

## Course E-Syllabus

1	Course title	Software Engineering
2	Course number	1902372
3	Credit hours	3
	Contact hours (theory, practical)	3
4	Prerequisites/corequisites	Database Management Systems
5	Program title	Computer Information Systems
6	Program code	2
7	Awarding institution	The University of Jordan
8	School	King Abdullah II School for Information Technology
9	Department	Computer Information Systems
10	Level of course	Undergraduate
11	Year of study and semester (s)	2022-2023 (Fall)
12	Final Qualification	Bachelor of Science in Computer Information Systems
13	Other department (s) involved in teaching the course	None
14	Language of Instruction	English
15	Teaching methodology	<input checked="" type="checkbox"/> Face to face <input type="checkbox"/> Blended <input type="checkbox"/> Online <input type="checkbox"/> Hybrid (Face to face + Online)
16	Electronic platform(s)	<input checked="" type="checkbox"/> Moodle <input checked="" type="checkbox"/> Microsoft Teams <input type="checkbox"/> Skype <input type="checkbox"/> Zoom <input checked="" type="checkbox"/> Others: <b>JUexams.com</b>
17	Date of production/revision	5 <sup>th</sup> October, 2022 / revision 10 <sup>th</sup> October, 2022

### 18 Course Coordinator:

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### 19 Other instructors:

<p><b>Prof. Amjad Hudaib</b>, e-mail: <a href="mailto:ahudaib@ju.edu.jo">ahudaib@ju.edu.jo</a>  <b>Dr. Rana Yousef</b>, e-mail: <a href="mailto:rana.yousef@ju.edu.jo">rana.yousef@ju.edu.jo</a></p>
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## 20 Course Description:

This course aims to present software engineering as a body of knowledge. The course is designed to present software engineering concepts and principles in parallel with the Software Development Life Cycle (SDLC). The course will begin with an introduction to software engineering, giving students a definition of this body of knowledge, as well as a discussion of the main methodologies of software engineering including agile methods i.e., XP. Students will then learn about the five major phases of the SDLC: requirements gathering and analysis, design, coding/implementation, validation, and evolution. This includes software modelling using Unified Modelling Language (UML), a standardized general-purpose modelling language used to create visual models of object-oriented software, for requirements gathering and analysis, and design. Students will also learn about project management and quality management for the purpose of delivering high-quality software that satisfies customer needs and is within budget and schedule. Delivery will be by in-class lectures, recorded lectures, practical sessions in the lab, case studies from different domains (i.e., healthcare domain), and assignments. Assignments will include a term project illustrative of professional practice in developing computer information systems. One or two guest speakers with many years of experience in software engineering will be invited to share their first-hand experience with students.

## 21 Course aims and outcomes:

### Aims:

The aim of this course is to equip students with knowledge about software engineering concepts and software development process models, as well as the skills required to successfully develop and deliver a software product (i.e., satisfy stakeholders' requirements, quality, and schedule and budget constraints). The main objectives of the course are:

- 1- To understand how to produce high-quality software with cost-effective development of software systems.
- 2- To provide students with software management, software requirements and design techniques that result in the development of maintainable and reliable software that meets the customer's needs.

### Intended Learning Outcomes (ILOs):

Upon successful completion of this course students will be able to:

#### A. Knowledge and Understanding:

- 1- Students will be expected to appreciate 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.
- 2- Students should be able to understand how the phases of the lifecycle can be managed using different models of the lifecycle.
- 3- Students should be able to understand the goals and deliverables of each phase of the software lifecycle, be able to select and apply appropriate techniques to achieving some of these goals and be able to accurately document the results.
- 4- Students shall be able to understand the ethical principles related to the behaviour of and decisions made by professional software engineers.

#### B. Intellectual skills:

- 1- Students should be able to understand how software projects are initiated.
- 2- Identify the basic concepts and principles to the analysis of software requirements.
- 3- Identify the basic concepts and principles to the "design of software" activity.
- 4- Identify the basic concepts and principles to the "software testing" activity.
- 5- Students will be expected to identify important issues in the management of software (i.e., project planning, generates reliable estimates of effort, cost, and project duration).
- 6- Identify the basic concepts and principles to the software quality management.
- 7- Identify the basic concepts and principles to the Validation and Evolution activities.

#### C. Subject Specific skills:

- 1- Describe how process models can be applied to software development.
- 2- Select the proper method(s) and techniques(s) to the software project at hand.

**D. Transferable Key Skills:**

- 1- Demonstrate how a software project manager selects the set of software engineering work tasks.
- 2- Evaluate the role of project schedule, quality control and assurance in the development of computer software.
- 3- Students should be able to demonstrate how different techniques and tools can be used during the different phases of the software life cycle.

**ABET Students Outcomes (SOs):**

- 1- Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
- 2- Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
- 4- Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
- 6- Support the delivery, use, and management of information systems within an information systems environment.

**Mapping ILOs to ABET SOs**

ILOs	ABET SOs
A1, B1, C1, B2	1
A2, B3, B4, D3	2
A4	4
A3, B5, B6, B7, C2, D1, D2	6

**22 Topic Outline and Schedule:**

Week	Lecture	Topic	ILOs	Teaching Methods* / Platform	Evaluation Methods	References
Week 1	1.1	Welcome and orientation (review syllabus, objectives, textbook, project and assignments, online material and teaching methods) + Introduction to the course	-	In class (face to face) lecture	-	Course syllabus, project specifications, announcements (MOODLE)
	1.2	Ch1: Professional Software Development	A.1, A.4	In class (face to face) lecture	In-lecture questions	Text Book - Chapter 1, lecture notes(slides) (MOODLE)
	1.3	Ch1: Professional Software Development		In class (face to face) lecture	In-lecture questions	Text Book - Chapter 1, lecture notes(slides) (MOODLE)
Week 2	2.1	Ch1: Professional Software Development		In class (face to face) lecture	In-lecture questions	Text Book - Chapter 1, lecture

Week	Lecture	Topic	ILOs	Teaching Methods* / Platform	Evaluation Methods	References
						notes(slides) (MOODLE)
	2.2	<b>Ch1:</b> Software engineering ethics, Case studies		In class (face to face) lecture	<b>Self-reading assignment - 1</b> (case study in health care information systems)	Text Book - Chapter 1 and lecture notes(slides), IEEE/ACM code of ethics, Insulin Pump Case study, case study in health care information systems (MOODLE)
	2.3	<b>Ch1:</b> Software engineering ethics, Case studies		In class (face to face) lecture	<b>Self-reading assignment - 1</b> (case study in health care information systems)	Text Book - Chapter 1 and lecture notes(slides), IEEE/ACM code of ethics, Insulin Pump Case study, case study in health care information systems (MOODLE)
<b>Week 3</b>	3.1	<b>Ch2:</b> Software process models, Process activities -1	<b>A.2, A.3, C.1, C.2</b>	In class (face to face) lecture	In-lecture questions	Text Book - Chapter 2, lecture notes(slides), recorded presentation (MOODLE)
	3.2	<b>Ch2:</b> Software process models, Process activities -2		In class (face to face) lecture	In-lecture questions	Text Book - Chapter 2, lecture notes(slides), recorded presentation (MOODLE)
	3.3	<b>Ch2:</b> Coping with change, RUP, SW process improvement		In class (face to face) lecture	In-lecture questions	Text Book - Chapter 2, lecture notes(slides), RUP material, recorded presentation (MOODLE)
<b>Week 4</b>	4.1	<b>Ch3: Agile methods:</b> Plan-driven and agile development	<b>A.1, B.1, C.1</b>	In class (face to face) lecture	In-lecture questions	Text Book - Chapter 3, lecture notes(slides), recorded presentation, <b>project initiation slides</b> (MOODLE)
	4.2	<b>Ch3:</b> Extreme programming		In class (face to face) lecture	<b>Self-reading assignment - 2 (SCRUM)</b>	Text Book - Chapter 3, lecture notes(slides), recorded

Week	Lecture	Topic	ILOs	Teaching Methods* / Platform	Evaluation Methods	References
						presentation (MOODLE), <b>SCRUM material (MOODLE)</b>
	4.3	Ch3: SCRUM		In class (face to face) lecture	In-lecture questions	Text Book - Chapter 3, lecture notes(slides), recorded presentation (MOODLE), <b>SCRUM material (MOODLE)</b>
Week 5	5.1	Ch22: Project Management: Success Criteria, software management distinctions, management activities	B.5, D.1, D.3	In class (face to face) lecture	In-lecture questions	Text Book - Chapter 22, lecture notes(slides), <b>feasibility study slides</b> , recorded presentations Parts (1 and 2) MOODLE
	5.2	Ch22: Project Management: Risk management		In class (face to face) lecture	In-lecture questions	
	5.3	Ch23: Project Planning: Software pricing, Plan-driven development Project scheduling	B.5, D.1, D.2	In class (face to face) lecture	In-lecture questions	Text Book - Chapter 23, lecture notes (slides), recorded presentations Parts 1 and 2 (MOODLE)
Week 6	6.1	Ch23: Project Planning: Scheduling, Agile planning, Estimation techniques		In class (face to face) lecture	In-lecture questions	
	6.2	Scheduling Example		In class (face to face) lecture	In-lecture questions	
	6.3	Practical session on Scheduling	In class (face to face) lecture	<b>Project Task 1</b>	Practice material (MOODLE)	
Week 7	7.1	Ch4: Requirements Engineering: Functional and non-functional requirements -1	A.3, B.1, B.2, D.3 B.3	In class (face to face) lecture	In-lecture questions	Text Book - Chapter 4, lecture notes(slides) (MOODLE)
	7.2	Ch4: Requirements Engineering: Functional and non-		In class (face to face) lecture		

Week	Lecture	Topic	ILOs	Teaching Methods* / Platform	Evaluation Methods	References
		functional requirements -2				
	7.3	<b>Ch4: Requirements Engineering:</b> The software requirements document, Requirements specification		In class (face to face) lecture	In-lecture questions	Text Book - Chapter 4, lecture notes(slides), recorded presentation, SRS Example (MOODLE)
Week 8	8.1	<b>Ch4: Requirements Engineering:</b> Requirements engineering processes, Requirements discovery		In class (face to face) lecture	In-lecture questions	
	8.2	<b>Ch4: Requirements Engineering:</b> Requirements validation Requirements management		In class (face to face) lecture	In-lecture questions	
	8.3	<b>Practical Session on Ch4: Requirements management tool</b>		In class (face to face) lecture	<b>Project Task 2</b>	
Week 9	9.1	<b>Ch4: Requirements Engineering:</b> writing requirements test cases		In class (face to face) lecture	<b>write requirements test cases for part of your project's requirements</b>	Requirements test cases file (MOODLE)
	9.2	<b>Review</b>		In class (face to face) lecture	In-lecture questions	Chapters 1 ~ 3, 22, 23
	9.3	<b>Mid-term exam</b>	-	<b>Will be announced later</b>	<b>Mid-term exam</b>	Chapters 1 ~ 3, 22, 23
Week 10	10.1	<b>Ch5: Design and Modelling:</b> Context models, Interaction models	B.3, D.3	In class (face to face) lecture	In-lecture questions	Text Book - Chapter 5, lecture notes(slides), recorded presentation parts 1 and 2, examples (MOODLE)
	10.2	<b>Ch5: Design and Modelling:</b> Structural models, Behavioral models		In class (face to face) lecture	In-lecture questions	Text Book - Chapter 5, lecture notes(slides), recorded presentation parts

Week	Lecture	Topic	ILOs	Teaching Methods* / Platform	Evaluation Methods	References
						3 and 4, examples (MOODLE)
	10.3	Projects progress and feedback	-	In class (face to face) lecture	Discussion	Project Specifications (MOODLE), students' submissions
Week 11	11.1	Ch5: Design and Modelling: Model driven Engineering	B.3, D.3	In class (face to face) lecture	In-lecture questions	Text Book - Chapter 5, lecture notes(slides), recorded presentation parts 3 and 4, examples (MOODLE)
	11.2	Ch5: Design and Modelling: Complete example using UML		In class (face to face) lecture	Discussion	Example material (MOODLE)
	11.3	Ch5: Design and Modelling: Practical Session on Ch5 (1)		In class (face to face) lecture	<b>Apply on your project</b>	Rational Rose material and examples (MOODLE)
	11.4	Ch5: Design and Modelling: Practical Session on Ch5 (2)		Synchronous (MS-Teams)- <b>details will be announced later</b>	<b>Apply on your project</b>	Rational Rose material and examples (MOODLE)
Week 12	12.1	Ch24: Quality Management: Software Quality, Quality Planning	B.6, D.2	In class (face to face) lecture	In-lecture questions	Text Book - Chapter 24, lecture notes (slides)
	12.2	Ch24: Quality Management: Software standards, Reviews, and inspections		In class (face to face) lecture	In-lecture questions	Text Book - Chapter 24, lecture notes (slides), recorded presentations Parts 1 and 2 (MOODLE)
	12.3	Ch24: Quality Management: Quality management and agile development, Software measurement		In class (face to face) lecture	In-lecture questions	Text Book - Chapter 24, lecture notes (slides)
Week 13	13.1	Selected Topics on SE: SW Architecture	B3	In class (face to face) lecture		Text Book - Chapter 6, lecture notes (slides), recorded presentation
	13.2	Selected Topics on SE: Testing	B7	In class (face to face) lecture		Text Book - Chapter 8, lecture notes (slides),

Week	Lecture	Topic	ILOs	Teaching Methods* / Platform	Evaluation Methods	References
						recorded presentation
	13.3	Selected Topics on SE: Evolution	B7	In class (face to face) lecture		Text Book - Chapter 9, lecture notes (slides), recorded presentation
Week 14	14.1	Industrial talk and demo about test first development (XP)	D3	In class + online via MS Teams		Guest's presentation and practical demo
	14.2	Projects progress and feedback	-	In class (face to face) discussion	In-lecture questions	Project Specifications (MOODLE)
	14.3	Review		In class (face to face) lecture	<b>Term project final submission</b>	Project specifications and evaluation criteria (MOODLE)
Week 15	Projects discussions			In office	<b>Term Project</b>	Project specifications and evaluation criteria (MOODLE)
	<b>Final Exam</b>					

### 23 Evaluation Methods:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

- Assignments
- Project
- Mid exam
- Final Exam

### 24 Course Requirements:

- Mobile, Laptop or desktop computers
- Internet connection
- Requirements management tool (i.e., Doors tool)
- Software design drawing tools (i.e., CASE tools + Rational Rose)
- Account on Microsoft Teams + Moodle

### 25 Course Policies:

#### A- Attendance policies

Attending online meetings is mandatory. Attendance will be taken for each meeting. Regular attendance is essential for satisfactory completion of this course and university regulations will be applied.



## **B- Absences from exams and handing in assignments on time**

- Any student who misses any exam will receive a zero grade. Permission for makeup will be granted only if the student notifies the instructor in due time and presents evidence of an officially excused absence.
- Submitting the assignments and project tasks will be through the Moodle platform, the time duration for each home assignment/ project task will be determined clearly. Late submissions are not allowed, any student exceed this time duration without submitted his/her assignment will take the zero as mark.

## **C- Health and safety procedures**

All students should comply with the university Health and Safety procedures.

## **D- Honesty policy regarding cheating, plagiarism, misbehavior**

Assignments are individual or done in learning teams. While students are free to discuss their individual assignments with anybody, including fellow students, individual assignments are expected to show the expertise, creativity and critical faculty of the individual student. Virtually identical individual assignments (in the judgment of the instructor) are not acceptable. Plagiarism is unacceptable and will be punished with an F for the full course. References to all source materials are necessary. For more details on University regulations please visit <http://www.ju.edu.jo/rules/index.htm>

## **E- Grading policy + Weighting (i.e. weight assigned to exams as well as other student work)**

All of the following are important in the evaluation of a student's work.

- Written Reports:
  - Organization, clarity and continuity.
  - Quality, completeness and soundness of the analysis
  - Quality of presentation.
- Oral Presentation:
  - Organization and continuity.
  - Selection and support of recommendations.
  - Time, style and clarity.
  - Professionalism.
- Assessment Weights:
  - Assignments + project + participations: 20%
  - Mid exam: 30%
  - Final exam: 50%
- Satisfactory completion of this subject requires a 50% pass in the end-of-semester
- Suggested Grading Scale:

0-44	F	45-49	D-	50-53	D	54-57	D+	58-61	C-	62-65	C
66-71	C+	69-72	B-	73-76	B	77-80	B+	81-84	A-	85-100	A

## **F- Available university services that support achievement in the course:**

elearning.ju.edu.jo

Juexams.com

## **G- Statement on Students with disabilities**

Students with Disabilities: Students with disabilities who need special accommodations for this class (online meetings) are encouraged to contact the instructor and/or their academic advisor as soon as possible. In order to receive accommodations for academic work in this course, students must inform the course instructor and/or their academic advisor, preferably in a written format, about their needs no later than the 2<sup>nd</sup> week of classes.

## 26 References:

### A- Required book (s), assigned reading and audio-visuals:

1. Ian Sommerville. Software Engineering (10th Edition). Addison Wesley, 2015.  
<http://iansommerville.com/software-engineering-book/>

### B- Recommended books, materials, and media:

1. Roger S. Pressman. Software Engineering a Practitioner's Approach, 8th Edition. McGraw-Hill, 2014.
2. J. Rumbaugh, I. Jacobson, and G. Booch. The Unified Modeling Language Reference Manual. Addison-Wesley, Longman, Mass, USA, 1999.
3. Power Designer: <http://www.sybase.com/products/modelingmetadata/powerdesigner>
4. Unified Modeling Language (UML): <http://WWW.UML.ORG>
5. Microsoft Visio: <http://WWW.MICROSOFT.COM>
6. Rational Software: <http://WWW.RATIONAL.COM>
7. Data flow diagram tutorial: <http://www.getaheadirect.com/gwbadfd.htm>
8. Microsoft Project: <http://www.brighthub.com/office/projectmanagement/articles/71235.aspx>
9. Healthcare Information and Management Systems Society: <http://www.himss.org/>
10. Journal of Medical Systems: <https://link.springer.com/journal/10916>
11. Healthcare IT News: <http://www.healthcareitnews.com/>
12. University of Jordan E-library: <http://e-library/>
13. <http://www.software-engin.com>

### C- Educational Platforms:

1. Elearning.ju.edu.jo
2. Juexams.com
3. <http://teams.office.com/>

## 27 Additional information:

- Students are encouraged to make heavy use of the library, E-LIBRARY.  
<http://ezlibrary.ju.edu.jo/login> or from within the university using (<http://e-library/>).
- The instructor can make changes to this syllabus when necessary.
- University regulations will be preserved at all times.
- Office hour: check with your instructor.

Name of Course Coordinator: Dr. Hamad Alsawalqah-----Signature: -----

Date: 10/10/2022

Head of Curriculum Committee/Department: -----Signature: -----

Head of Department: -----Signature: -----

Head of Curriculum Committee/Faculty: -----Signature: -----

Dean: -----Signature: -----