Course Specification

(Bachelor)

Course Title: Advance Software Engineering	
Course Code: CSC 1405	
Program: Bachelor in Computer Science	
Department: Computer Science	
College: Faculty of Computers and Information Technology	
Institution: University of Tabuk	
Version: 1.0	
Last Revision Date: 27 July 2022	

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A. General information about the course:

1. Course Identification

1. Credit hours: (3)

2. Course type

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

3. Level/year at which this course is offered: (Level 7/8-Year 4)

4. Course general Description:

This intensive course delves into the advanced concepts and methodologies of software engineering, preparing students to become leaders in the field. Building on foundational knowledge of software development, the course explores cutting-edge techniques and philosophies in software design, development, testing, and maintenance, emphasizing their practical application in real-world scenarios.

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

CSC1301 Software Engineering

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

7. Course Main Objective(s):

- Learn the students the state-of-the-art in terms of what problems can be solved and what are the current exciting challenges.
- Describe to students how select the best approach for large systems and small systems.
- Teach the students the main concepts of agile software engineering.
- Familiarize the students with the software evolution and software reuse.
- Give the students the fundamentals of development of distributed systems and embedded systems.
- State the concepts of Dependability and Security Engineering
- State the concepts of quality management.
- Teach the students how to review, analyze and evaluate selected papers.
- Train students to work in a team effectively and independently.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100%
2	E-learning		
3	Hybrid ● Traditional classroom ● 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**	
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	**Describe the main agile software development concepts and process.**	**K1**	Lectures Group discussions	Exams Assignments
1.2	**Demonstrate the object oriented development concepts.**	**K4**	Lectures Group discussions	Exams Assignments

Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
1.3	State the concepts of software evolution and software Reuse.	K3	Lectures Group discussions	Exams Assignments
1.4	State the fundamentals of software dependability and security engineering.	K2	Lectures Group discussions	Exams Assignments
1.5	Describe the fundamentals of distributed software and component based software.	K3	Lectures Group discussions	Exams Assignments
1.6	Describe the main agile software development concepts and process.	K2	Lectures Group discussions	Exams Assignments
2.0	Skills			
2.1	Analyze and compare different methods used in large system modeling.	S4	Lectures Group discussions	Exams Project Assignments
2.2	Apply the concepts of agile software development.	S1	Lectures Group discussions	Exams Project Assignments
2.3	Explain the concepts of components based software development and distributed systems.	S2	Lectures Group discussions	Exams Project Assignments

Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
2.4	**Explain the activities of quality management process.**	S3	Lectures Group discussions	Exams Project Assignments
2.5	**Analyze and evaluate a selected paper in software engineering.**	S5	Lectures Group discussions	Exams Project Assignments
3.0	**Values, autonomy, and responsibility**			
3.1	**Examine with CASE tool to perform a variety of models as part of the overall development process.**	V1	Lectures Group discussions	Exams Project Assignments

C. Course Content

No	List of Topics	Contact Hours
1.	**Agile software development:** Understand different agile methods include Extreme programming XP as well as spring and rapid model for software development. Comparing between Agile development and plan-driven development	3
2.	**Software Evolution:** Evolution processes, Program evolution dynamics , software maintenance ,legacy system management	3
3.	**Security Engineering part 1:** security management during software development, security risk assessment, design for security	3
4	**Security Engineering part 2:** security management during software development, security risk assessment, design for security	3
5.	**Component-based:** component-based software engineering processes, component composition, components reuse.	3
6.	**Distributed Software Engineering part 1:** distributed systems overview, client-server computing engineering.	3
7.	**Distributed Software Engineering part 2:** Architectural patterns for distributed systems, Software as a service engineering.	3
8.	**Embedded Systems engineering:** embedded systems design, architectural patterns , timing analysis	3
9.	**Dependability engineering part 1:** Redundancy and diversity, Dependable processes, Dependable systems architectures	3

10.	**Dependability engineering part 2:** Dependable programming, dependability engineering	3
11.	**Project management part 1:** risk management, software project management	3
12.	**Project management part 2:** managing people, strategy management	3
13.	**Project planning part1:** software pricing, project scheduling , agile planning, COCOMO cost modeling	3
14.	**Project planning part 2:** software pricing, project scheduling , agile planning, COCOMO cost modeling	3
15.	**Quality management :** software quality, software standards, review and inspection for quality purposes	3
	Total	**45**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Assignments	3,6,9,12	10%
2.	Project	14	20%
3.	Mid term 1	6,7	15%
4.	Mid term 2	11,12	15%
5.	Final Exam	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	Software Engineering, Ian Sommerville, 2018, 10th Edition, Prentice Hall, ISBN- 9332582696-978-9332582699.
Supportive References	● **Software Engineering: Modern Approaches,** Eric J. Braude **and** Michael E. Bernstein**, 2011, 2nd Edition , Wiley.**
Electronic Materials	**https://www.smartdraw.com/**
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities	Lecture room of each section to accommodate 40 students

Items	Resources
(Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	
Technology equipment (projector, smart board, software)	Projectors, data show, smart board, etc.
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of Teaching	Faculty, Program Leaders, and Advisory Board	Both Direct and Indirect
	Students	Indirect
Effectiveness of Students Assessment	Faculty, Program Leaders, Advisory Board, and Independent Opinion	Both Direct and Indirect
Quality of Learning Resources	Faculty, Students, and Advisory Board	Indirect
The Extent to which CLOs have been Achieved	Faculty, Program Leaders, Advisory Board, and Independent Opinion	Direct (as in section B) and Indirect/Surveys
	Students	Indirect
Other	-	-

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	