King Saud University
College of Computer and Information Sciences
Department of Software Engineering

SWE 321 – SOFTWARE DESIGN AND ARCHITECTURE

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Required Course: 3 hours lecture and 1 hour tutorial/lab per week

Course Description:

This course covers the fundamental design principles and strategies for software architecture and design. Architectural styles and patterns, architecture-centric software design, modeling architectural design decision, architecture connectors, architecture analysis and implementation, applied architectures, designing non-functional properties, deployment and mobility, domain-specific architecture, component oriented design, and service-oriented architecture are presented. Students participate in a group project on software design and architecture and design tools.

Prerequisite(s): SWE 312: Software Requirement Engineering

Textbook(s) and/or Other Supplementary Materials:

- Richard Taylor et al. (2010): Software Architecture: Foundations, Theory, and Practice, John Wiley & Sons. (**primary**)
- Len Bass et al. (2003): Software Architecture in Practice, Addison-Wesley. (**optional**)
- Kai Qian et al. (2009): Software Architecture and Design Illuminated, Jones and Bartlett.(**optional**)

Supplementary:

- David Garlan and Mary Shaw, An Introduction to Software Architecture, January 1994, CMU-CS-94-166.
- Other technical papers

SWE Student Outcomes (SO) Addressed by the Course:

(l) the ability to analyze, design, verify, validate, implement, apply, and maintain software systems
(m) the ability to work in one or more significant application domains
(n) the ability to appropriately apply discrete mathematics, probability and statistics, and relevant topics in computer science and supporting disciplines to complex software systems
(o) the ability to manage the development of software systems

Major Topics Covered:

Introduction to Software Architecture & Design	Software Architecture in the Context
Architecture-Centric Software Design	Architectural Styles and patterns
Architecture Connectors	Modeling Architectural Design Decision
Architecture Visualization	Software Architecture Analysis
Software Architecture Implementation & deployment	Applied Architectures
Design Non-Functional Properties	Domain-Specific Software Engineering

Assessment & Evaluation Plan for the Course:

Students' performance is evaluated based on homework, quizzes, exams, and group projects.

Attendance	Attendance and participation	5 points
Quizzes	2 Quizzes	10 points
Tutorial	Set of lab tutorials	10 points
Project	Teamwork semester project	25 points
Exams	Midterm	25 points
	Final	25 points

Policies:

- Type all homework, you may use some tools e.g., Rational, ArchStudio, Visio, etc.
- Students can discuss homework, but no copying!
- Late Submission Penalty (***50 % of earned points if submitted after the due date within one week, 0 if submitted late more than seven days of the due date).***

Calendar & Outline of Topics

Week	Date (Hijri)	Topics	Due Dates
1	12 / 10	Orientation and Beginning of the semester	
2	19 / 10	Introduction to Software Architecture	
3	26 / 10	Architecture in the Context	Team Formation
4	2 / 11	Basic Concepts	
5	10 / 11	Designing Architectures	Project deliverable 1
6	17 / 11	Architectural Styles I	Quiz 1
7	24 / 11	Architectural Styles II	
8	2 / 12	Architecture Connectors	Project deliverable 2
	4 / 12	Hajj Break	BREAK
9	16 / 12	Architecture Modeling	MIDTERM
10	23 / 12	Architecture Visualization	
11	1 / 1	Architecture Analysis	Quiz 2
12	8 / 1	Architecture Implementation	Project deliverable 3
13	15 / 1	Deployment and Mobility	
14	22 / 1	Applied Architectures and Styles	Project deliverable 4
15	29 / 1	Designing for Non-Functional Properties	
16	6 / 2	Domain-Specific Software Engineering	Project Presentation & Demo
17	13 / 2	FINAL EXAMS	