NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	BTech (CSE), Integrated BTech (CSE)-MBA
Course Code:	3CS511CC24
Course Title:	Software Engineering
Course Type:	Core
Year of Introduction:	2024-25

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Course Learning Outcomes (CLO):

At the end of the course, the students will be able to –
1. explain various phases of the software development lifecycle (BL2)
2. analyse the software requirement specifications for a project (BL4)
3. evaluate the process model using standard tools and methodologies (BL5)
4. design a prototype considering all aspects of SDLC. (BL6)

Unit	Contents	Teaching Hours (Total 45)
Unit-I	**Introduction:** Introduction to Software Engineering, Defining Software, Changing Nature of Software, attributes of a good Software, Software Product, Software Development Life Cycle, Software Processes, Software Engineering Practices, Software Myths	05
Unit-II	**Software Process Models:** Generic Process Model (Defining Framework Activity, Identifying Task Set), Waterfall Process Model, Incremental Process Model, Spiral Process Model, Prototyping Software Process Model, Evolutionary Process Model, Component based Process Model, Introduction to basic concepts of Agile Software Development	10
Unit-III	**Project Management Concepts:** Management activities, Project Planning, Project Scheduling, Overview of Risk Handling and Management.	03
Unit-IV	**Software requirement engineering:** Software Requirements, Requirement Engineering, Extraction and Specification, Feasibility Study, Requirements Modelling, Object Oriented Analysis.	07
Unit-V	**Design Concepts:** Object oriented design, Architectural Design, Component level Design, User Interface Design, Distributed Systems Architecture, Real-Time Software Design, User Interface Design, Pattern Based Design **Coding:** Top-down and bottom-up, structured programming, information hiding, programming style, and internal documentation.	06
Unit-VI	**Software Process and Metrics:** Metrics in the Process and Project Domains: Process metrics, project metrics, Software Measurement Metrics for Software Quality	06

Unit-VII **Software Testing:** Unit testing, integration testing, black box and white box testing, regression testing, performance testing, object-oriented testing. Verification and validation of Software and Software configuration management: Concepts and examples   08

Self-Study:
The self-study contents will be declared at the commencement of the semester. Around 10% of the questions will be asked from self-study contents

Suggested Readings/ References:
1. Ian Sommerville, Software Engineering, Addison – Wesley
2. Roger Pressman, Software Engineering: A Practitioner's Approach, McGraw Hill
3. Rajib Mall, Fundamentals of Software Engineering, Prentice Hall of India
4. Ivar Jacobson, Object Oriented Software Engineering A use case Approach, Pearson

Suggested List of Experiments:

Sr. No.	Title	Hours
1	Identify Project scope, Objectives, Problem Statement formulation, and requirement identification for the project.	02
2	Define functional & non-functional requirements for the same. Prepare a SRS document for the project.	02
3	Define modules of the project & design the project plan (Gantt Chart) for the same and identify deliverables with the timeline.	02
4	Design Use Case Diagrams and Use Case Specifications for your system.	04
5	Construct an Activity Diagram for your system.	02
6	Design Class Diagram & CRC index cards for your System.	02
7	Construct a Sequence Diagram and Collaboration Diagram for the project.	04
8	Construct a State Diagram for your project.	04
9	Implement formal specification using Z notation.	04
10	Implement at least four functional modules of your project. Design test cases for your project and perform testing. Prepare test strategy document.	04