COURSE HANDOUT

SOFTWARE ENGINEERING (COM-603)

BE CSE - 6TH SEMESTER

ACADEMIC YEAR (2024-2025)

Ms.Azra Ashraf

Assistant Professor

Department of Computer Science and Engineering

Department of Computer Science and Engineering

Model Institute of Engineering & Technology (Autonomous)

Kot Bhalwal, Jammu - 181122

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Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Sessional	Final Exam	Total
COM-603	Software Engineering	PCC	3	2	1	0	50	100	150

COURSE OUTCOMES

At the end of the course the student will be able to:	
CO 1	Analyze software development process models, including agile models and traditional models.
CO 2	Demonstrate the use of software life cycle through requirements gathering, choice of process model and design model.
CO 3	Apply and use various UML models for software analysis, design and testing.
CO 4	Acquire knowledge about the concepts of application of formal specification, case tools and configuration management for software development.
CO 5	Analysis of software estimation techniques for creating project baselines.

Unit-I

Software Engineering and Processes: Introduction to Software Engineering, Software Evolution, Software Characteristics, Legacy Software, Software Crisis: myths and Causes, Software Engineering: A layered Technology, Process Framework, and Software Process Models (Waterfall, Incremental, and Evolutionary process models and Agile).

(8 Hours)

Unit-II

Requirements Engineering: Problem Analysis, Requirement elicitation and Validation, Requirements Modeling: Scenarios, Information and Analysis Classes, Flow and Behavioral Modeling, Documenting Software Requirement Specification (SRS).

(5 Hours)

Unit-III

Software Planning and Project Management: Software Project Management Process: Software Scope, Resources, Software Metrics, Software Project Estimation, Decomposition Techniques, Empirical Estimation model: COCOMO, Software Project Scheduling, Risk Analysis, Software Acquisition.

(6 Hours)

Unit- IV

Software Design and Construction: System Design Principles: Levels of Abstraction (Architectural and Detailed Design), Cohesion and Coupling, Structured Design (Top-Down Functional Decomposition), Object-Oriented Design, Event Driven Design, Component-level Design, Test Driven Design, Aspect Oriented Design , Function Oriented, Service Oriented, Design Patterns, Coding Practices: Techniques, Refactoring, Integration Strategies, Internal Documentation, Data Flow Diagrams Transform Analysis, Transaction Analysis, Transform and Transaction Mapping.

(8 Hours)

Unit-V

Software Quality Assurance, Testing and Maintenance: Software Quality and Software Quality Assurance, Formal Technical Reviews, Software Quality Metrics: McCall's Quality Factors, Software Reliability, Software Testing Fundamentals, White Box Testing, Basic Path Testing, Control Structure Testing, Black Box Testing. Software Testing Strategies, Unit Testing, Integration Testing, Validation Testing, System Testing, Maintenance Characteristics, Reverse Engineering, Re-engineering.

(12 Hours)

Textbooks

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
1	Software Engineering, A Practitioner's Approach	Pressman S. R. and Maxim R. B.	McGraw Hill International	9th (2020)
2.	Software Engineering	Sommerville I	Addison-Wesley Publishing Company	10th (2017)

Reference Books

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
1	Software Engineering: A Methodical Approach	Foster C. E	Apress	2nd (2021)
2	The Unified Modeling Language User Guide	Booch G., Rambaugh J., Jacobson I	Pearson	2nd (2005)

COURSE PLAN		
Unit-I Software Engineering Processes		
S No	**Topics**	**Recommended Books**
1	Introduction to Software Engineering	Book 1, Chapter 1
2	Software Evolution and Characteristics, Legacy Software	Book 1, Chapter 1
3	Software Crisis: Myths and Causes	Book 1, Chapter 1
4	Software Engineering: A Layered Technology	Book 1, Chapter 1
5	Software Process Framework, Software Process Models	Book 1, Chapter 1
6	Waterfall, Incremental, Evolutionary and Agile Models	Book 1, Chapter 2
Unit-II Requirements Engineering		
1	Problem Analysis	Book 1, Chapter 5
2	Requirement Elicitation and Validation	Book 1, Chapter 5
3	Requirements Modeling: Scenarios, Information and Analysis Classes	Book 1, Chapter 6
4	Flow and Behavioral Modeling	Book 1, Chapter 6
5	Documenting Software Requirement Specification (SRS)	Book 1, Chapter 7
Unit-III Software Planning and Project Management		
1	Software Project Management Process	Book 1, Chapter 26
2	Software Scope, Resources	Book 1, Chapter 26
3	Software Metrics, Software Project Estimation	Book 1, Chapter 27
4	Decomposition Techniques	Book 1, Chapter 27
5	Empirical Estimation Model: COCOMO	Book 1, Chapter 26
6	Software Project Scheduling	Book 1, Chapter 27

7	Risk Analysis	Book 1, Chapter 28
8	Software Acquisition	Book 1, Chapter 27
Unit-IV Software Design and Construction		
1	Software Design Principles: Levels of Abstraction - Architectural and Detailed Design	Book 2, Chapter 2
2	Coupling and Cohesion	Book 2, Chapter 22
3	Structured Design - Top Down Functional Decomposition	Book 2, Chapter 3
4	Object Oriented Design, Event-Driven Design, Component-Level Design, Test Driven Design, Aspect Oriented Design	Book 2, Chapter7
5	Function Oriented, Service Oriented, Design Patters	Book 2, Chapter7
6	Coding Practices: Techniques, Refactoring, Integration Strategies, Internal Documentation	Book 2, Chapter5
7	Data Flow Diagrams, Transform Analysis, Transaction Analysis, Transform and Transaction Mapping	Book 2, Chapter5
Unit-V Software Quality Assurance, Testing and Maintenance		
1	Software Quality and Software Quality Assurance	Book 2, Chapter24
2	Formal Technical Reviews	Book 2, Chapter24
3	Software Quality Metrics: McCall's Quality Factors	Book 2, Chapter24
4	Software Reliability, Software Testing Fundamentals	Book 2, Chapter24
5	White Box Testing, Basic Path Testing, Control Structure Testing, Black Box Testing	Book 2, Chapter24
6	Software Testing Strategies: Unit Testing, Integration Testing, Validation Testing, System Testing	Book 2, Chapter24
7	Maintenance Characteristics, Reverse Engineering, Re-engineering	Book 2, Chapter9

ADDITIONAL WEB RESOURCES

1.	**MOOC:** Introduction to Software Engineering by IBM https://www.coursera.org/learn/introduction-to-software-engineering#about
2.	**MOOC:** Software Engineering Specialization by Hong Kong University of Science and Technology https://www.coursera.org/specializations/software-engineering
2.	**NPTEL:** Software Engineering by Prof. Rajib Mall https://onlinecourses.nptel.ac.in/noc20_cs68/preview
3.	**Creately Tool:** https://creately.com/lp/uml-diagram-tool/

GRADING AND ASSESSMENT

- **Sessional Test**: 20 marks
- **Assignment**: 20 marks
- **Attendance**: 10 marks
- **Final Examination**: 100 marks

COURSE POLICIES

- **Attendance**: Minimum 75% attendance is mandatory to appear in the final examination of the course.

- **Academic Integrity**: MIET's academic integrity policies apply. Plagiarism will not be tolerated.
- **Late Submissions**: Assignments and projects must be submitted by the specified timelines.

FACULTY INFORMATION

- **Office Hours**

  Monday - Friday (02:35 PM - 04:00 PM)

- **Contact Information**

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