



COMSATS University Islamabad

Department of Computer Science

Course Syllabus

Course Information

Course Code: CSE305

Credit Hours: 3 (3,0)

Lab Hours/Week: 0

Course Title: **Software Requirement Engineering**

Lecture Hours/Week: 3

Pre-Requisites: **CSC-291 Software Engineering Concepts**

Catalogue Description:

The focus of this course is how to find and collect requirements from relevant sources, both at the start and during software development. Topics include Software Requirements Engineering; Usage of Tools for RE Processes; Requirements Elicitation; Understanding User Requirements; Traditional and Agile Approaches to Define User Requirements; Functional and Non-Functional Requirements; Requirements Modeling; Documenting the Requirements; Requirements Validation; Requirements Engineering for Agile Methodologies; and Requirements Management.

Text and Reference Books

Textbooks:

1. Software Requirements, Wiegers K. & Beatty J., Microsoft Press, 2013.
2. Requirements Engineering for Software and Systems, Phillip A. Laplante, Auerbach Publications, 2017.

Reference Books:

1. Engineering Software Products: An Introduction to Modern Software Engineering, Ian Sommerville, Global Edition, Pearson Education Limited, 2021.
2. Requirements Engineering and Management for Software Development Projects, Chemuturi M., Springer New York, 2013.
3. Visual Models for Software Requirements, Beatty J. & Chen A., Microsoft Press, 2012.
4. Requirements Engineering, Hull E., Ken Jackson K. & Dick J., Springer-Verlag, 2011.
5. Software & Systems Requirements Engineering: In Practice, Berenbach B., Paulish D. J., Kazmeier J. & Rudorfer A., McGraw Hill, 2009.

Week wise Plan:

Lecture #	CDF Unit #	Topics Covered	Reading Material
1.	1	Discussion on Preliminary Concepts of Software Engineering, and the Importance of Requirements Engineering Process.	Wiegers: Ch1
2.	1	Fundamentals of Software Requirements Engineering, Requirements Definition, and Interpretations & Types of Requirements.	Wiegers: Ch1
3.	1	Working with the Three Levels, Product vs. Project Requirements, Requirements Development and Management, Reason Behind Bad Requirements, and Benefits of a High-Quality Requirements Process.	Wiegers: Ch1
4.	1	Requirements Development Process Framework; Good Practices of Requirements Elicitation, Analysis, Specification, Validation, and Management.	Wiegers: Ch3

5.	1	What are Business Requirements, Identifying Business Requirements, Documenting Vision & Scope Statement; and Controlling & Managing Project Scope.	Wiegers: Ch5
6.	2	Requirement Elicitation Process; Requirement Elicitation Inputs & Outputs, Requirement Elicitation Task; What are Stakeholders? and Importance of Stakeholder in Requirement Elicitation Process.	Wiegers: Ch7
7.	2	Requirement Elicitation Techniques: Interviews, Workshops, Focus Groups, Observations, Questionnaires; System Interface Analysis, User Interface Analysis, and Document Analysis.	Wiegers: Ch7
8.	2	Following up after Elicitation, Organizing & Sharing the Notes, Documenting Open Issues, Classifying Customer Input, Cautions about Elicitation, Assumed & Implied Requirements, and Finding Missing Requirements.	Wiegers: Ch7
9.	2	Understanding User Requirement, Traditional & Agile Approaches to Identify User Requirements, Use Cases / User Stories & Usage Scenarios, and Exploring & Validating Use Cases along with Functional Requirements.	Wiegers: Ch8
10.	2	Definition & Classification of Business Rules.	Wiegers: Ch9
11.	2	Documenting Business Rules, Discovering Business Rules, and Business Rules & Requirements.	Wiegers: Ch9
12.	3	Writing Functional Requirements, and Deriving Functional Requirements from the Use Case.	Wiegers: Ch11
13.	3	Characteristics of Excellent Requirements & Requirement Statements, Characteristics of Requirements Collections, Guidelines for Writing Requirements, and System or User Perspective.	Wiegers: Ch11
14.	3	Writing Style, Level of Detail, Representation Techniques, Avoiding Ambiguity, Avoiding Incompleteness, and Sample Requirements.	Wiegers: Ch11
15.	3	Software Quality Attributes or Non-Functional Requirements, Classification of Non-Functional Requirements, and Exploring & Specifying Internal Quality Attributes.	Wiegers: Ch14
16.	3	Exploring & Specifying External Quality Attributes, Conflicts Related to Non-Functional Requirements, Trade Off to Resolve Conflicts, and Elaboration of Non-Functional Requirements with Example.	Wiegers: Ch14
17.	Mid Term Exam		
18.			
19.	4	Requirements Modeling, Data Flow Diagram, and Swim Lane Diagram.	Wiegers: Ch12
20.	4	State-Transition Diagram, State Table, and Dialog Map.	Wiegers: Ch12

21.	4	Decision Tables, Decision Trees, and Event-Response Tables.	Wiegers: Ch12
22.	5	Documenting the Requirements, Software Requirement Specifications, and Case Study (FYP SRS).	Wiegers: Ch10
23.	6	Requirements Validation & Verification, Reviewing Requirements, Inspection Process. Requirements Review Challenges, and Prototyping Requirements.	Wiegers: Ch17
24.	6	Testing the Requirements, Validating Requirements with Acceptance Criteria, and Acceptance Tests.	Wiegers: Ch17
25.	7	Introduction to Agile Methodologies, Principles Behind the Agile Manifesto, Extreme Programming (XP), Scrum, Requirements Engineering for Agile Methodologies, and General Practices in Agile Methodologies.	Phillip: Ch07
26.	7	Agile Requirements Best Practices, and Requirements Engineering in XP & Scrum.	Phillip: Ch07
27.	7	Writing User Stories, Story Test-Driven Development, and Challenges for Requirements Engineering in Agile Methodologies.	Phillip: Ch07
28.	7	Tool Support for Requirements Engineering, Traceability Support, Requirements Linkage Traceability Matrix, Requirements Source Traceability Matrix, and Requirements Stakeholder Traceability Matrix.	Phillip: Ch08
29.	7	Requirements Management Tools, Tool Evaluation, and Open-Source Requirements Engineering Tools.	Phillip: Ch08
30.	7	Elicitation Support Technologies, Using Wikis for Requirements Elicitation, Mobile Technologies, Virtual Environments, Content Analysis, and Requirements Metrics.	Phillip: Ch08
31.	8	Requirements Management: Planning for Requirements Management, Requirements Change Management Process, Requirement Traceability, and Backward & Forward Tractability.	Wiegers: Ch27
32.	8	Tracking & Reporting, Tracking Requirements Status, Resolving Requirements Issues, and Measuring Requirements Effort.	Wiegers: Ch27
Final Term Exam			

Student Outcomes (SOs)				
S.#	Description			
1	Apply knowledge of computing fundamentals, knowledge of a computing specialization, and mathematics, science, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements			
2	Identify, formulate, research literature, and solve <i>complex</i> computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines			
3	Design and evaluate solutions for <i>complex</i> computing problems, design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations			
4	Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to <i>complex</i> computing activities, with an understanding of the limitations			
5	Function effectively as an individual and as a member or leader in diverse teams and in multi-disciplinary settings.			
6	Communicate effectively with the computing community and with society at large about <i>complex</i> computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions			
7	Understand and assess societal, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice			
8	Understand and commit to professional ethics, responsibilities, and norms of professional computing practice			
9	Recognize the need, and have the ability, to engage in independent learning for continual development as a computing professional			
Course Learning Outcomes (CLO)				
Sr.#	Unit #	Course Learning Outcomes	Blooms Taxonomy Learning Level	SO
CLO-1	1	Demonstrate software requirements engineering process using tools.	<i>Applying</i>	1,2,4
CLO-2	2	Apply appropriate requirements elicitation techniques to specify a set of software requirements for a medium sized software system.	<i>Applying</i>	2
CLO-3	4	Apply user requirements approaches to analyze system behavior and requirements.	<i>Applying</i>	2
CLO-4	7	Apply agile methodologies to specify software requirements.	<i>Applying</i>	2,3
CLO-5	1-8	Prepare software requirements specification document for a medium sized software system.	<i>Creating</i>	5-9

CLO Assessment Mechanism

Assessment Tools	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
Quizzes	Quiz 1	Quiz 2	Quiz 3	Quiz 4	-
Assignments	Assignment 1	Assignment 2	Assignment 3	Assignment 4	-
Mid Term Exam	Mid Term Exam	Mid Term Exam	Mid Term Exam	-	-
Final Term Exam	Final Term Exam				
Project	-	-	-	-	Project

Policy & Procedures

- **Attendance Policy:** Every student must attend 80% of the lectures as well as laboratory in this course. The students falling short of required percentage of attendance of lectures/laboratory work, is not allowed to appear in the terminal examination.

- **Course Assessment:**

	Quizzes	Assignments	Mid Term Exam	Terminal Exam	Final Marks
Theory(T)	15	10	25	50	100

- **Grading Policy:** The minimum passing marks for each course is 50% (In case of LAB; in addition to theory, student is also required to obtain 50% marks in the lab to pass the course). The correspondence between letter grades, credit points, and percentage marks at CUI is as follows:

Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	F
Marks	>= 85	80 - 84	75 - 79	71 - 74	68 - 70	64 - 67	61 - 63	58 - 60	54 - 57	50-53	< 50
Cr. Point	3.67-4.00	3.34-3.66	3.01-3.33	2.67-3.00	2.34-2.66	2.01-2.33	1.67-2.00	1.31-1.66	1.01-1.30	0.10-1.00	0.00

- **Missing Exam:** No makeup exam will be given for final exam under any circumstance. When a student misses the mid-term exam for a legitimate reason (such as medical emergencies), his grade for this exam will be determined based on the Department policy. Further, the student must provide an official excuse within one week of the missed exam.
- **Academic Integrity:** All CUI policies regarding ethics apply to this course. The students are advised to discuss their grievances/problems with their counsellors or course instructor in a respectful manner.
- **Plagiarism Policy:** Plagiarism, copying and any other dishonest behaviour is prohibited by the rules and regulations of CUI. Violators will face serious consequences.