Course Specification

(Bachelor)

Course Title: Software Modeling and Analysis

Course Code: CS413

Program: Computer Science

Department: Computer Science

College: College of Computer and Information Sciences

Institution: Majmaah University

Version: 1

Last Revision Date: *Pick Revision Date.*

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (3 (3,0,1))

2. Course type

A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required			☐Elective	

3. Level/year at which this course is offered: (7)

4. Course general Description:

This course presents an integrated set of techniques for software analysis and design based on object-oriented concepts and the UML notation. Topics include introduction to object concepts, fundamentals of object oriented analysis and design process, use-case analysis, object modeling using behavioral techniques, design patterns, design quality and metrics.

5. Pre-requirements for this course (if any):

CS 314-Software Engineering

6. Co-requirements for this course (if any):

7. Course Main Objective(s):

This course introduces students to the concepts of Software Modeling like object-oriented analysis and design, developing uses cases, interaction diagrams, class diagrams, activity diagram, software quality and software cost estimation methods.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100
2	E-learning		
3	Hybrid • Traditional classroom		

No	Mode of Instruction	Contact Hours	Percentage
	● E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	45
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	15
5.	**Others (specify)**	
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1				
1.2				
...				
2.0	**Skills**			
2.1	CLO1-Understand the role of analysis and design in the software engineering lifecycle	S2	Classroom Lectures, Group Discussions, Lab demonstrations, Home assignments, Tutorial classes	Test, Mid Exam, Final Exam, Assignment
2.2	CLO2 - Develop object-oriented designs by applying established design principles	S3	Classroom Lectures, Group Discussions, Lab demonstrations, Home assignments, Tutorial classes	Test, Mid Exam, Assignment, Final Exam
2.3				
2.4				
2.5				

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
3.0	**Values, autonomy, and responsibility**			
3.1	CLO3- Develop use-case and scenario descriptions of the requirements	V1	Classroom Lectures, Group Discussions, Lab demonstrations, Home assignments, Tutorial classes	Test, Mid Exam, Final Exam
3.2	CLO4 - Develop richer descriptions of design models using UML diagrams	V1	Classroom Lectures, Group Discussions, Lab demonstrations, Home assignments, Tutorial classes	Exercises Homework
3.3	CLO5- Understand the role and influence of design patterns and frameworks in software design	V1	Classroom Lectures, Group Discussions, Lab demonstrations, Home assignments, Tutorial classes	Exercise, Assignment

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to object concepts	6
2.	Fundamentals of object oriented analysis and design process	6
3.	Inception, Understanding Requirements, Use-Case Model	6
4.	Identifying Other Requirements, From Inception to Elaboration	6
5.	Elaboration, Use-Case Model: Drawing System Sequence Diagrams, Domain Model: Visualizing Concepts, Adding Associations, Adding Attributes	6
6.	Interaction Diagram Notation, GRASP: Designing Objects with Responsibilities	6
7.	Determining Visibility, Creating Design Class Diagrams, Mapping Designs to Code	6
8.	Designing Use-Case Realizations with GoF Design Patterns	6
9.	Modeling Behavior in Statechart Diagrams	6
10.	Designing the Logical Architecture with Patterns, Design quality and metrics	6
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes	Week 6, Week 9	10%
2.	Assignments / Project / Lab	Week 7,10	20%
3.	Mid Term Exam	Week 8	20%
4.	Case Study	Week 12	10%
5.	Final Exam	Week 16	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development", by Larman, Craig, 3rd edition, 2008
Supportive References	1. Computer Security: Art and Science (2 Volume Set) 1st Edition, Matt Bishop, Addison-Wesley Professional, 2015 2. Core Software Security: Security at the Source 1st Edition, James Ransome and AnmolMisra, Auerbach Publications, 2013. 3. Fundamentals of Information Systems Security, 2nd Edition, David Kim and Michael G. Solomon, Jones & Bartlett Learning, 2014.
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom
Technology equipment (projector, smart board, software)	PC or Laptop with Windows/Linux, Smart Board, Projector
Other equipment (depending on the nature of the specialty)	Internet Connection, Free / Open source tools like Visio, Eclipse Plug-ins available for UML.

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Survey

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of Students assessment	Students	Survey
Quality of learning resources	Peer Faculty Members and Students	Survey
The extent to which CLOs have been achieved	**Students**	**Survey**
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	CS COUNCIL
REFERENCE NO.	
DATE	