Course specification

(4103 Software Engineering(2))

Faculty:	HICIT- **Higher Institute for Computers & Information Technology**-El Shorouk Academy
Programme(s) on which the course is given:	Under graduate program in Computer Science
Major or minor element of programme:	Compulsory
Department offering the programme	Department of Computer Science
Department offering the course:	Department of Computer Science
Year / Class	4th Year – 1st semester
Date of specification approval	1/8/2022

A- Basic Information

Title: Software Engineering(2)	*Code:* 4203		
Weekly Hours:			
Lecture : 3	**Exercise: -**	**Practical :3**	**Total: 6**

B- Professional Information

1- Course Objectives:

Understand the problems of managing large software development projects, and the techniques used to address them, including:

After completing this course, the student should acquire the knowledge of:
- Software testing techniques
- Software metrics
- Software Quality management
- Software maintenance
- Software Configuration management

2- Program ILOs Covered by Course

Program Intended Learning Outcomes			
Knowledge and understanding	**Intellectual Skills**	**Professional and practical skills**	**General and Transferable skills**
A9, A11, A15, A16, A18, A20, A21	**B2, B4, B5, B6, B7, B8, B11, B12, B14, B15, B18, B19**	**C2, C3, C4, C5, C6, C9, C10, C11, C13, C15, C17, C18, C19**	**D1, D2, D3, D4, D6, D7, D8, D9, D10, D12**

3 - Intended learning outcomes of course (ILOs)

In this course student will understand the management activities involved in the conventional software life cycle models; student will be aware of the potential benefits of good software project management; student will be able to perform thorough testing of software projects; student will be able to apply software quality management techniques; and student will understand the importance of controlling the software development process to achieve software quality and will be aware of some relevant techniques and tools. The student will also understand the importance of software configuration management and software maintenance and will be aware of some relevant techniques and tools.

Successful completion of the Software Engineering course should lead to the following outcomes:

a. Knowledge and Under-Standing:

a1. Define the importance of product and process quality in the software development process [A9, A15]

a2. Explain how the software testing can be performed and managed using different methods and techniques. [A18]

a3. Clarify the reasons for a highly structured approach to the software lifecycle and understand the properties of good software and how these relate to different types of software, and how to improve the software process. [A9]

a4. Explain the goals and deliverables of software configuration management and how to control software change. [A15]

a5. Define the role and scope of software maintenance. [A11]

b. Intellectual Skills:

b1. Demonstrate how a software team prepares test plans and test cases. [B7,B18]

b2. Discuss the basic concepts and principles of the software quality management. [B15]

b3. Discuss the basic concepts and principles of software process improvement, and the role Of CMMI in this domain. [B7, B8, B12, B15]

b4. Identify important issues in configuration management of software. [B4,]

b5. Evaluate the categorize application domains for computer software. [B8, B12]

c- Professional and practical skills

c1. Apply the process models to software development. [C5, C10]

c2. Apply the management activities in the conventional software life cycle models. [C5]

d- General and transferable skills

d1. Collaborate effectively within multidisciplinary team. [D3]

d2. Work in stressful environment and within constraints. [D4]

d3. Prepare technical reports, and a dissertation, to a professional standard; use IT skills and display mature computer literacy. [D12]

d4. Lead and motivate individuals. [D6]

d5. Search for information and adopt life-long self-learning. [D8]

4 – Contents

Topic	Hours	Lec.	Exc/Lab
Software Testing Techniques: White box testing, black box testing	6	3	3
Software Testing Techniques: Unit testing, integration testing	6	3	3
Software Testing Techniques: Validation testing, system testing	6	3	3

Quality management: Quality Assurance and Standards.	6	3	3
Quality Planning, Quality Control.	6	3	3
Software measurements and metrics.	6	3	3
Process Improvement: Process and Product Quality	6	3	3
Process Classification, Process Measurement	6	3	3
The SEI Process Capability Maturity Model	6	3	3
Software Maintenance: maintainability, Maintenance tasks.	6	3	3
Change, Version and Release Management.	3	3	3
Selected Topics	3	3	-
Course Project	12	6	6

5 - Teaching and learning methods

Teaching and learning methods	Used
Active Learning	
Lectures	√
Tutorial Exercises	-
Practical Lab (blending learning– online learning)	√
Exercises	-
Discussions.	√
Self – Learning strategy	
Reading material	√
Websites search	√
Research and reporting	√
Self-studies	√
Experimental strategy	
Group work	√
Presentation	-
Problem solving strategy	
Problem solving/problem solving learning based	-
Case study	√
Synchronous E-Learning	
Virtual lab	-
Virtual class	-
Chat Room	-
Video lectures	-
Asynchronous E-Learning	
E-Learning	√

6 -Student assessment methods

Methods	Assessment	Used
Electronic Midterm Exam	To assess the knowledge and understanding achieved by the student during the previous weeks. (Online on e-learning hub)	√
Pencil-to-Paper Final Exam	To evaluate what the student gain at the end of the course, and to assess: the knowledge and understanding, general skills, and intellectual skills.	√
Course Project	To allow students work in team, and to evaluate knowledge, understanding, intellectual, and transferable skills. (Online on e-learning hub, FTF)	√
Electronic Course Work & Quizzes	To keep the student always in the course, and to evaluate knowledge, understanding, intellectual, and transferable skills. (Online on e-learning hub)	√
Practical Exam	to measure the ability of students to design and implement a software program (FTF).	√
Participation	To assess the knowledge and understanding achieved by the student during the previous weeks.	√

Assessment Schedule

Assessment	Week #
Participation	3-14
Electronic Mid Term Exam	8
Final Exam	16
Course Project	3-14
Course Work &Quizzes	2-14
Practical Exam	15

Assessment Weight

Assessment	Weight %
Participation	
Electronic Mid Term Exam	5%
Final Exam	30%
Course Project	10%
Course Work &Quizzes	5%
Practical Exam	10%
Total	100

- Course Work &Quizzes:
  o Short Exams, Assignments, Research, Reports, Presentations on e-learning hub
  o Class/Project discussion in a virtual classroom

6 -List of references

Essential books	- Sommerville, I. (2000, August 1). *Software Engineering*. https://doi.org/10.1604/9780201398151
Course notes	- http://ranger.uta.edu/~elmasri/ - http://infolab.stanford.edu/~ullman/dscb/gslides.html - http://www.mysql.com/
Recommended books	- Graham, D., Black, R., & Veenendaal, E. V. (2019, July 19). *Foundations of Software Testing : ISTQB Certification*. -
Periodicals, website	PowerPoint presentations of all course materials All labs material [https://moodle.sha.edu.eg/course/view.php?id=1370] [https://drive.google.com/drive/folders/1G9cuT3oXxBV7CCWQdyXIqqTvD_jl6t5o]

7- Required Facilities

To assess professional and practical skills given the following facilities:

a. Tools & SW (Technologies facilities):

- **Eclipse IDE 2020-09**
- **TestNG Eclipse plug-in**
- **Microsoft Office Excel**
- **Microsoft SQL server 2019 platform**
- **portal (MOODLE) to make electronic quizzes and electronic midterm exam**
- **portal (MOODLE) to upload project deliverable and assignment**
- **academy portal (MOODLE) to upload electronic material**

b. Teaching facilities:

	Lecture	*class*	*Lab*
Whiteboard	used	-	used
Pc/laptop	used	-	used
Data show	used	-	used
Webinars	MS TEAMS	-	MS TEAMS
Social Media	Facebook Page for 4th year	-	Facebook Page for 4th year WhatsApp group for 4th year
Chatroom	ChatTeams	-	ChatTeams
Videos	MOODLE	-	MOODLE

Website	MOODLE	-	MOODLE

8- Course Matrices

8.1- Course Content/ILO Matrix

Course Contents	Knowledge & understanding					Intellectual skills					Professional and practical skills		General				
	a1	a2	a3	a4	a5	b1	b2	b3	b4	b5	c1	c2	d1	d2	d3	d4	d5
Software Testing Techniques: White box testing, black box testing		√				√											
Software Testing Techniques: Unit testing, integration testing		√				√											
Software Testing Techniques: Validation testing, system testing		√				√											
Quality management: Quality Assurance and Standards.	√		√				√										
Quality Planning, Quality Control.	√		√				√										
Software measurements and metrics.			√				√										
Process Improvement: Process and Product Quality			√				√	√									
Process Classification, Process Measurement			√							√							
The SEI Process Capability Maturity Model			√							√	√	√					
Software Maintenance: maintainability, Maintenance tasks.				√					√								
Change, Version and Release Management.			√								√	√					
Selected Topic			√				√										
Course Project													√	√	√	√	√

8.2- Learning Method /ILOs Matrix

Learning Methods	Knowledge and understanding					Intellectual skills					Professional and practical skills		General				
	a1	a2	a3	a4	a5	b1	b2	b3	b4	b5	c1	c2	d1	d2	d3	d4	d5
Lectures	x	x	x	x	x	x	x	x	x	x	x	x					
Tutorial Exercises						x	x	x	x	x	x	x					

Reading material	X	X	X	X		X	X	X	X							
Websites search	X	X	X	X		X	X	X	X			X	X	X	X	
Research and reporting	X	X	X	X								X	X			
Problem solving/problem solving learning based																
Group work												X	X	X	X	
Presentations																
Practical Lab					X	X	X	X	X	X	X					
Discussions.					X	X	X	X	X	X	X	X	X	X	X	X

8.3 Assessment Methods /ILOs Matrix

Assessment Methods	Knowledge & understanding					Intellectual skills				Professional & practical skills		General				
	a1	a2	a3	a4	a5	b1	b2	b3	b4	c1	c2	d1	d2	d3	d4	d5
Electronic Mid Term Exam	X	X	X	X	X	X	X	X	X							
Final Exam	X	X	X	X	X	X	X	X	X							
Electronic Course Project	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Electronic Course Work &Quizzes	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Practical Exam	X	X	X	X	X	X	X	X	X	X	X					

9. Course ILOs Vs Program ILOs

ILOs Prog / Course ILOs		Knowledge & understanding							Intellectual skills											Professional and practical skills													General									
		A9	A11	A15	A16	A18	A20	A21	B4	B5	B6	B7	B8	B11	B12	B14	B15	B18	B19	C2	C3	C4	C5	C6	C9	C10	C11	C13	C15	C17	C18	C19	D1	D2	D3	D4	D6	D7	D8	D9	D10	D12
K&U	a1	√		√																																						
	a2					√																																				
	a3		√																																							
	a4			√																																						
	a5		√																																							
Int.	b1											√							√																								
	b2																√																									
	b3											√	√		√		√																									
	b4								√																																	
	b5												√		√																											
P. &P.	c1																						√			√																
	c2																						√																			
General	d1																																√									
	d2																																		√							
	d3																																									√
	d4																																			√						
	d5																																					√				

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Date: 1/8/2022