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|  | **PIR MEHR ALI SHAH ARID AGRICULTURE UNIVERSITY**  **University Institute of Information Technology** |

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| **Software Requirement Engineering** | | | | |
| **Credit Hours:** | 3(3-0) | **Prerequisites:** | NA | |
| **Course Learning Outcomes (CLOs)** | | | | |
| At the end of course the students will be able to: | | | **Domain** | **BT Level\*** |
| 1. Explain the requirements engineering process | | | C | 2 |
| 1. Apply appropriate method(s) to specify a set of software requirements for a medium-sized software system. | | | C | 3 |
| 1. Apply use case(s) to analyze system behavior and requirements. | | | C | 3 |
| 1. Prepare both functional and non-functional requirements along with validation for a medium-size software system. | | | C | 3 |
| 1. Describe how requirements engineering in agile projects differs from traditional requirements engineering. | | | C | 2 |
| \*BT- Bloom’s Taxonomy, C=Cognitive domain, P=Psychomotor domain, A=Affective domain | | | | |

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| **Course Contents:** |
| The focus of this course is how to find and collect requirements from relevant sources both at the start and during software development. The topics include: Fundamentals of software requirements engineering; Role of requirements engineering in software lifecycle; requirements engineering process; requirements elicitation process and techniques; requirements analysis and negotiation,; functional and non-functional requirements; requirements engineering methods ;requirements modeling, requirement documentation, requirements validation; requirement management and requirement engineering for agile development. |
| **Course Objective:** |
| The aim of course is enable Software Engineering students in terms of requirement and its types understanding, requirement elicitation, requirement analysis and negotiation, requirement validation and management. |
| **Teaching Methodology:** |
| Lectures, Assignments, labs, Projects, Presentations, etc. Major component of the course should be covered using conventional lectures. |
| **Courses Assessment:** |
| Exams, Assignments, Quizzes, Project, Presentations. Course will be assessed using a combination of written examinations and project(s). Practical evaluation, using rubrics, is encouraged and suggested to make up around 20% of the course. |
| **Reference Materials:** |
| Text Book(s):   1. Software Requirements, Wiegers K. &Beatty J., 3rd Edition (2013), Microsoft Press.   Reference Book(s):   1. Requirements Engineering and Management for Software Development Projects, Chemuturi M., (2013), Springer New York. 2. Visual Models for Software Requirements, Beatty J. &Chen A., (2012), Mocrosoft Press. 3. Requirements Engineering, Hull E., Ken Jackson K. &DickJ. 3rd Edition (2011), Springer-Verlag. 4. Software & Systems Requirements Engineering: In Practice, Berenbach B., Paulish D. J., Kazmeier J. &Rudorfer A., (2009) McGraw Hill. |

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| **Week** | **Lecture #** | **Theory** |
| Week 1 | Lecture-I | Introduction to the course, discussion on preliminary concepts of Software Engineering and the importance of Requirements Engineering process. |
| Lecture-II | Fundamental of Software requirements engineering, What are requirements, Some interpretations of” requirement” |
| Lecture-III | Types of requirements |
| Week 2 | Lecture-I | Working with the three levels, Product vs. project requirements, Requirements development and management, Reason behind bad requirements, Benefits from a high-quality requirements process. |
| Lecture-II | Requirements development process framework. Good practices of Requirements elicitation, analysis, specification |
| Lecture-III | Validation and management. |
| Week 3 | Lecture-I | What are business requirements, Identifying business requirements, vision and scope statement and document, controlling and managing project scope? |
| Lecture-II | Defining requirement elicitation process, requirement elicitation inputs and outputs. |
| Lecture-III | Requirement elicitation task. |
| Week 4 | Lecture-I | What are stakeholders? |
| Lecture-II | Importance of stakeholder in requirement elicitation process. |
| Lecture-III | Requirement elicitation techniques, Interviews, Workshops, |
| Week 5 | Lecture-I | Focus groups, Observations, Questionnaires |
| Lecture-II | System interface analysis, User interface analysis. |
| Lecture-III | Document analysis. |
| Week 6 | Lecture-I | Class activity on requirement elicitation process. |
| Lecture-II | Presenting software project idea and class exercise of performing requirement elicitation activities. |
| Lecture-III | Following up after elicitation, Organizing and sharing the notes, documenting open issues, classifying customer input, Some cautions about elicitation |
| Week 7 | Lecture-I | Assumed and implied requirements, Finding missing requirements. |
| Lecture-II | Understanding user requirement, Use cases, The use case approach. |
| Lecture-III | Use cases and usage scenarios, Identifying use cases. |
| Week 8 | Lecture-I | Defining Business Rules, Classification of Business Rules, |
| Lecture-II | Documenting Business Rules, Discovering business rules. |
| Lecture-III | Business rules and requirements. |
| **Midterm Exam** | | |
| Week 10 | Lecture-I | Writing functional requirements, deriving functional requirements from the use case. |
| Lecture-II | Characteristics of excellent requirements, Characteristics of requirement statements, Characteristics of requirements collections, Guidelines for writing requirements. |
| Lecture-III | System or user perspective. |
| Week 11 | Lecture-I | Writing style, Level of detail, Representation techniques, avoiding ambiguity, Avoiding incompleteness, Sample requirements. |
| Lecture-II | What are Software Quality attributes or non-functional requirements? |
| Lecture-III | Classification of non-functional requirements. |
| Week 12 | Lecture-I | Exploring and specifying non-functional requirements |
| Lecture-II | Conflicts related to non-functional requirements, trade off to resolve conflicts. |
| Lecture-III | Class exercise to elaborate non-functional requirements. |
| Week 13 | Lecture-I | Requirements modeling, Data flow diagram, Swim lane diagram, State-transition diagram, state table |
| Lecture-II | Dialog map, Decision tables, decision trees |
| Lecture-III | Event-response tables |
| Week 14 | Lecture-I | Documenting the requirements, Software requirement specifications, Discussing software requirements specification template |
| Lecture-II | Requirements validation and verification, Reviewing requirements, inspection process. |
| Lecture-III | Requirements review challenges. |
| Week 15 | Lecture-I | Prototyping requirements, Testing the requirements |
| Lecture-II | Validating requirements with acceptance criteria, Acceptance criteria, |
| Lecture-III | Acceptance tests. |
| Week 16 | Lecture-I | Requirements Management: Planning for requirements management, Requirements change management process. |
| Lecture-II | Requirements tracing, Requirement Traceability. Backward and forward tractability, tracking and reporting |
| Lecture-III | Presentations |
| **Final term Exam** | | |