King Fahd University of Petroleum & Minerals
College of Computer Sciences and Engineering

Information and Computer Science Department

SWE 316: Software Design & Architecture (3-0-3)

Syllabus – Spring Semester 2017-2018 (172)

Class/Laboratory Schedule: 3 lectures per week, 50 minutes each (UTR)
Designation: Core course
Course Website: Blackboard CE 9.1

Instructor	Dr. Sajjad Mahmood
Office	Building 22, Room 109
Office Hours	UTR 11:00 AM – 11:50 AM
	Or by appointment
Phone	860-7698
E-Mail	smahmood@kfupm.edu.sa

Catalog Course Description:
Study of design concepts and notations. Architecture, middleware architectures, design patterns, frameworks and components. Designing for qualities such as performance, security, reusability, reliability. Metrics and measurement. Basics of software evolution, reengineering, and reverse engineering. Students participate in a group project on software design.
Pre-requisites: ICS 202 and SWE 215

Text Book:
- "Software Design: From Programming to Architecture" by Eric J. Braude, John Wiley & Sons, 2004, ISBN: 0 - 471- 42920 -1.

Reference Material:
- Martin Fowler. Refactoring, Improving the Design of Existing Code, Addison Wesley, 1999.
- David Budgen, Software Design, Pearson, Addison Wesley, second edition 2003.
- Timothy C. Lethbridge and Robert Laganière , "Object-Oriented Software Engineering: Practical Software Development using UML and Java", 2nd Ed, 2004.

Course Objectives:
- To develop a thorough understanding of students towards software design. Various aspects of software design like design approaches, design quality, design evolution, design environments and tools, etc. will be highlighted and discussed.
- To learn how to work in teams.
- To enhance communication and writing skills.
- To instill life-long learning skills.

Course Learning Outcomes:
Upon completion of the course, you should be able to:

1. Apply a wide variety of design patterns, frameworks, components, and architectures in designing a wide variety of software.
2. Develop different design solutions taking into consideration conflicting design principles.
3. Use sound software metrics to measure and assess the quality of the software.
4. Restructure existing design in order to improve its quality.
5. Work effectively as leader/member of a development team to deliver quality software design.
6. Express and effectively present a developed software design in a software design document (SDD) for a software project of significant size.
7. Employ appropriate methods and tools for developing design specifications.

Assessment Plan

Assignments	5 %
Quizzes	15 %
Project	15 %
Midterm Exam	30 %
Final Exam (Comprehensive)	35 %

Tentative Schedule

Week	Topic
1	Introduction to Software Process Object-Oriented Review
2	UML Review Object Oriented Design Process
3	Requirements and Domain Classes Design Principles **Quiz # 1 – Tuesday February 6, 2018**
4	Architecture
5	Architecture
6	Principle of Package Design Frameworks **Quiz # 2 – Tuesday February 27, 2018**
7	Principle of Class Design Coupling and Cohesion Types
8	Introduction to Design Patterns Creational Design Patterns
Midterm Exam: Tuesday March 13, 2018	
9	Structural Design Patterns Behavioural Design Patterns
10	Good Design Introduction to Components
11	Java Beans Measurements and Metrics in Design **Quiz # 3 – Tuesday April 03, 2018**
12	Refactoring
13	Refactoring
14	Agile Modelling Design in XP **Quiz # 4 – Tuesday April 24, 2018**
15	Project Presentations **Quiz # 5 – Tuesday May 01, 2018**