COLLEGE OF INFORMATION TECHNOLOGY

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE SYLLABUS/ SPECIFICATION

Course Code & Title:	**ITCS 425 – Web Engineering**
Weight:	**(2-2-3)**
Prerequisite:	**ITMS 205 & ITCS 327**
NQF Level Allocated:	**8**
NQF Notional Hours / Credits:	**120 notional hours/ 12 NQF credit**

Description: Modern web applications are complex systems; therefore, a systematic approach is required for developing web-based information systems. This course is to study the concepts, methods, and techniques needed for developing web-based applications. Topics covered: concepts and architecture of web-based information systems, web system development phases, web technologies and the desired quality characteristics of web applications.

Objective:

1. To critically understand concepts, standards, and specialist theories of web applications.
2. To understand the architecture of Web-based information systems.
3. To understand the development phases of web-based information systems.
4. To critically analyze the quality metrics of web-based information systems.
5. To implement web-based information systems using various specialized web tool and technologies.

Semester:

Instructor (s):

Office Telephone: EXT: **Email (s):**

Intended Learning Outcomes (ILOs):

A. Knowledge and Understanding		NQF Descriptor/ Level
A1	**Concepts and Theories:** Demonstrate critical understanding of principles, standards, and concepts related to World Wide Web and web-based applications.	Knowledge: theoretical understanding [Level8]
A2	**Contemporary Trends, Problems and Research:** Demonstrate critical understanding of current issues of web applications as well as research on new trends and web technologies needed to handle these issues.	Knowledge: theoretical understanding [Level8]
A3	**Professional Responsibility: N/A**	

B. Subject-specific Skills		NQF Descriptor/ Level
B1	**Problem Solving:** Critically analyze and identify real world problems and choose the appropriate web design to solve these problems.	Knowledge: Practical Application [Level8] Skills: Communication, ICT & Numeracy [Level8]
B2	**Modeling and Design:** Model different aspects of web applications such as: data, presentation, and hypertext, as well as design a web application that meets web standards by designing front end web page and connecting it to the back end databases.	Knowledge: Practical Application [Level8]
B3	**Application of Methods and Tools:** Use specialized web technologies to implement various web applications such as: Web Markup languages, Web GUI technologies, PHP, and XML.	Knowledge: Practical Application [Level8] Skills: Communication, ICT & Numeracy [Level8]

C. Critical-Thinking Skills		NQF Descriptor/ Level
C1	**Analytic skills:** Critically assess, compare and select emerging and existing web technologies, as well as analyze the quality metrics of web applications to meet the web standards and user needs.	Generic Problem Solving& Analytical skills [Level8]
C2	**Synthetic:** Integrate websites with other IT applications as well as implement web interface for underlying databases.	Generic Problem Solving& Analytical skills [Level8]
C3	**Creative:** Demonstrate creativity in the application of web technologies as well as in the development of effective and efficient web applications to solve real world problems.	Generic Problem Solving& Analytical skills [Level8]

D. General and Transferable Skills (other skills relevant to employability and personal development)		NQF Descriptor/ Level
D1	**Communication:** Express and communicate critical ideas, such as, system specification, system analysis, in written and oral forms.	Communication, ICT and Numeracy Skills [Level 8]
D2	**Teamwork and Leadership:** Demonstrate the ability to work as a group member/leader and share the ideas of each other.	Competence: Autonomy, Responsibility and Context [Level8]
D3	**Organizational and Developmental Skills:** Demonstrate ability to organize ideas and effectively allocate time in given assignments and project.	Competence: Autonomy, Responsibility and Context [Level8]
D4	**Ethical and Social Responsibility: N/A**	

Course Structure (Outline)

Week	Hours		ILOs	Unit/Moduleor TopicTitle	Teaching Method	Assessment Method
	Lecture	Lab				
1	2	2	A1	**Introduction to Internet & World Wide Web:** −History of the Internet & World- Wide Web −Web Browsers −Web Servers −Uniform Resource Locator − Tools and Web Programming Languages.	Lecture	
2	2	2	A1,B3, D1,D3	**Introduction and overview:** −Definitions −Web Standards −Categories of Web Applications − Characteristics of Web Applications. **Hypertext Mark Up Language (HTML) Revision:** −Basic HTML page −Text Formatting −Table −Headers −Linking − Images −List −Meta Elements	Lecture/ Debate/Lab Demonstration	Assignment1/ In-Lab Exercise

3	2	2	A1,B1, B3	−**Web-Based Information System Architecture:** −Fundamentals −Components of a Generic Web Application Architecture −Categorizing Architectures based on integrated components. −Layered Architectures **Cascading Style Sheets(CSS) Revision:** − Inline, Internal and External Style Sheet − Conflicting Styles − Positioning Elements Backgrounds, Element Dimensions, Text Flow and the Box Model −User Style Sheet	Lecture/ Debate/Lab Demonstration	In-Lab Exercise
4-5	4	4	A1,B1, B3	**Requirements Collection:** −Where Do Requirements Come From? Requirements Engineering Activities − RE Specifics in Web Engineering − Principles for RE of Web Applications − Adapting RE Methods to Web Application Development. **Writing Basic PHP Programs:** −Creating PHP Programs −Numbers and Strings −Literals and Variables −Operators and Functions	Lecture/Class Discussion/In-Lab Supervised Work	In-Lab Exercise

6-7	4	4	B1,B2, B3,D1, D3	**Modeling:** −Fundamentals −Modeling Requirements −Content Modeling −Hypertext Modeling −Presentation Modeling **Forms & PHP:** −Creating Form Controls − Using Values Returned From Forms Using PHP	Lecture/In-Class Supervised Work/In-Lab Supervised Work	Assignment2/ In-Lab Exercise
8-9	4	4	A2,B1, B2,B3, D1,D3	**Web Applications Design.** **Web Applications Design and Relational Database:** −Relational Database Model − SQL (SELECT, WHERE, ORDER BY, INNER JOIN, INSERT, UPDATE and DELETE statements)	Lecture/ Independent Learning/In-Lab Supervised Work	In-Lab Exercise/ Assignmen t3 (Literature Review, week9)
10-12	6	6	A1,B1, B3,C1, C2	**The Quality Characteristics of Web Applications:** Usability, Performance and Security. **PHP Database Connectivity (Integration of application to data layer):** −Connecting to Database Server −Selecting Databases −Checking for Errors − Closing the MySQL Server Connection	Lecture/In-Class Supervised Work/Lab Demonstration/ In-Lab Supervised Work	Major Test (week10)/In - Lab Exercise
13	2	2	B1,B3	**Manipulating Data in MySQL Using PHP** − Inserting, Viewing, Updating and Deleting Records −Manipulating joined tables **User Authentication** −Creating Session −Authorization Level	In-Lab Supervised Work	In-Lab Exercise

14	2	2	A1,B1, B2,B3	**Security in Web** - Synchronous and Asynchronous Communication among web services - Same session protocol - Same Origin Protocol - Improving security **Extensible Markup Language (XML)** −Introduction −Structuring Data −Document Type Definition −XML Vocabularies − Document Object Model (DOM) with JavaScript −Extensible Style sheet Language Transforms (XSLT)	Lecture/Lab Demonstration/ In-Lab Supervised Work	Lab Test
15	2	2	A2,B1, B2,B3, C1,C2, C3,D1, D2,D3	**Student Project**	Project Supervision	Evaluation of Project Presentations and Reports
16	2	-	A1, A2,B1, B2,C1	All Topics		Final Exam

* Formative assessment

Teaching Materials:

Textbook(s):	1. Rajiv Chopra. (2016) *Web Engineering,* 1st Edition, PHI Learning Pvt Ltd, ISBN: 978-8120352544 2. Robin Nixon (2018) *Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5*, 5th Edition, O'Reilly Media, ISBN: 978-1491978917
Handout(s):	PowerPointslidesavailableonMoodlei.e.http://www.ahlia.edu.bh/moodle
Reference(s):	1. Sebesta R.W. (2014) *Programming the World Wide Web*,8th edition, Pearson. 2. Pressman R. and Lowe D. (2008) *Web Engineering: a practitioner's approach*, First Edition, McGraw Hill 3. Kappel G., et al. (2006) *Web Engineering: The Discipline of systematic Development of Web Applications*, First Edition, John Wiley &Sons.

	4. Suh W. (2005) *Web Engineering: Principles and Techniques*, Idea Group Inc. 5. Ullman L (2016) *PHP for the Web: Visual Quick Start Guide*, Fifth Edition, Peach pit Press. 6. Naramore E., Gerner J., Scouarnec Y.L., et al., (2005) Beginning PHP5, Apache, MySQL Web Development: Programmer to Programmer, John Wiley & Sons Inc., ISBN: 9780764579660.

Assessment

Method of Assessment	Description	Learning Outcomes	Weighting
In-Lab Exercises	Exercises cover problem solving questions and help the student in differentiating the importance of each web technology.	B1,B3, C2	Formative
Lab Test	A practical test of two hours to assess students' skills in developing web applications.	B1,B3, C2	20%
Assignments	Three assignments to be given to students, each assignment worth 5 marks and their average will be considered at the end. The assignments will assess students' skills in differentiating, analyzing, and modeling web applications in addition to literature review.	A1,A2, B1,B2, D1,D3	5%
Major Test	The major test is a written, in-class 90 minutes test. It will cover topics studied in the first 10 weeks. The majority of the test's questions are problem solving, short answer, and analysis questions.	A1,B1, B2,C1	20%
Project	Student will work as groups of 2-4 members to develop a web application as project. This will go through several phases in which the student should design, implement, and test a web application of his/her choice.	A2,B1, B2,B3, C1,C2, C3,D1, D2,D3	15%
Final Exam	The final exam is a comprehensive, written exam and will be of two hours. It will consist of analysis, design and modeling, short-answer and essay questions.	A1,A2, B1,B2, C1	40%
Overall:			**100 %**

Admissions	
Minimum number of students	**5**
Maximum number of students	**20**

Ahlia University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see www.ahlia.edu.bh/integrity **for more information).**