COLLEGE OF ENGINEERING
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CMPS 356 / Software Development of Enterprise Applications

Spring 2017

Instructor Information

Dr. Abdelkarim Erradi
Assistant Professor
Office: 132 Female Engineering Building
Phone: 4403 4254
Email: erradi@qu.edu.qa
Office Hours:

- **Sunday 9 to 10am** at 132 Female Engineering Building (for female students)
- **Tuesday 9 to 10am** at CSE Meeting Room BCR-E104 (for male students)
- Other times are available **by appointment only** on Sunday or Thursdays before 2pm

TA Information

N/A

Class/Laboratory Schedule

Classes:
- Sunday and Tuesday 11:00 am to 11:50 am (for male students) - **BCR- Corridor F212**
- Sunday and Tuesday 10am to 10:50am (for female students) - **C07- Female Engineering Bldg. 0243**

Labs:
- Tuesday 3:30 pm - 6:20 pm, BCR- Corridor F212 (for male students)
- Sunday 2:00 pm - 4:50 pm or Monday 3:30 pm - 6:20 pm @ C08- Business Operations Dept. 0224 (for female students)

Coordinator Information

Same as the instructor.

Course Information

Catalog Description:

Introduction to issues, architectures, and technologies for designing and developing multi-tiered enterprise applications. Emphasis on object-relational mapping, multithreading, Web user interface development, application integration patterns, and approaches, internet technology standards such as markup languages, web services, and application security; hands-on project using state-of-the-art software architectures, open source application frameworks, middleware, and development tools to design, develop, test, and secure an enterprise application.

Credits: **3**

Contact Hours: 3

Prerequisites: CMPS 351

Textbook(s):

- Chris Aquino and Todd Gandee, *Front-End Web Development: The Big Nerd Ranch Guide*, 1st Edition. ISBN: 0134433947.

References:

- W3Schools Online Web Tutorials http://www.w3schools.com/
- Mozilla Developer Network https://developer.mozilla.org
- Java EE 7 tutorials http://docs.oracle.com/javaee/7/tutorial/doc/

Course Objectives:

- Use knowledge of enterprise architectures and design patterns in application design.
- Design and implement modular, efficient and scalable enterprise applications.
- Employ state-of-the art application frameworks, middleware and development tools to build enterprise applications.

Course Learning Outcomes (CLO):

1. Design enterprise applications using relevant architectures and design patterns.
2. Construct an enterprise application using different server-side programming frameworks and client-side markup and scripting languages.
3. Demonstrate understanding of common security threats for enterprise applications.
4. Work in groups to design, implement and test an enterprise application using state-of-the-art application frameworks, application programming interfaces (APIs) and development tools.

Relationship of Course Outcomes to Student Outcomes:

Course Learning Outcomes (CLO)	**Related Student Outcomes**							
	a	**c**	**d**	**e**	**h**	**i**	**j**	**k**
1		√					√	
2	√	√				√		
3				√				
4		√	√		√	√		√

Student Outcomes (CS-SO)

a) An ability to apply knowledge of computing and mathematics appropriate to the discipline.
b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.
d) An ability to function effectively on teams to accomplish a common goal.

e) An understanding of professional, ethical, legal, security and social issues and responsibilities.
f) An ability to communicate effectively with a range of audiences.
g) An ability to analyze the local and global impact of computing on individuals, organizations, and society.
h) Recognition of the need for, and an ability to engage in, continuing professional development.
i) An ability to use current techniques, skills, and tools necessary for computing practice.
j) An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.
k) An ability to apply design and development principles in the construction of software systems of varying complexity.

Topics Covered:

Topics	**Chapter**	**Weeks**
Web architectures, protocols and enabling technologies	Online readings	1
Web Interface Technologies: HTML, CSS & Bootstrap	3, 7 and 9	1
JavaScript	17 and 18	1
Ansynchronous JavaScript	14	1
Manipulating DOM using JavaScript	10, 11, 12 and 13	1
Server-side Development with Node.js	15	2
Data Access of a document-oriented database (e.g., MongoDB)	Online readings	1
Single-page application (SPA) using Angular 2	Online readings	2
REST Web Services using JavaEE	Online readings	1
Data Access of relational databases using JavaEE	Online readings	2
Securing Web applications	Online readings	1
Review & Exams	-	1
Total		**15**

Method of Instruction

The course is taught through lectures, examples, demos and a project. The approach adopted is project oriented learning by developing hands-on assignments and a project to reinforce the concepts introduced in the lectures. Throughout the course, students perform hands-on exercises that build their practical knowledge and skills to design, build, test, and deploy enterprise applications using Web technologies, Node.js and Java EE. The course uses examples taken from real applications.

Learning Activities

To achieve the objectives of the course, students will carry out several learning activities:

1. **Readings**: The lectures will follow the topics listed in the course detailed schedule. The students are expected to read the assigned textbook chapter, online resources and slides. The reading assignments will elaborate on information presented in the lectures. **Each student is responsible for reading all related material prior to each lecture.** This is a senior-level course and students are expected to learn independently as much as needed in order to complete the course requirements.

2. **Lectures**: students are expected to attend every lecture; this is where the course material will be discussed and ambiguities clarified. Class participation is highly encouraged. The technologies to be applied in the project and the assignments will be presented in the lectures via examples and demos.
   There are no labs for this course but students are required to practice and extend the examples and the demos provided. Also during some Thursdays time will be allocated to clarify implementation issues and provide further guidelines about the assignments/project.
3. **Lab Activities**: Lab activities / assignments will be given so that students practice and apply the material covered in class. Multiple practical Lab activtives on software development of enterprise applications are carried out individually. Each Lab will require the students to practice the material learned during the course.
4. **Exams:** The midterm and the final exams have a theoretical part and a practical programming part to build a solution to a simplified problem.
5. **Project**: Students will complete a web enterprise application project with significant use cases. The course project involves building a multi-tier (Web Tier, Services Tier, Business Logic Tier, and Data Tier) enterprise application delivered in 3 phases. The project is carried out in groups of three students and it will require the students to leverage the material learned during the course to develop a software architecture, design and implement a real-world enterprise application while meeting relevant quality attribute such performance, availability, interoperability and security. Students are encouraged to build a project team comprising students with varied experiences. Each member of each team must contribute roughly equally to each assignment, and should understand the entire assignment. The project is used as a tool to help the student reinforce concepts and gain a hand-on experience. It also offers an opportunity to study covered concepts in more depth and to apply them to realistic scenarios.

Assessment Methods and Grading Policy

Lab activities/assignments: 30%
Project: 30% (Project delivered in 3 phases delivered and presented in the Lab)
Midterm Exam: 20% (Midterm in week 8. 8% for the theory and 12% for the practical at the Lab)
Final Exam: 20% (Consult final exams timetable. 8% for the theory and 12% for the practical during the last Lab)

ABET Contribution of Course to Professional Component

Math & Basic Science : 0%
Engineering : 40%
Engineering Design : 60%
General Education : 0%

Computer/Software Usage

WebStorm
Node.js

Eclipse for Java EE
Glassfish Application Server
Visual Paradigm UML tool

Laboratory Projects

None

Course Ground Rules

Homework Submission:

All homework or project documents should be written using MS-Word and/or appropriate computer software. All due assignments must be submitted on time through the blackboard system at http://mybb.qu.edu.qa and a hard-copy should be submitted at the beginning of the session. No hand-written submission will be accepted.
Each team should also demo their work to the instructor during office hours throughout the semester. Submissions without demo will get 30% deduction!
Late submission policy: 10 points deduction for each late day.
After posting the grades on Blackboard, an office hour will be announced for the students to review their graded works with the instructor. The student has 10 working days maximum to come to the office hour to review his/her graded work.

Attendance Policy:

University attendance policies will be enforced. Attendance will be taken during each class meeting. You are responsible for all material covered and all announcements made in class. Classes will start on time. No one should be more than 5 minutes late. Switch off mobile phones during lecture time, pay utmost attention to lecture.

Academic Honesty:

Plagiarism (cheating on an exam, sumitting work that is not your own) will not be tolerated. The university rules will be enforced in case of cheating and plagiarism.
Student submissions must submit their own work without copying from the Internet or from other students. Students could be asked to explain their implementation. A student who shares code with another student will be treated the same as the person who does the copying. Outsourcing or getting external help to complete assignments is strongly prohibited, and disciplinary actions will be taken if outsourcing is confirmed.

Support for Students with Special Needs

It is Qatar University policy to provide educational opportunities that ensure fair, appropriate and reasonable accommodation to students who have disabilities that may affect their ability to participate in course activities or meet course requirements. Students with disabilities are encouraged to contact their Instructor to ensure that their individual needs are met. The University through its Special Needs Section will exert all efforts to accommodate for individuals' needs.

Contact Information for Special Needs Section:
Tel-Female: (00974) 4403 3843
Tel-Male: (00974) 4403 3854
Location: Student Activities Building

Email: specialneeds@qu.edu.qa

Academic Support and Learning Resources

The University Student Learning Support Center (SLSC) provides academic support services to male and female students at QU. The SLSC is a supportive environment where students can seek assistance with academic coursework, writing assignments, transitioning to college academic life, and other academic issues. SLSC programs include: Peer Tutoring, the Writing Lab, Writing Workshops, and Academic Success Workshops. Students may also seek confidential academic counseling from the professional staff at the Center.

Contact Information for Students Support and Learning Resources:
Tel: (00974) 4403 3876
Fax: (00974) 4403 3871
Location: Female Student Activities Building
E-mail: learningcenter@qu.edu.qa

Student Complaints Policy

Students at Qatar University have the right to pursue complaints related to faculty, staff, and other students. The nature of the complaints may be either academic or non-academic. For more information about the policy and processes related to this policy, you may refer to the student handbook.

Declaration

This syllabus and contents are subject to changes in the event of extenuating circumstances. The instructor (with approval of the Head of Department) reserves the right to make changes as necessary. If changes are necessitated during the term of the course, the students will be notified by email communication and posting the notification on the online teaching tool Blackboard. It is the student's responsibility to check on announcements made while they were absent.

Faculty Name: Abdelkarim Erradi
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