# Lahore University of Management Sciences

## CS 360- Software Engineering

Spring 20204

**Subject to Change**

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|---|---|
| Instructor | Dr. Maryam Abdul Ghafoor |
| Room No. | SBASSE 9-G51A |
| Office Hours | TBA |
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| Teaching Fellow/TAs | TBA |
| TA Office Hours | TBA |
| Course URL (if any) | TBA |

| Course Basics | | | | |
|---|---|---|---|---|
| Credit Hours | | | | |
| Lecture(s) | Nbr of Lec(s) per week | 2 | Duration | 75 minutes per lecture |
| Recitation/Lab | Nbr of Lec(s) | | Duration | |
| Tutorial | Nbr of Lec(s) | | Duration | |

| Course Distribution | |
|---|---|
| Core | No |
| Elective | Yes |
| Open for Student Category | Junior, Senior |
| Close for Student Category | Freshmen, Sophomore |

### COURSE DESCRIPTION

This course offers general introduction to software engineering: Practical problems of specifying, designing, and developing and testing software systems. It introduces students to the practical problems of specifying, designing, and developing and testing software systems by discussing concepts such as software processes and agile methods, and fundamental software development activities, from software specification through to system testing and maintenance. UML (Unified Modeling Language), the standard tool for expressing designs in software engineering, will be introduced.

This course will equip students with tools and techniques required to design reliable software systems. In this course, students are expected to develop 'functional' software system by following a software development lifecycle.

Key topics include:

- Introduction to software development life cycle models including classical and agile models.
- Introduction to the software requirements engineering process, including requirements elicitation, specification, and validation.
- Introduction to software design with the focus on architectural design including different software architecture models.
- Introduction to software testing and system reliability including testing methodologies and code inspections.

### COURSE PREREQUISITE(S)

None

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| Learning Outcomes |
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| Students will be able to<br><br>1. Understand key software engineering practices and design principles for producing quality software systems<br>2. Understand software development life cycle models including linear and agile models.<br>3. Work in a small (collaborative) teams to develop a small-sized software system from conceptualization to completion, including requirements elicitation and specification, system modeling, system design, implementation, unit and system testing, and configuration management.<br>4. Propose and new software system or improvements in the existing one based on the user requirements<br>5. Design a software system to a given problem using one or more design patterns<br>6. Model the structure and behavior of a (proposed) software system using the standard UML diagrams.<br>7. Implement the design of a software system in a programming language (web or a mobile framework).<br>8. Make concise and coherent technical documents on both the technical aspects (requirements - SRS, design - SDS, quality assurance - SQAP) and the managerial aspects (planning and scheduling).<br>9. Make presentations to explain their ideas to diverse stakeholders (end users, team members, business manager and technical managers)<br>10. Apply relevant ethical considerations while designing and developing software systems |

| Grading Breakup and Policy |
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| Mid-term 1: 20%<br>Mid-term 2: 20%<br>Quizzes: 10%<br>Tech presentations: 5%<br>Assignments + project: 45% |

| Examination Detail | |
|---|---|
| Midterm Exam 1 | Duration: 100 mins<br>Preferred Week: First week of March and the last week of April<br>Exam Specifications: Closed Book / Closed Notes |
| Midterm Exam 2 | Duration: 100 mins<br>Preferred Week: First week of March and the last week of April<br>Exam Specifications: Closed Book / Closed Notes |
| Group Project | The group project is the focal point of this course. The project is divided into four phases and every phase will have a separate deadline - starting from the user research phase and ending at the final presentations |

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| COURSE OVERVIEW (TENTATIVE) | |
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| Week/ Lecture/ Module | Topics |
| 1 | - Introduction to Software Engineering<br>- Course Logistics and assignment details |
| 2 | - Software development process<br>- Different types of processes |
| 3 | - Process models<br>- Project feasibility and planning |
| 4 | - Requirements Engineering |
| 5 | - User stories and scenarios<br>- Requirement Analysis and relevant models |
| 6 | - System Architecture and design |
| 7 | - Program design<br>- Performance matrices<br>- Design Patterns |
| 8 | - Software development (techniques, tools and environments)<br>- Source control |
| 9 | - Usability engineering<br>- GUI Design |
| 10 | - Testing and quality assurance<br>- System verification and bug testing |
| 11 | - Testing and quality assurance<br>- User acceptance and delivery |
| 12 | - Software as Service<br>- Focus on build automation |
| 13 | - Software Business: Ethical and legal issues<br>- Process for startups |
| 14 | - Presenting to business and technical audience<br>- Final presentations and demos |

**Textbook(s)/SupplementaryReadings Chapters from following textbooks:**

1. Frederick P. Brooks, Jr., The Mythical Man Month. Addison Wesley, 1972.
2. Sommerville, Ian, Software Engineering, 9th Edition. Addison Wesley, 2014.
3. Pressman, R. Software Engineering: A Practitioner's Approach, 8th Edition, 2014

Articles:

1. Online articles and book chapters will be provided after each lecture.

Reference Material:

Will be provided at the end of each lecture.

## HARASSMENT POLICY

SSE, LUMS and particularly this class, is a harassment free zone. There is absolutely zero tolerance for any behavior that is intended or has the expected result of making anyone uncomfortable and negatively impacts the class environment, or any individual's ability to work to the best of their potential.

In case a differently abled student requires accommodations for fully participating in the course, students are advised to contact the instructor so that they can be facilitated accordingly.

If you think that you may be a victim of harassment, or if you have observed any harassment occurring in the purview of this class, please reach out and speak to me. If you are a victim, I strongly encourage you to reach out to the Office of Accessibility and Inclusion at oai@lums.edu.pk or the sexual harassment inquiry committee at shic@lums.edu.pk for any queries, clarifications, or advice. You may choose to file an informal or a formal complaint to put an end of offending behavior. You can find more details regarding the LUMS sexual harassment policy here. To file a complaint, please write to harassment@lums.edu.pk.

| **SSE Council on Equity and Belonging** |
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| In addition to LUMS resources, SSE's Council on Belonging and Equity is committed to devising ways to provide a safe, inclusive and respectful learning environment for students, faculty and staff. To seek counsel related to any issues, please feel free to approach either a member of the council or email at cbe.sse@lums.edu.pk |