

**Independent University, Bangladesh Fall 2018**

**Department of Computer Science & Engineering Course Outline**

**CSE309** Web Applications and Internet

Co-offering: CSC455, CEN455

This course will give students the basic background, terminology, fundamental concepts and hands-on experience with the various technologies that are needed to build modern full stack web applications. Although the World-Wide Web was initially conceived as a vehicle for delivering documents, it is now being used as a platform for sophisticated interactive applications. Applications that provide instant access, automatic upgrades, and opportunities for collaboration on a massive scale. Creating full stack web applications requires different approaches than traditional applications and involves the integration of numerous technologies.

In this course, students will adopt a learn by doing approach, and progressively develop a full stack web application as they become familiar with each "layer" of the software technologies involved in a web application, including the user interface, basic visual design and user interaction concepts, markup languages, scripting languages, the web server environment and middleware components, network protocols, data modeling and database technologies.

**General Information**

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| --- | --- | --- |
| Lectures: | **MW 8:00 am - 9:30 am in GPL** | |
| Instructor: | **Shama Hoque** | Email: **shama@tech-dojo.org** |
|  |  | Hours: **After class lecture (by appointment)** |
| Web Forum: | [Piazza Code](http://piazza.com/independent_university_bangladesh/fall2018/cse309/home) **iub-cse309-fall18** | |

**Teaching Method & Assessment**

In this course students will learn by doing. Every week there will be two 90-minute classes; during which students will be introduced to different topics and given related practical assignments to learn the concepts through application. As they progress through the topics in the course, the students will build and continually refine a fully functional full-stack web application as the course project. Students are expected to work in a team for this project throughout the course beyond regular classes, and report project progress in a weekly team meeting with the instructor. Besides performance on the course project, students will be assessed through class assignments, a midterm and a final exam.

**Marks Distribution**

|  |  |  |
| --- | --- | --- |
| **Written Examination (70%)** | | |
| **Classwork** | **10** | To be completed during class |
| **Assignment** | **15** | To be completed individually |
| **Midterm Exam** | **20** | Will be taken during class time |
| **Final Exam** | **25** | Dates are provided by Registrar’s office |
| **Sub-Total** | **70** | Minimum 30 required in written exams to pass this course |
|  |  |  |
| **Course Project (30%)** | | |
| **Code Completeness** | **10** | Code Quality (Readability, Extensibility & Efficiency) |
| **UI/UX** | **5** | Usability - User interface design and User Experience |
| **Full Stack Implementation** | **5** | Frontend, Backend design and integration |
| **Individual Contribution** | **10** | Participation in weekly progress meetings and oral presentation is mandatory |
| **Sub-Total** | **30** | Minimum 15 required in the project to pass this course |
| **Total** | **100** | You have to acquire minimum (30 + 15) = 45 to pass this course |

**Grading Policy**

1. You have to acquire minimum 30 marks out of 70 in the written examination and 15 marks out of 30 in the course project to pass this course.
2. Minimum marks to pass this course is 45 out of 100.
3. The following chart will be followed for grading. Please note that for each category Numbers are inclusive

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **A** | **A-** | **B+** | **B** | **B-** | **C+** | **C** | **C-** | **D+** | **D** | **F** |
| 90-100 | 85-89 | 80-84 | 75-79 | 70-74 | 65-69 | 60-64 | 55-59 | 50-54 | 45-49 | 0-44 |

**Reference Materials**

*Books*

[Learning Web App Development](https://www.amazon.com/Learning-Web-App-Development-JavaScript/dp/1449370195) by Semmy Purewal

[JavaScript: The Good Parts](http://shop.oreilly.com/product/9780596517748.do) by Douglas Crockford

[Secrets of the JavaScript Ninja](https://www.manning.com/books/secrets-of-the-javascript-ninja) by John Resig

[JavaScript: The Definitive Guide, 6th Edition](http://shop.oreilly.com/product/9780596805531.do) by David Flanagan

[Dynamic HTML: The Definitive Reference, Third Edition](http://www.amazon.com/Dynamic-HTML-Definitive-Danny-Goodman/dp/0596527403/ref=sr_1_1?ie=UTF8&s=books&qid=1251152927&sr=1-1) by Danny Goodman

*Online*

[Mozilla Developer Network](https://developer.mozilla.org/en-US/) for documentation on HTML, CSS, and the DOM

[jQuery Learning Center](https://learn.jquery.com/about-jquery/how-jquery-works/), [EJS](http://ejs.co)

[Node.js](https://nodejs.org/)

[Express.js](https://expressjs.com/)

[MongoDB](https://www.mongodb.org/)

**Audit**

IUB Students who are willing to audit the course are welcome and are advised to contact the instructor before they do so, to check availability of space.

**Attendance Policy**

1. It is the student’s responsibility to gather information about the assignments and covered topics during the lectures missed. Regular class attendance is mandatory. Points may be taken off for missing classes. Without 70% of attendance, sitting for final exam may NOT be allowed.
2. The date and syllabus of midterm and final exam is already given in this handout, however, announcements will be given ahead of time if there is any change. There is **NO** provision for make-up assignments or examinations for this course.

**Administrative Policy**

1. All announcements will be made available via [www.piazza.com](http://www.piazza.com). Students have to enroll to this course by themselves.
2. The lecture notes, reading materials, codes, or other resources will be made available prior to the discussion on that material in class so that students may have a cursory look into the materials. Students are recommended to get a printed copy of the lecture note to keep note.
3. Class participation is vital for the better understanding of concepts introduced in class. Moreover, this is considered as an indicator of a good learner. Students are encouraged to participate on raising web technology relevant issues on [www.piazza.com](http://www.piazza.com). Piazza provides an interesting statistics on student participations at the end of each semester. Students may be awarded bonus marks for raising interesting issues and engaging constructively in discussions.
4. Students are invited to raise questions in any point during the lecture.
5. Students should take tutorials with the teaching assistant and/or instructor during the office hours. Prior appointment is required.

**Academic Dishonesty**

1. A student who cheats, plagiarizes, or furnishes false, misleading information in the course is subject to disciplinary action up to and including an F grade in the course and/or suspension/expulsion from the University.
2. Students must maintain the IUB code of conduct.
3. Collaboration with other classmates and between project teams is encouraged for class assignments and the course project, but due credit must be given to contributors.
4. Online resources or code libraries used in assignments or the project must be properly referenced.
5. **No collaboration whatsoever is permitted during examinations.**
6. Plagiarism and other anti-intellectual behavior cannot be tolerated in any academic environment that prides itself on individual accomplishment. If you have any questions about the collaboration policy, or if you feel that you may have violated the policy, please talk to one of the course staff. Although the course staff is obligated to deal with cheating appropriately, we are more understanding and lenient if we find out from the transgressor himself or herself rather than from a third party or by ourselves.

**Non-Discrimination Policy**

The course and University policy prohibits discrimination on the basis of race, color, religion, sex, marital or parental status, national origin or ancestry, age, mental or physical disability, sexual orientation, military status. If you see either by course instructor or any other person related to course showing any form of discrimination, please inform the proctors office of the wrong doing.

**Class, Exam & Project Schedule (Next Page)**

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| --- | --- | --- | --- |
| **Class No.** | **Lecture Topic** | **Contents** | **Project Schedule** |
|  |  |  |  |
| 01 | Course Overview | 1. Learn how to use [www.piazza.com](http://www.piazza.com)  2. Teaching & Learning plan, Assessment  3. Introduction to Git & other tools | Week 1  Team Formation |
| 02 | Internet & World Wide Web | 1. Overview of WWW & Internet  2. Web Application Architectures |
| 03 | Hypertext Markup Language (HTML) | 1. HTML Elements, Links, Forms | Week 2  Project Idea & Scope |
| 04 | Cascading Style Sheets (CSS) | 1. Styling rules, selectors, layouts |
| 05 | Responsive Design | 1. UI design guidelines, Bootstrap intro  2. Debugging in Chrome Dev Tools | Week 3  UI Design & Mockups |
| 06 | Introduction to JavaScript | 1. Basic Programming Constructs with JS |
| 07 | JavaScript In-Depth | 1. JS objects, function callbacks | Week 4  User Interface Coding |
| 08 | Document Object Model (DOM) | 1. DOM manipulation with JS  2. DOM events and Asynchronicity |
| 09 | jQuery | 1. Introduction to jQuery library | Week 5  Frontend Coding,  Data Modeling |
| 10 | Client-side Storage | 1. LocalStorage, IndexedDB, Web SQL DB  3. FileSystem |
| 11 | Browser Server Communication | 1. HTTP  2. REST API  3. AJAX | Week 6  Revise Project Scope |
| 12 | **Midterm Exam** | |  |
| 13 | AJAX API Calls & EJS Templates | 1. jQuery AJAX with third-party APIs  2. Templates with EJS | Week 7  API Design |
| 14 | Web Servers | 1. Backend Design  2. Hosting (Heroku / Cloud Foundry) |
| 15 | Node.js (I) | 1. Introduction to Node.js  2. Server programming with Node.js | Week 8  Backend Design & Implementation |
| 16 | Node.js (II) | 1. NPM modules  2. Socket.io |
| 17 | Express.js | 1. REST API Design  2. Routing API calls | Week 9  Backend Implementation |
| 18 | Server Side Storage Tier | 1. NoSQL vs SQL  2. MongoDB Introduction |
| 19 | Data Validation | 1. Client-side Input validation  2. Server-side data validation | Week 10  Frontend & Backend Integration |
| 20 | Cookies, Sessions & Auth | 1. Cookies & Sessions  2. Authentication & Authorization |
| 21 | Web Security | 1. HTTPS & SSL  2. Network Attacks & Vulnerabilities | Week 11  Revise Project Scope & Wrap Up |
| 22 | Large Scale Apps | 1. Scale-out Web Architecture  2. Load Balancing  3. Cloud Computing |
| 23 | Future of Web Applications | 1. Frameworks & Tools  2. Emerging Technologies | Week 12  Project Submission |
| 24 | **Project Presentation** | |  |
| 25 | **Final Exam** | |  |