

Uka Tarsadia University

C. G. Patel Institute of Technology



B. Tech.

Semester – 6

(030090601/ 030080601)

SOFTWARE ENGINEERING

EFFECTIVE FROM July-2017

Syllabus version: 1.02

SEMESTER – 6
Software Engineering
(030090601/ 030090601)

Credits: 4 (Theory)

Contact hours per week: 4 (Theory)

Objective of the course:

- Apply their foundations in software engineering to adapt to readily changing environments using the appropriate theory, principles and processes.
- Make strong contributions to teams that are responsible for the specifications, design, construction, testing, deployment, maintenance, or use of software systems.
- Demonstrate the ability to work effectively as a team member and/or leader in an ever-changing professional environment.

Outcome:

Upon completion of the course, the student shall be able to

CO1	Plan and deliver an effective software engineering process, based on knowledge of widely used development lifecycle models.
CO2	Prepare SRS (Software Requirement Specification) document and Translate a requirements specification into an implementable design, following a structured and organised process.
CO3	Make effective use of UML, along with design strategies such as defining a software architecture.
CO4	Recognize how to ensure the Scheduling, Risk, quality of software product, different quality standards and software review techniques.
CO5	Formulate a testing strategy for a software system, employing techniques such as unit testing, test driven development and functional testing.
CO6	Able to understand Agile Development and Computer Aided Software Engineering.

Uka Tarsadia University

Version 1.02

B. Tech.	Subject	Hours
Sem 6	030090601/ 030080601 Software Engineering	4 hrs/week
	(Theory)	4 Credits
Sr. No.	Topic	Hours
Unit – I		
1	Introduction to software engineering: Study of different models, Software characteristics, Components, Applications, Layered technologies, Processes, Methods and tools, Generic view of software engineering, Process Models: Waterfall model, Incremental, Evolutionary process models- Prototype, Spiral and Concurrent development model.	8
Unit – II		
2	Requirements engineering and Structured system design: Problem recognition, Requirement engineering tasks, Processes, Requirements specification, Use cases and Functional specification, Requirements validation and Requirements analysis, Modelling – different types, Design concepts and Design model, Software architecture, Data design, Architectural styles and Patterns, Architectural design, Alternative architectural designs, Modelling component level design and its modelling procedural design, Object oriented design.	12
Unit – III		
3	Data oriented analysis & Design: Difference between data and information, E-R diagram, Data flow model and Control flow model, User interface design: Concepts of UI, Interface design model, Internal and external design, Evaluation, Interaction and information display software.	10
Unit – IV		
4	Software project planning and Quality assurance: Scope, Feasibility and effort estimation, Schedule and staffing, Quality planning, Risk management: Identification, Assessment, Control, Project monitoring plan, Detailed scheduling, Quality control, Assurance, Cost, Reviews, Software quality assurance, Approaches to SQA, Reliability, Quality standards- ISO9000 and 9001.	8
Unit – V		
5	Coding and Testing: Programming principles and guidelines, Programming practices, Coding standards, Incremental development of code, Management of code Evaluation, Unit testing- procedural units,	12

	classes, Code inspection metrics – Size measure, Complexity metrics, Cyclomatic complexity, Halstead measure, Knot count, Comparison of different metrics, Concepts, Psychology of testing, Levels of testing, Testing process - Test plan, Test case design, Execution, Black-box testing, Boundary value analysis, Pair wise testing - State based testing, White-Box testing, Criteria and test case generation and tool support, Metrics, Coverage analysis-reliability.	
Unit – VI		
6	Software project management and CASE tools: Management spectrum, People – Product – Process - Project, W5HH, Principle, Importance of team management, Introduction to CASE, Building blocks of CASE, Integrated CASE environment.	10

Practical
(030090601/ 030080601)
Software Engineering

Credit: 1 (Practical)

Contact hours per week: 2 (Practical)

Sr. No.	Operating Systems (Practical)	Hours
1	To select the project title and assign requirement engineering to the project title.	2
2	To perform the system analysis: Requirement analysis, SRS.	2
3	To perform the function oriented diagram: DFD and Structured chart.	2
4	To perform the user's view analysis: Use case diagram.	2
5	To draw the structural view diagram: Class diagram.	2
6	To draw the behavioural view diagram: Sequence diagram, Activity diagram.	2
7	To draw the environmental view diagram: Deployment diagram.	2
8	Implementation of the project.	10
9	To study various testing tools.	2
10	To design test cases and to apply them using various testing tools.	2
11	To study cost estimation and preparation of timeline chart.	2

Text book:

1. Roger S Pressman - "Software Engineering – A Practitioner's Approach", McGraw-Hill.

Reference books:

1. Sommerville - "Software Engineering", Pearson Education.
2. Pankaj Jalote – "An Integrated approach to SE", Narosa.
3. Rajib Mall - "Software Engineering", PHI.
4. Ghezzi, Jazayeri, Mandrioli - "Fundamentals of Software Engineering", Pearson Education.
5. Stephen R Schach - "Software Engineering with JAVA", TMH.

Course objectives and Course outcomes mapping:

- Apply their foundations in software engineering to adapt to readily changing environments using the appropriate theory, principles and processes: CO1,CO2
- Make strong contributions to teams that are responsible for the specifications, design, construction, testing, deployment, maintenance, or use of software systems:CO3,CO4,CO5
- Demonstrate the ability to work effectively as a team member and/or leader in an ever-changing professional environment: CO6

Course units and Course outcome mapping:

	CO1	CO2	CO3	CO4	CO5	CO6
Introduction to software engineering	√					
Requirements engineering and Structured system design		√				
Data oriented analysis & Design			√			
Software project planning and Quality assurance				√		
Coding and Testing					√	
Software project management and CASE tools						√

Programme Outcomes

- **PO 1: Engineering knowledge:** An ability to apply knowledge of mathematics, science, and engineering.
- **PO 2: Problem analysis:** An ability to identify, formulates, and solves engineering problems.
- **PO 3: Design/development of solutions:** An ability to design a system, component, or process to meet desired needs within realistic constraints.
- **PO 4: Conduct investigations of complex problems:** An ability to use the techniques, skills, and modern engineering tools necessary for solving engineering problems.
- **PO 5: Modern tool usage:** The broad education and understanding of new engineering techniques necessary to solve engineering problems.
- **PO 6: The engineer and society:** Achieve professional success with an understanding and appreciation of ethical behaviour, social responsibility, and diversity, both as individuals and in team environments.
- **PO 7: Environment and sustainability:** Articulate a comprehensive world view that integrates diverse approaches to sustainability.
- **PO 8: Ethics:** Identify and demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work.
- **PO 9: Individual and team work:** An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO 10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give/receive clear instructions.

- **PO 11: Project management and finance:** An ability to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **PO 12: Life-long learning:** A recognition of the need for, and an ability to engage in life-long learning.

Programme Outcomes and Course Outcomes mapping:

Program Outcomes	Course Outcomes					
	CO 1	CO 2	CO 3	CO 4	CO 5	CO 6
PO 1	√	√	√	√	√	√
PO 2	√	√	√	√	√	√
PO 3	√	√	√	√	√	√
PO 4	√	√	√	√	√	√
PO 5	√			√	√	
PO 6		√	√	√		√
PO 7						
PO 8	√		√		√	
PO 9		√	√	√	√	√
PO 10	√	√				
PO 11	√	√		√		√
PO 12	√	√	√	√	√	