



Faculty: Information Technology
Department: Software Engineering Program: Bachelor
Academic year: Semester:

Course Plan

First: Course Information

Course No.: 1503370	Course Title: Software Design and Architecture	Credit Hours: 3
Prerequisite: 1503271	Section No.: 1	Lecture Time: 9:00 - 10:00 Sun- -Tues-Thur.
Type Of Course:	<input type="checkbox"/> <i>Obligatory Faculty Requirement</i> <input type="checkbox"/> <i>Elective University Requirement</i> <input type="checkbox"/> <i>Obligatory University Requirement</i> <input type="checkbox"/> <i>Faculty Requirement</i> <input type="checkbox"/> <i>Course Elective Specialty Requirement</i> <input checked="" type="checkbox"/> <i>Obligatory Specialization requirement</i>	
Type of Learning:	<input checked="" type="checkbox"/> <i>Face-to-Face Learning</i> <input type="checkbox"/> <i>Blended Learning (2 Face-to-Face + 1Asynchronous)</i> <input type="checkbox"/> <i>Online Learning (2 Synchronous+1 Asynchronous)</i>	

Second: Instructor's Information

Name:	Academic Rank:			
Office Number:	Ext. Number: -		E-mail:	
Office Hours:	Sunday	Monday	Tuesday	Wednesday Thursday

Third: Course Description

This course offers a comprehensive understanding of software architecture and design principles, techniques, and best practices for building robust, scalable systems. Students will explore architectural patterns, styles, and domain-driven design while engaging in lectures, labs, and group projects to develop problem-solving skills and effective teamwork. Throughout the semester, students will analyze real-world software systems, understand design decisions and trade-offs, and ultimately become equipped to tackle diverse software design challenges and create innovative, maintainable solutions.

Fourth: Learning Source

Main Reference:	<i>Clean architecture</i>		
Author: Martin, Robert C.	Issue No.: 1st	Publication Year: 2017	
Additional Sources & Websites:			
Teaching Type:	<input checked="" type="checkbox"/> Classroom <input type="checkbox"/> Laboratory <input type="checkbox"/> Workshop <input type="checkbox"/> MS Teams <input checked="" type="checkbox"/> Moodle		

Fifth: Learning Outcomes

Course Code	Course Intended Learning Outcomes (CILOs)	Connection To Program ILOs Code
Knowledge		
**K1	Gain knowledge of software architecture and design.	*PK1
K2	Gain knowledge of the different design principles and implementation strategies used in software architecture and design.	PK2
K3	Examine knowledge of essential principles of software architecture and design	PK3
K4	Demonstrate knowledge of essential facts and concepts in software architecture, design, and computing.	PK4
Skills		
***S1	Problem-solving skills	PS1
S2	Modeling and Design:	PS2
S3	Application of Methods and Tools	PS3
S4	Understanding of the principles of software architecture and design.	PS4
S5	Understanding of the different design principles and implementation strategies used in software architecture.	PS5

Competencies		
****C1	Communication	PC1
C2	Teamwork and Leadership:	PC2
C3	Demonstrate understanding of essential facts and concepts in software architecture and design	PC3

C4	Will do independent learning and continuous professional development.	PC4
C5	Creative thinking and innovation	PC5

* P: Program, **K: knowledge, ***S: skills, ****C: competencies.

Sixth: Course Structure

Lecture Date	Intended Teaching Outcomes (ILOs)	Topics	Teaching Procedures*	Teaching Methods**	References***
Week 1	K1,K2,K3 , S4	Introduction: History	Face-to-Face	Lecture, In-class Questions	Textbook
	K1,K2,K3, S4	Generations of Software Architecture and Design, multi-user systems	Face-to-Face	Lecture, In-class Questions	Textbook
	K4, S1, S2	Modularity, component-based systems, future trends	Face-to-Face	Videos	Textbook
Week 2	K1,K2,K3, S4	Design Concepts: What is software design?	Face-to-Face	Lecture, In-class Questions	Textbook
	K1,K2,K3, S4	Introduction to Software Architecture and Design.	Face-to-Face	Lecture, In-class Questions	Textbook
	K4, S1, S2	Design principles	Face-to-Face	Videos	Textbook
Week 3	K1,K2,K3	Operations on components	Face-to-Face	Lecture, In-class Questions	Textbook
	K1,K2,K3	Introduction to Software Architecture and Design part 2.	Face-to-Face	Lecture, In-class Questions	Textbook
	K4, S1, S2	Event-driven architecture	Face-to-Face	Quiz	Textbook
Week 4	K1,K2,K3, S4	Domain-driven design	Face-to-Face	Lecture, In-class Questions	Textbook
	K3, S1,	Online Quiz	Face-to-Face	Lecture, In-class Questions	Textbook
	K4, S1, S2	Design patterns and communication	Face-to-Face	Assignment	Textbook
Week 5	K4, S1	Software architecture comparisons (monolithic, microservices, SOA, serverless).	Face-to-Face	Lecture, In-class Questions	Textbook
	K3, S1, S4	Architectural levels, objectives, criteria	Face-to-Face	Lecture, In-class Questions	Textbook
	K4, S1, S2	Architectural patterns	Face-to-Face	Videos	Textbook
Week 6	K4, S1, S2	Architectural Patterns	Face-to-Face	Lecture, In-class Questions	Textbook
	K4, S1, S2	architectural patterns	Face-to-Face	Lecture, In-class Questions	Textbook
	K4, S1, S2	architectural patterns	Face-to-Face	Assignment	Textbook
Week 7	K4, S1, S2	architectural patterns	Face-to-Face	Lecture, Assignment, Quiz, Lab work	Textbook

	K3, S1, S2	In-class practice	Face-to-Face	Lecture, In-class Questions	Textbook
	K4, S1, S2	Review the chapter	Face-to-Face	Lecture, In-class Questions	Textbook
Week 8	K4, S1	Designing for Performance: Caching strategies, load balancing, and performance monitoring in software architecture and design	Face-to-Face	Lecture, In-class Questions	Textbook
	K4, S1, S2	Security and Resilience in Architecture: Secure design principles, threat modeling, and incorporating fault tolerance and resilience in software architecture and design	Face-to-Face	Lecture, In-class Questions	Textbook
Week 9	K4, S1, C1,C2, S4	Asynchronous Design Patterns: Parallel processing and concurrency in software architecture and design	Face-to-Face	Lecture, In-class Questions	Textbook
	K4, S2, C3,C5, S5	Mutual exclusion and critical sections, design pattern implementations	Face-to-Face	Lecture, In-class Questions	Textbook
	K3, S3,C1,C2	Presentations from students	Face-to-Face	Lecture, Assignment, Quiz Exam, Lab work	Textbook
Week 10	K4, S1, C1,C4,C5, S4	Hardware and software solutions, semaphores, and case studies	Face-to-Face	Lecture, In-class Questions	Textbook
	K3, S1	Hardware and software solutions, semaphores, and case studies	Face-to-Face	Lecture, Assignment, Quiz, Lab work	Textbook
	K4, S1, S2	Designing for Scalability: Scalability concepts	Face-to-Face	Lecture, Assignment, Quiz Exam, Lab work	Textbook
Week 11	K4, S1,C1,C2, S5	Optimizing performance and resource management in software architecture	Face-to-Face	Lecture, In-class Questions	Textbook
	K2, S1	Microservices and modular architectures	Face-to-Face	Lecture, In-class Questions	Textbook
	K4, S1, S2	Microservices and modular architectures	Face-to-Face	Lecture, Assignment, Quiz Exam, Lab work	Textbook
Week 12	K2, S2	Data Storage and Management: Storage organization, storage hierarchy	Face-to-Face	Lecture, In-class Questions	Textbook
	K3, S3	Contiguous vs. noncontiguous storage allocation	Face-to-Face	Lecture, In-class Questions	Textbook
Week 13	K4, S3	Practical examples	Face-to-Face	Lecture, In-class Questions	Textbook
	K4, S3	Practical examples.	Face-to-Face	Lecture, In-class Questions	Textbook
	K4, S1, S2	Practical examples	Face-to-Face	Lecture, Assignment,	Textbook

				Quiz Exam, Lab work	
Week 14	K4, S3	Review	Face-to-Face	Lecture, Assignment, Quiz Exam, Lab work	Textbook
	K4, S3	Review	Face-to-Face	Lecture, Assignment, Quiz Exam, Lab work	Textbook
	K4, S1, S2	Recap and conclude the course	Face-to-Face	Lecture, Assignment, Quiz Exam, Lab work	Textbook

* Learning procedures: (Face-to-Face, synchronous, asynchronous). * * Teaching methods: (Lecture, video.....).

*** Reference: (Pages of the book, recorded lecture, video....).

Seventh: Assessment Methods

Methods	Online Learning	Blended Learning	Face-To-Face Learning	Measurable Course (ILOs)
First Exam				
Second Exam				
Mid-term Exam			30	K1, S1, S2, S3, S4, S5, C1
Participation			15	K1, S1, S2, S3, S4, S5, C1, C2
Asynchronous Activities				
Final Exam			50	K1,K2,K3, S1, S2, S3, S4, S5, C1,C2,C3,C4

Eighth: Course Policies

- All course policies are applied to all teaching patterns (online, blended, and face-to-face Learning) as follows:
 - Punctuality.
 - Participation and interaction.
 - Attendance and exams.
- Academic integrity: (cheating and plagiarism are prohibited).

Approval	Name	Date	Signature
Head of Department	Dr. Mohammad Refai		
Faculty Dean	Prof. M. Hassan		

