الجامعـــــــــة الهاشـــميـــــــــة
كلية الاميـر الحسين بـــــن عبدالله الثاني لتكنولوجيا المعلـــومات

The Hashemite University
Prince Al-Hussein Bin Abdullah II Faculty for Information Technology
Department of Software Engineering

Course Syllabus
Fall 2018

Course Title: Software Design and Architecture (Graduate) **Course Number: 121003732** **Prerequisite:** **When and Where: Thursdays** 1-4 IT 210	**Assessment and Course Grade:** • Mid Exam 30% • Final Exam: 40% • Paper Presentations: 5% • Term Paper 25%
Instructors: Dr. Maen Hammad **Office No**: **Contact Info**: mhammad@hu.edu.jo	
Office Hours: **Daily 11-12**	

Course Description

This course provides the student with a working knowledge of the terms, principles and methods of Software Architecture and Component-Based Design, introducing students to a wide variety of processes and alternatives that can be deployed in creating and/or evaluating software architectures and designs. Numerous case studies of working software architectures are studies and the student will acquire an appreciation of the role that software architecture and design activities play in the acquisition and/or development of complex software-intensive systems.
Special consideration is given to the role of architecture and design in software assurance for dependability, including performance, reliability and security, Recent advances in design techniques, software patterns, component based design and design refactoring are introduced

Material

- Textbooks
    a. Software Architecture and Design illuminated, Kai Qian, Xiang Fu, Lixin Tao, Chong-Wei Xu, and Jorge Diaz-Herrera, Jones and Bartlett Publishers. ISBN: 076375420-X, 2010

    b. Software Engineering, A practitioners Approach, Roger Pressman, 7th Edition by Press Man., McGraw Hill 2010.

- Recommended Textbooks (But not required)
    a. Bass, Len; Clements, Paul; and Kazman, Rick. Software Architecture in Practice, Addison-Wesley, 3rd edition, 2012
    b. Peter Eeles and Peter Cripps, The Process of Software Architecting, Addison-Wesley Professional; 1 edition (July 24, 2009)
    c. Ian Gorton, Essential Software Architecture, Springer 2010
    d. George Fairbanks, Just Enough Software Architecture: A Risk-Driven Approach, Marshall & Brainerd; 1 edition (August 30, 2010)

- In Addition, Research papers will be assigned throughout the course and will be posted each week on Moodle. Each student will also develop their own individual reading list for the course in accordance with their selected research paper.

Paper presentations and class participation

Several papers are available on Moodle. These papers are selected from top journals and conferences. The papers will be discussed in class and a student will lead the discussion. Other students must also participate in the discussion. Attendance is a necessary but not sufficient condition to get participation credits for each class.

Course Plan (Tentative)

Week no.	Topic	Reading
1	Introduction to software Design, Design Process and design quality (Design concepts, The Design Methods)	Ch.8 (Pressman)
2	Object Oriented Paradigm	Ch. 4 (Qian)
3,4	Component Level Design	Ch.10 (Pressman) + class notes
5	Hierarchical and Distributed Architectures	Ch. 7+10 (Qian)
6	Introduction to Design Patterns Creational Patterns (Abstract Factory, Builder, Factory Method, Singleton) Structural Patterns (Adapter, Bridge, Composite)	Class Notes
7	Structural Patterns (Decorator, Flyweight, Façade) Behavioral Patterns (Chain, Command, State, Strategy, Visitor)	Class Notes
8-11	**Selected Research Papers to cover:** • Architectural Quality • Design Evolution and Maintenance • Reverse engineering design elements and design patterns • Design bad smells • Tools and frameworks • Refactoring • Literature reviews and case studies	
12-14	**Projects Presentations**	