Course Specification

(Postgraduate Programs)

Course Title:	**Advanced Software Engineering**
Course Code:	**MSCS 614**
Program:	**Master Programme in Computer Science**
Department:	**Computer Science**
College:	**Computer Science and Information Technology**
Institution:	**King Faisal University**
Version:	*Course Specification Version Number*
Last Revision Date:	*Pick Revision Date.*

Table of Contents

A. General information about the course:

1. Course Identification:

1. Credit hours: 3 (3-0-6)				
2. Course type				
A.	☐University	☒ College	☐Department	☐Track
B.	☒ Required		☐ Elective	
3. Level/year at which this course is offered: : Level 2 , 3 or 4				
4. Course General Description:				

This course is designed to present MS students with an overview of advanced topics in Software Engineering. Students will be exposed to methods and techniques that are gaining increasing gaining attention in the industrial and research communities. To enhance the knowledge of Software engineering best practices must be understood in depth. The topics covered in this course includes: Requirements Engineering, Software Design and Architecture, Design Patterns, Service-Oriented Architectures and Product line engineering, Distributed Software Engineering, Software Verification and Validation, Formal Methods, Software Quality issues, Project Management, Software Project Planning, Risk Analysis, Project Scheduling and Tracking, Project Evaluation and Review Techniques and Recent trend in software engineering. Students shall apply the software engineering techniques discussed in class to homework assignments and projects throughout the course. Both individual and group-oriented exercises will be assigned. Moreover, knowledge about recent trends in software engineering will be discussed. Research paper review and term papers will be assigned on individual and group basis. Class participation is an essential component of the course. Attendance is also must. Students will have opportunities to develop and/or improve their technical writing and software development skills during the course of the term..

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

NA

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

NA

7. Course Main Objective(s):

The objectives of this course are to enhance the knowledge and skills of software engineering by appraising new trends and techniques both from theory and practice. Developing advanced software engineering skills and applying such skills using concepts, methods, principles, standards and techniques of software engineering across varied software domains. Identify and differentiate emerging software development trends across the software life cycle for both large and smaller software systems.

2. Teaching Mode: (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom		
2	E-learning		
3	Hybrid • Traditional classroom • E-learning	45	100%
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**	-
5.	**Others (specify)……**	-
	Total	45

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

Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Recognize new and emerging trends in software engineering.	K1	Lectures	- Quizzes - Exams - Assignments
2.0	**Skills**			
2.1	Develop advanced skills in software engineering by understanding the	S1	- Lectures	- Quizzes - Exams - Assignments

Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
	differences between different techniques, methods and standards			
2.2	Appraise new software engineering trends and technologies and impact on future software applications..	S2	- Lectures	- Quizzes - Exams - Assignments
...				
3.0	**Values, autonomy, and responsibility**			
3.1	Demonstrate team work by applying software engineering skills in projects using cutting edge techniques, technologies and recent research.	V1	- Lectures - Case studies -Research assignment	Project Report and Presentation
...				

C. Course Content:

No	List of Topics	Contact Hours
1. 1	Introduction to Software Engineering, Process Models and Requirements Engineering Techniques and methods.	3.0
2. 2	Design Concepts, Software Quality, Design Models, Component, Deployment Diagrams and Software Architectural Design	3.0
3	Component-Level Design, Software Reuse, Software Product lines, Architectural Patterns, User Interface Design Patterns	6.0
4	Quality Concepts, Software Quality, Software Quality Assurances, Software Reliability	6.0
5	Software Verification and Validation, Product Metrics	3.0
6	Service-oriented Architecture & Software Product Lines. Recent Advances in SOA and SPL (Research Papers)	6.0
7	Project Management Concepts, Metrics in the process and Project Domains, Software Measurement, Software Quality Metrics.	3.0
8	Estimation of Software Projects: The planning process, Software Project Estimation.	6.0

9	Distributed Software Engineering: Multi-Agent Systems, Socio-Technical Systems, Cloud Computing: SaaS, PaaS, IaaS Recent Advances in MAS, STS, Cloud Computing (Research Papers)	6.0
10	Project Scheduling, Risk Management: Software Risks, Risk Identification, Risk Projection, Risk Refinement, Risk Mitigation, Monitoring, and Management	3.0
Total		**45**

D. Students Assessment Activities:

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Assignments	Continuous	10%
2.	Quiz	Continuous	10%
3.	Mid Term	8th- 9th	25%
4	Capstone Project	15th	15%
5	Final Exam	16th- 17th	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:

Required Textbook	*"Software Engineering"* (10th Edition) by Ian Somerville, Publishers: Pearson Higher Ed USA (2015). ISBN: 9781292096131.
Essential References	*1. "Fundamentals of Software Engineering"*, Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, Prentice Hall Copyright: (2003), ISBN: 0-13-305699-6 *2. "Software Engineering: A Practitioner's Approach"*, Roger S. Pressman, 7th Edition, McGraw-Hill, (2009).
Supportive References	
Electronic Materials	IEEE/ACM Journal / Conference Papers on Software Engineering
Other Learning Materials	Electronic Materials, Web Sites etc. for any recent resources related to Advanced Topics in Software Engineering

2. Educational and Research Facilities and Equipment Required:

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Sufficient seats (typically 20) as per student registration required in the lecture
Technology equipment (Projector, smart board, software)	Sufficient computer terminals with required setup having the necessary software installed

Items	Resources
	and configured for the students to complete assignments and projects. Data show is needed to demonstrate in the class
Other equipment (Depending on the nature of the specialty)	Not Required

F. Assessment of Course Quality:

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Indirect Assessment through Teaching Evaluation
Effectiveness of students' assessment	Faculty	Indirect assessment through Course Evaluation Survey
Quality of learning resources	Students	Indirect Assessment through Learning Resources Survey
The extent to which CLOs have been achieved	**Faculty**	Direct assessment through Rubrics analyses
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval Data:

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	