

# جامعة الزيتونية الأردنية Al-Zaytoonah University of Jordan كلية العلوم وتكنولوجيا المعلومات Faculty of Science and IT



QF01/0408-4.0E Course Plan for Bachelor program - Study Plan Development and Updating Procedures/
Department

Study plan No.	2021-2022	University Specialization	Software Engineering
Course No.	0114489	Course name	Software maintenance and re-engineering
Credit Hours	3	Prerequisite Co-requisite	Software development and documentation
Course type	□ MANDATORY     □ UNIVERSITY       UNIVERSITY     ELECTIVE       REQUIREMENT     REQUIREMENTS	□ FACULTY □ Support  MANDATORY course family  REQUIREMENT requirements	☐ Mandatory Felective requirements ts
Teaching style	☐ Full online learning	☐ Blended learning	✓Traditional learning
Teaching model	☐ 2Synchronous: 1asynchronous	☐ 2 face to face : 1synchronous	✓3 Traditional

# Faculty member and study divisions information (to be filled in each semester by the subject instructor)

Name	Academic rank	Office No.	Phone No.	E-mail	
Mohammed Lafi	Assistant professor	302		lafi@zuj.edu	<u>.jo</u>
Division number	Time	Place	Number of students	Teaching style	Approved model
1				traditional	

#### **Brief description**

This course introduces the concepts of software re-engineering and its phases, includes legacy systems re-engineering to enhance the maintenance process, and presents the different cost-effective methods to maintain software products. This course covers the concepts of the software reversal engineering, and how to use the CASE tools during the maintenance process.

**Learning resources** 

Course book information (Title, author, date of issue, publisher etc)	Tripathy, Priyadarshi, and Kshirasagar Naik. Software evolution and maintenance: A Practitioner's Approach. John Wiley & Sons, 2015.			
Supportive learning resources (Books, databases, periodicals, software, applications, others)	<ol> <li>Fowler, Martin. Refactoring: improving the design of existing code. Addison-Wesley Professional, 2018.</li> <li>Mens, Tom, Serebrenik, Alexander, Cleve, Anthony (Eds.) Evolving Software Systems, Springer, 2014</li> <li>Reifer, Donald J. Software Maintenance Success Recipes. CRC Press, 2016.</li> </ol>			
Supporting websites				
The physical environment for teaching	Class room	√labs	☐ Virtual educational platform	☐ Others
Necessary equipment and software				



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Supporting people with	
special needs	
For technical support	

#### Course learning outcomes (S = Skills, C= Competences K= Knowledge,)

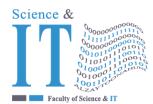
No.	Course learning outcomes	The associated program learning output code
	Knowledge	lear imig output code
K1	The student will gain an understanding of principles and techniques of software maintenance, software change, evolution process	MK1
K4	The students will gain an understanding of types of software changes and maintenance: corrective, perfective, adaptive and preventive.	MK1
К3	The student will know the reengineering stages and the elements of legacy systems	MK1
K4	The student will be able to identify code bad smells and refactoring principles	MK1
	Skills	
S1	The student will be able to perform reverse engineering and refactoring And measure software complexity	MS1
S2	The student will be able to assess business value and quality of legacy systems and the best strategy to evolve legacy system	MS1
	Competences	
<b>C1</b>	Work in groups to maintain and evolve software in different domains	MC1

#### Mechanisms for direct evaluation of learning outcomes

Type of assessment / learning style	Fully electronic learning	Blended learning	Traditional Learning (Theory Learning)	Traditional Learning (Practical Learning)
Midterm exam	30%	30%	40%	30%
Participation / practical applications	0	0	10%	30%
Asynchronous interactive activities	30%	30%	0	0
Final exam	40%	40%	50%	40%

**Note 1:** Asynchronous interactive activities are activities, tasks, projects, assignments, research, studies, projects, work within student groups ... etc, which the student carries out on his own, through the virtual platform without a direct encounter with the subject teacher.

**Note 2:** According to the Regulations of granting Master's degree at Al-Zaytoonah University of Jordan, 40% of final evaluation goes for the final exam, and 60% for the semester work (examinations, reports, research or any scientific activity assigned to the student).



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Week	Subject	learning style*	Reference **
1	Software evolution	Lecture, learning through	Software evolution and
		projects, learning through	maintenance: A
		problem solving	Practitioner's Approach
			44-48
2	Lehman's laws	Lecture, learning through	Software evolution and
		projects, learning through	maintenance: A
		problem solving	Practitioner's Approach
			49-60
3	Software maintenance	Lecture, learning through	Software evolution and
		projects, learning through	maintenance: A
		problem solving	Practitioner's Approach
			25-43
4	Software complexity	Lecture, learning through	Software evolution and
		projects, learning through	maintenance: A
		problem solving	Practitioner's Approach
			162-164
5	CK metric suite	Lecture, learning through	Software evolution and
		projects, learning through	maintenance: A
		problem solving	Practitioner's Approach
			162-164
6	Software reengineering	Lecture, learning through	Software evolution and
		projects, learning through	maintenance: A
		problem solving	Practitioner's Approach
			133-150
7	Reverse engineering	Lecture, learning through	Software evolution and
		projects, learning through	maintenance: A
		problem solving	Practitioner's Approach
			153-174
8	Legacy systems	Lecture, learning through	Software evolution and
		projects, learning through	maintenance: A
		problem solving	Practitioner's Approach
			187-221
9	Refactoring principles	Lecture, learning through	Refactoring: improving the
		projects, learning through	design of existing code
		problem solving	45-70
10	Code bad smells	Lecture, learning through	Refactoring: improving the
		projects, learning through	design of existing code
		problem solving	71-84
11	Refactoring transformation	Lecture, learning through	Refactoring: improving the
	<i>y</i>	projects, learning through	design of existing code
		problem solving	101-256
12	Review		
	Midterm Exam		
13	Refactoring using NetBeans	Lecture, learning through	Refactoring: improving the
13	Keractoring using netbeans	projects, learning through	design of existing code
		problem solving	101-256
1.4	Defeatoring using Nat Dages	Lecture, learning through	Refactoring: improving the
14	Refactoring using NetBeans		
		projects, learning through	design of existing code 101-256
1.5	D ' + 1' ' 1 '	problem solving	101-230
15	Project discussion and review	learning through projects	
16	Final Exam		



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Schedule of asynchronous interactive activities (in the case of e-learning and blended learning)

Week	Task / activity	Reference	<b>Expected results</b>
			•

<sup>\*</sup> Learning styles: Lecture, flipped learning, learning through projects, learning through problem solving, participatory learning ... etc.

<sup>\*\*</sup> Reference: Pages in a book, database, recorded lecture, content on the e-learning platform, video, website ... etc.