** Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice in system development and solutions to complex engineering problems related to system fundamentals, software development, networking & communication, and information assurance & security.
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of software engineering practice.
PO9	**Individual Work and Teamwork:** Ability to function as an individual and as a team player or leader in multidisciplinary teams and strive towards achieving a common goal.
PO10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project Management and Finance:** Demonstrate knowledge and understanding of engineering management principles and economic decision making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

K

Table 4.1: Knowledge Profile

	Attribute
K1	A systematic, theory-based understanding of the natural sciences applicable to the discipline
K2	Conceptually based mathematics, numerical analysis, statistics and the formal aspects of computer and information science to support analysis and modeling applicable to the discipline
K3	A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline
K4	Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline
K5	Knowledge that supports engineering design in a practice area
K6	Knowledge of engineering practice (technology) in the practice areas in the engineering discipline
K7	Comprehension of the role of engineering in society and identified issues in engineering practice in the discipline: ethics and the engineer's professional responsibility to public safety; the impacts of engineering activity; economic, social, cultural, environmental and sustainability
K8	Engagement with selected knowledge in the research literature of the discipline

P

Table 4.2: Range of Complex Engineering Problem Solving

Attribute	**Complex Engineering Problems** have characteristic P1 and some or all of P2 to P7:
Depth of knowledge required	P1: Cannot be resolved without in-depth engineering knowledge at the level of one or more of K3, K4, K5, K6 or K8 which allows a fundamentals-based, first principles analytical approach
Range of conflicting requirements	P2: Involve wide-ranging or conflicting technical, engineering and other issues
Depth of analysis required	P3: Have no obvious solution and require abstract thinking, originality in analysis to formulate suitable models
Familiarity of issues	P4: Involve infrequently encountered issues
Extent of applicable codes	P5: Are outside problems encompassed by standards and codes of practice for professional engineering
Extent of stakeholder	P6: Involve diverse groups of stakeholders with widely varying
involvement and conflicting requirements	needs
Interdependence	P7: Are high level problems including many component parts or sub-problems

A

Table 4.3: Range of Complex Engineering Activities

Attribute	**Complex activities** means (engineering) activities or projects that have some or all of the following characteristics:
Range of resources	A1: Involve the use of diverse resources (and for this purpose resources include people, money, equipment, materials, information and technologies)
Level of interaction	A2: Require resolution of significant problems arising from interactions between wide-ranging or conflicting technical, engineering or other issues
Innovation	A3: Involve creative use of engineering principles and research-based knowledge in novel ways
Consequences for society and the environment	A4: Have significant consequences in a range of contexts, characterized by difficulty of prediction and mitigation
Familiarity	A5: Can extend beyond previous experiences by applying principles-based approaches

Grading Policy

Numeric Grade	Letter Grade	Grade Point
80% and above	A+	4.00
75% to less than 80%	A	3.75
70% to less than 75%	A-	3.50
65% to less than 70%	B+	3.25
60% to less than 65%	B	3.00
55% to less than 60%	B-	2.75
50% to less than 55%	C+	2.50
45% to less than 50%	C	2.25
40% to less than 45%	D	2.00
Less than 40%	F	0.00

Class Schedule

Day	Section 1	Section 2
Tuesday	10:30 AM – 11:45 AM	08:00 AM – 09:15 AM
Thursday	08:00 AM – 09:15 AM	03:45 PM – 05:00 PM

Student's consulting hour: Email for appointment

Course Teacher contact details:

Md. Nazmul Haque
Assistant Professor
Department of Computer Science and Engineering (CSE)
Islamic University of Technology (IUT)
Board Bazar, Gazipur-1704, Bangladesh.
E-mail: nazmul.haque@iut-dhaka.edu
Contact: +8801521219023, +8801786870220