**King Saud University**

**College of Computer and Information Sciences**

**Department of Software Engineering**

**SWE 312 – SOFTWARE REQUIREMENTS ENGINEERING 3(3-0-1)**

**Required Course: 3 hours lecture and 1 hour lab per week**

**Course Instructor and/or Coordinator**: .

**Course Description (catalog):** The course covers modeling and requirements engineering. Modeling topics include the following: purpose and importance of modeling, UML and its different diagrams. Requirements engineering topics include the following: Requirements Engineering Process - Elicitation of requirements - Functional and nonfunctional requirements - System services and constraints – Quality of Requirements - Requirements traceability - Metrics for non-functional requirements - Use case description - Use case and context diagrams - Software Requirements Specification - Requirements for agile developments - Requirements management – Formal specification using specification languages such as OCL and Z. Students participate in a group project on software requirements analysis and specification and requirements management case tools.

**Prerequisite(s):** SWE 211 – Introduction to Software Engineering **Co-requisite(s):** None

**Textbook(s) and/or Other Supplementary Materials:**

**Primary**:

1. Karl Wiegers and Joy Beatty: Software Requirements (3rd Edition) (Developer Best Practices). Microsoft Press, 2013.

2. Bernd Bruegge and Allen H. Dutoit. Object-Oriented Software Engineering Using UML, Patterns, and Java. 3rd Edition, Prentice Hall, 2010.

**Supplementary:**

1. Axel van Lamsweerde: Requirements Engineering, from System Goals to UML Models to Software Specifications. John Wiley, 2007.
2. Peter Zielczynski, Requirements Management Using IBM Rational RequisitePro. IBM Press, 2008.

**Major Topics Covered:**

|  |  |  |
| --- | --- | --- |
| **Topic** | **# Weeks** | **# Contact hours\*** |
| Review of SDLC and Methodologies | 1 | 3 |
| Overview of Project planning and link with requirements management | 1 | 3 |
| Introduction to Software Requirements Engineering and Management; Ethical behavior of software engineers | 1 | 3 |
| Understanding of user and stakeholder needs | 1 | 3 |
| Analyzing the problem | 1 | 3 |
| Defining and specifying the system: A use case approach | 2 | 3 |
| Non- Functional Requirements | 1 | 3 |
| Managing the scope - Traceability | 1 | 3 |
| Modeling with UML | 3 | 3 |
| Requirements Quality Assurance  | 1 | 3 |
| Requirements for agile developments | 1 | 3 |
| Overview about formal methods in specification | 1 | 3 |
|  |  |  |
| **Total** | **15** | **45** |

**Specific Outcomes of Instruction (Course Learning Outcomes):**

By the end of this course students will be able to:

1. demonstrate a knowledge of professional and ethical responsibility of a software engineer, in particular when dealing with customers in order to gather the requirements. [SO(4)]
2. explain the impact of development methodologies on requirements analysis. [SO(2)]
3. discover, elicit, and record user requirements for a software project.[SO(2)]
4. specify requirements in use cases and other specification techniques.[SO(2)]
5. use basics of formal methods in requirements specification. [SO(1)]
6. use modeling techniques in specifying software[SO(2)]
7. use a software case tool to effectively manage and specify requirements. [SO(2)]

**Student Outcomes (SO) Addressed by the Course:**

|  |  |  |
| --- | --- | --- |
| **#** | **Outcome Description** | **Contribution** |
| **Student Outcomes** |
| 1 | an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics | M |
| 2 | an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors | H |
| 3 | an ability to communicate effectively with a range of audiences  |  |
| 4 | an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts  | L |
| 5 | an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives  |  |
| 6 | an ability to develop and conduct appropriate experimentation , analyze and interpret data, and use engineering judgment to draw conclusions  |  |
| 7 | an ability to acquire and apply new knowledge as needed, using appropriate learning strategies |  |
|  |  |  |

**H**=High, **M**= Medium, **L**=Low

**ASSESSMENT**

Assessment will be distributed as follows:

|  |  |
| --- | --- |
| One midterm exam | **15 %** |
| Two assignments | **10 %** |
| Quizzes (Best 2 out of 3 quizzes) | **10 %** |
| Project – demonstration at lab | **20 %** |
| Lab activities | **5%** |
| Final Exam | **40 %** |
| **Total** | **100** |

Grades will be distributed based on the total obtained by each student as follows:

|  |  |
| --- | --- |
| **Total** | **Grade** |
| >= 95% | **A+** |
| < 95% and >= 90% | **A** |
| < 90% and >= 85% | **B+** |
| < 85% and >= 80% | **B** |
| < 80% and >= 75% | **C+** |
| < 75% and >= 70% | **C** |
| < 70% and >= 65% | **D+** |
| < 65% and >= 60% | **D** |
| < 60% and >= 55% | **F** |
| < 55% and >= 50% | **F** |
| < 50% | **F**  |

**LATE SUBMISSIONS AND ABSENCES**

* Attendance is noted 5 minutes after the start of the class. Any student attending after will be counted as absent.
* **Only a medical note is accepted as an excuse for an absence. The medical note must be given to the instructor within a week after the missed class**.
* If a student does not deliver an assignment/project at the beginning of the class at the day of submission deadline, the student loses 25% of the full mark. The assignment can still be accepted before 5 pm the next business day.
* No excuse is accepted for late assignments/project.
* **Every student must obtain 50% of the project + lab marks combined in order to pass this course**
* Plagiarism is not tolerated and will result immediately in failing the course (e.g. copying from the work of other students, cheating in the exam, and missing proper acknowledgement and referencing)