Prince Sultan University
College of Computer and Info Sciences / Department of Computer Science
Term 261
1st Semester 2026-2027

COURSE SYLLABUS

Mission Statement of the Bachelor of Computer Science Program(s): Provide high quality, computer science education to prepare top graduates through an environment that promotes innovative thinking, ethical behavior, lifelong learning, research, and service to the community

1. **Course number and name:** SE322 Software Design and Architecture

2. **Credits and contact hours:** 3 credits and 4 contact hours (Lectures: 3 Tutorials:1 Lab: 0)

3. **Instructor's or course coordinator's name:** Dr. Reem Alsuhaibani
   a. **Scheduled Office Hours: Office Location:** W377
   b. **Email:** rsuhaibani@psu.edu.sa

4. **Text book, title, author, and year**
   a. **Primary Text:** − Carlos Otero, "Software Engineering Design: Theory and Practice", CRC Press, 2012.

   b. **Other References:**
   - Essential of software architecture, Ian Gorton, 2nd ed.
   - Introduction to Software Engineering Design: Processes, Principles and Patterns with UML2, Copyrighted @ 2006 by Christopher John Fox, Addison Wesley Publishers ISBN 0-321- 41013-0
   - Kai Qian, Xiang Fu, Lixin Tao, Chong-wei Xu, and Jorge Diaz-Herrera. Software Architecture and Design Illuminated, Jones and Bartlett Publishers, ISBN: 9780763754204
   - Software Design Decoded: 66 Ways Experts Think (MIT Press) Hardcover – September 16, 2016.
   - C. Larman, "Applying UML and Patterns: An Introduction to Object Oriented Analysis and Design". Prentice hall, 3rd edition
   - Vogel et al. Software Architecture: A Comprehensive Framework and Guide for Practitioners, Springer, 2009

   c. **Course Website [*Optional*]:** N/A
5. **Learning Management System:** Moodle available at https://lms.psu.edu.sa

6. **Specific course information**

Brief description of the content of the course (catalog description): The main purpose of course is to develop thorough understanding of students towards software design. The course highlights and provides

knowledge on various aspects of software design like middleware architectures, software architecture styles, architectural views and design patterns. Application UML to document software architecture and appropriate use of metrics in design will be highlighted. Basics of software evolution, reengineering, and reverse engineering will be discussed.

a. **Prerequisites or co-requisites:** SE311
b. **Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program:** Required as a Core course in BSSE program

7. Specific goals for the course

a. Specific outcomes of instruction. The student will be able to:

CLO 1: Recognize the principles, strategies, and process of software design and architecture.
CLO 2: Analyze an existing software architecture or design.
CLO 3: Differentiate how various architectural styles and design patterns enhance and degrade a system's functional-and non-functional properties.
CLO 4: Justify architecture and/or design given a collection of requirements.
CLO 5: Present concise and unambiguous architecture and design descriptions.
CLO 6: Create, implement, and present an architecture and design in a group project.

8. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.

Course LOs #	Student Outcomes		
	Computer Science	Software Engineering	Information Systems
1		1	
2		6,7	
3		2,6	
4		4,6	
5		3	
6		2,3,5,7	

9. Brief list of topics to be covered

Topics	CLO(s) alignment	Assessments	**No. of Weeks**
Syllabus and Background Software engineering (revised) Problem solving	1		1
Introduction Software engineering design Why study software engineering design Software design challenges Software design process Software design fundamentals	2		1
Software Architecture Fundamentals of software architecture Key tasks in software architecture Problem-solving in architecture Software Architecture Process Requirements Engineering Designing the Architecture with the 4+1view model	3, 6		2
Software Quality Attributes Architecture and Requirements Quality Attribute Considerations Quality Design Decisions Major Quality Attributes	1, 2, 3	Quiz/HW	1
Architecture Styles and Patterns Overview of Architecture Styles and Patterns History of Architectural Styles and Patterns Classification of Architectural Styles and Patterns	4	Mid Exam	2
Principles of Detailed Design Overview of Detailed Design Key Tasks in Detailed Design Overview of Component Design Designing Internal Structure of Components (OO Strategy) Design Principles for Internal Component Design (SOLID) Designing Internal Behavior of Components	1, 2, 3, 4		2
Creational Design Patterns Patterns in Detailed Design Classification of Design Patterns Documenting Design Patterns Creational Design Patterns	4	Quiz/HW	1
Structural and Behavioral Design Patterns	5, 6		2

Topics	CLO(s) alignment	Assessments	No. of Weeks
Structural Patterns in Detailed Design Behavioral Design Patterns			
Architecture and Design Evaluation Architecture Evaluation Benefits of Architecture Evaluation Methods of Architecture Evaluation ATAM Evaluation	5, 6		1
Documenting Software Architecture and Design Why Document the architecture Documenting a view Documenting beyond the view Documenting Quality	5		1
Project Presentation	1, 2, 3, 4, 5, 6	Project Discussion	1

10. Weight of Assessments

- Phased Project (four deliverables) 15% - Throughout the semester
- Attendance 5% - Throughout the semester
- Quizzes, assignments(Lab), case studies 20% - Throughout the semester
- Mid exam 20% - Week 8
- Final Exam 40% - Week 20

11. Additional Information

Plagiarism and Academic Dishonesty: "Plagiarism can be defined as unintentionally or deliberately using another person's writing or ideas as though they are one's own. Plagiarism includes, but is not limited to, copying another individual's work and taking credit for it, paraphrasing information from a source without proper documentation, and mixing one's own words with those of another author without attribution. In addition, buying a paper or project, or downloading a paper from the Internet, and submitting them as your own are also plagiarism. The penalty for academic dishonesty will bring course expulsion and failure, or even suspension" (Academic Integrity and Syllabus Acknowledgement Form).

Attendance Policies: The University attendance policy will be strictly followed. Students are expected to attend all class sessions and be in class on-time. Missing a class session is a student's responsibility. Missed classes will not be repeated. A total of 16 absences may lead to denial grade DN. It is the student's responsibility to periodically check course website/Moodle for course content, projects assignments, updates and notifications. If a student arrives 10 minutes late to the class, she will be marked late for the hour.

Major Exam Policies: No make-up exams will be allowed except for university accepted documents. Refer to the student regulation handbook for further details. If a makeup exam was approved for a justified

reason, the makeup will be at the end of the semester and all the materials are included in the exam (a comprehensive assessment).

Assignment/Project Policies: Students are expected to actively participate in class discussion and activities. Students must submit their assignments, class exercises and project works on time. Failure to submit on time will result with deduction of 1 mark per day (for assignment & project) and 50% (for class exercises) to their submission marks.

Final Exam Policies: Final exam includes all material covered during the semester (comprehensive).