National University of Sciences & Technology (NUST)
School of Electrical Engineering and Computer Science (SEECS)
Department of Software Engineering

# Web Engineering

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| **Course Code:** | CS344 | **Semester:** | 5th |
| **Credit Hours:** | 3+1 | **Prerequisite Codes:** | CS212 Object Oriented Programming |
| **Instructor:** | Dr. Qaiser Riaz | **Class:** | BESE 9AB |
| **Office:** | #A103, IAEC Building | **Telephone:** | 9085-2153 |
| **Lecture Days:** | Monday, Tuesday | **E-mail:** | qaiser.riaz@seecs.edu.pk |
| **Class Room:** | CR-13, CR-15 | **Consulting Hours:** | Monday (12pm-1pm) or appointment |
| **Lab Engineer:** | Mr. Aftab Hussain | **Lab Engineer Email:** | aftab.hussain1@seecs.edu.pk |
| **Knowledge Group:** | KGH-PL | **Updates on LMS:** | After every Sunday |

**Course Description:**

The focus of this course is to provide students with the fundamental concepts necessary to better engineer Web applications. The course covers fundamental concepts behind Web engineering, approaches in Web usability and Web application testing, and technologies supporting Web engineering.

**Course Objective:**

The students are expected to achieve the following:

1. Understand about World Wide Web & Internet
2. Will be able to develop Websites and applications
3. Will be able to understand, design and develop techniques for building Web applications
4. Will be able to learn techniques and use them to ensure proper operability, and functioning of a Web application

**Course Learning Outcomes (CLOs):**

| | Upon completion of the course, students should demonstrate the ability to: | | PLO Mapping** | BT Level* |
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| | CLO 1 | Define the concepts relating to World Wide Web | 1 (Engineering Knowledge) | C-1 |
| | CLO 2 | Use design and development techniques for developing user centric and/or data-driven Web applications | 3 (Design/Development of solutions) | C-3 |
| | CLO 3 | Apply implementation strategies provided by various modern frameworks for creating Web applications. | 4 (Investigation) | C-4 |
| | CLO 4 | Design Static and Dynamic Websites and applications using modern tools and frameworks | 5 (Modern Toll Usage) | P-7 |

* BT= Bloom's Taxonomy, C=Cognitive domain, P=Psychomotor domain, A= Affective domain
Knowledge(C-1), Comprehension(C-2), Application(C-3), Analysis(C-4), Synthesis(C-5), Evaluation(C-6)
Perception(P-1), Set(P-2), Guided Response(P-3), Mechanism(P-4), Complete Overt Response(P-5), Adaption(P-6), Organization(P-7)
Receiving(A-1), Responding(A-2), Valuing(A-3), Organization(A-4), Internalizing(A-5)

** Description of Program Learning Outcomes (PLOs) is available on Website and in a separate document.

**Topics to be Covered:**

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| 1. | Introduction to Web & Web applications | 2. | Client Side - Static content |
| 3. | Client Side - Styling to static content | 4. | Client Side – Reading and Storing static content |
| 5. | Client Side – Dynamic content | 6. | Client Side – Managing dynamic content |
| 7. | Server Side – Content generation | 8. | Server Side – Reading and storing dynamic content |
| 9. | Server Side – Passing content within apps | | |

**Lecture Breakdown:**

| Week No. | Topics | Assessment | Remarks |
|---|---|---|---|
| 1 | Introduction to Web & Web applications<br>• Course Introduction, About Web: Definition, Internet Protocols (Layers),<br>• Client Server Model, Request Response Loop, Peer to Peer model.<br>• Role of DNS, HTTP, Uniform Resource Locators (URL), Web Servers | | |
| 2 | Client Side - Static content<br>• HTML: Syntax, Structure, Elements, Markup.<br>• HTML5, Role of W3C, Doc Type, HTML essentials | | |
| 3 | Client Side - Static content<br>• HTML Tags, nested tags, required structured tags, Doctype, Head, Divs, Images, Links, Lists, Tables, Nav Bar | | |
| 4 | Client Side - Styling to static content<br>• CSS1: Syntax, Blocks, Selectors, Properties, Inline styles, Id vs class sectors, Margins, Borders, Text, Style sheets<br>• CSS3: Media Queries, Responsive Grid, Grid layout | | |
| 5 | Client Side – Reading and storing static content<br>• XML: syntax, elements, attributes, parser<br>• DTD: schema | | |
| 6 | Client Side – Dynamic content<br>• Javascript: design, syntax,<br>• XHTML: DOM, Events | | |
| 7 | Client Side – Dynamic content<br>• AJAX and JQuery: Library, syntax, scripting, functions, event actions on clicks | | |
| **8** | **Mid Term Exam** | | |
| 9 | Client Side – Dynamic content<br>• AJAX and JQuery: Variables, , usages, if-else structure, logical operators | | |
| 10 | Client Side – Managing dynamic content<br>• Angular JS: Advantages, features | | |
| 11 | Client Side – Managing dynamic content<br>• AngularJS: Directives, expressions, filters, services, what's new in Angular JS 4 | | |
| 12 | Server Side – Static content<br>• PHP: Server side scripting concept, introduction, syntax, control structures, Datatypes, Strings, printf, | | |
| 13 | Server Side – Content generation<br>• PHP: if-else, do-while, for clause, arrays,<br>• Classes and Objects | | |
| 14 | Server Side – Storing content, Passing content within apps<br>• MySQL: Database & Web, MySQL<br>• PHP: Session variables and JSON | | |
| 15 | Project Week | | |
| **16** | **End Semester Exam** | | |

**Lab Experiments:**

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| Lab 01 | Introduction to DreamWeaver and HTML |
| Lab 02 | HTML Basics |
| Lab 03 | Advanced HTML |
| Lab 04 | CSS |
| Lab 05 | XML and DTD |
| Lab 06 | JavaScript |
| Lab 07 | JQuery |
| Lab 08 | AngularJS Basics |
| Lab 09 | Advanced AngularJS |
| Lab 10 | PHP Basics |
| Lab 11 | Advanced PHP and Laravel |
| Lab 12 | PHP and MySQL and Laravel |
| Lab 13 | Sessions and JSON |

**Tools / Software Requirement:**

Student will work extensively with Chrome/Firefox browser, Adobe Dream Weaver, WAMP and Eclipse/NetBeans/Zend editor

**Books:**

**Text Book:**
1. The Complete Reference, HTML & XHTML (2003), Thomas Powell
2. Web Programming: Building Internet Applications (2007) 2nd, 3rd Edition by Chris Bates
3. Forbes, Alan. The Joy of PHP: A Beginner's Guide to Programming Interactive Web Applications with PHP and MySQL (2015)

**Reference Books:**
1. W3Schools (https://www.w3schools.com/)
2. PHP Homepage (http://php.net/)
3. Stackoverflow (https://stackoverflow.com/)

| **Course Assessment** | |
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| Exam: | 1 Mid Term Exam and 1 End Semester Exam (ESE) |
| Home work: | 4-5 Assignments |
| Lab Assignments: | 12-13 Reports |
| Semester Project: | 1 Report for the term/semester project |

**Course Assessment Weightages (In accordance with NUST statutes)**

**Theory: 75%**
- Assignments 20%
- Mid Term: 30%
- End Semester Exam: 50%

**Practical: 25%**
- Labs Assignments (12 labs minimum): 70%
- Project : 30%

**Grading Policy:**

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| **Quiz Policy:** | The quizzes will be unannounced and normally last for ten minutes. The question framed is to test the concepts involved in last few lectures. Number of quizzes that will be used for evaluation is at the instructor's discretion. |
| **Assignment Policy:** | In order to develop comprehensive understanding of the subject, assignments will be given. Late assignments will not be accepted / graded. All assignments will count towards the total (No 'best-of' policy). The students are advised to do the assignment themselves. Copying of assignments is highly discouraged and violations will be dealt with severely by referring any occurrences to the disciplinary committee. The questions in the assignment are meant to be challenging to give students confidence and extensive knowledge about the subject matter and enable them to prepare for the exams. |
| **Lab Conduct:** | The labs will be conducted for three hours every week. A lab handout will be given in advance for study and analysis The lab handouts will also be placed on LMS. The students are to submit their results by giving a lab report at the end of lab for evaluation. One lab report per group will be required. However, students will also be evaluated by oral viva during the lab. |
| **Plagiarism:** | SEECS maintains a zero tolerance policy towards plagiarism. While collaboration in this course is highly encouraged, you must ensure that you do not claim other people's work/ ideas as your own. Plagiarism occurs when the words, ideas, assertions, theories, figures, images, programming codes of others are presented as your own work. You must cite and acknowledge all sources of information in your assignments. Failing to comply with the SEECS plagiarism policy will lead to strict penalties including zero marks in assignments and referral to the academic coordination office for disciplinary action. |