

CLUSTER UNIVERSITY SRINAGAR

SYLLABUS (FYUP UNDER NEP - 2020)

Offered by Department of Information Technology

Semester 6th (Major Course – CT3)

Title: Software Engineering with Mini Project

Course Code: UGICT22J603

Credits: 6 (Theory: 4, Practical: 2)

Contact Hrs: 120 (Theory: 60, Practical: 60)

Max. Marks: 150

Theory External: 80; Min Marks: 32

Theory Internal (Continuous Assessment): 20 Marks, Min Marks: 08

Practical Experimental Basis= 30, Min. Marks: 12

Practical Experimental (Continuous assessment) = 20, Min. Marks: 08

Course Objectives:

The objective of this course is to understand the concepts of Software Engineering, Software Development Life Cycle (SDLC), and to apply project management and analysis, design and testing principles to software project development.

Course Outcome:

Students will be able to apply core software engineering principles, including requirements analysis, design, development, testing, and maintenance, to create reliable, scalable, and maintainable software solutions.

Unit 1:

(15 Hrs.)

The Evolving Role of Software, Defining Software, Software Myths, Concept of Software Engineering, Legacy Software, A Generic View of Process, A Layered Technology, Process Framework, Capability Maturity Model Integration (CMMI), Software process and project metrics.

Unit 2:

(15 Hrs.)

Process Models: Build and fix model, The Waterfall Model, Incremental Process Model, RAD Model, Evolutionary Process Models, Unified Process, Prototyping, Agile Methodology, SCRUM Approach
DevOps: Introduction, Continuous Integration, Continuous Delivery, Continuous Deployment
Lean Software Development: Principles, Practices, and Benefits.

Unit 3:

(15 Hrs.)

Software Engineering Practice, Requirements Engineering Tasks, Types of Requirements, Feasibility Studies, Initiating the Requirements Engineering Process, Eliciting Requirements, Developing Use Cases, Requirement Analysis, Documentation and Validation, software requirements document.
Software Quality Assurance: Quality Attributes, Verification and Validation

Unit 4:

(15 Hrs.)

Requirements Analysis, Analysis Modelling Approaches, Data Modelling Concepts, Object-Oriented Analysis, Scenario-Based Modelling, Flow-Oriented Modelling, Class-Based Modelling, Planning: Size Estimation, Cost Estimation, COCOMO, Software Risk Management, Testing Techniques and terminology, Testing fundamentals, White box testing, Black box testing, static vs dynamic testing, functional and non-functional testing, structural testing, validation testing, system testing,

Recommended Books:

1. Pressman, R. S. (2010). *Software engineering: A practitioner's approach*. McGraw-Hill.
2. Sommerville, I. (2016). *Software engineering*. Pearson Education.
3. Schwaber, K., & Sutherland, J. (2020). *Agile software development with scrum*. Pearson Education.
4. Software Engineering: A Precise Approach, Pankaj, Wiley
5. Fundamentals of Software Engineering, Mall B, Prentice Hall India.
6. Software Engineering, Udit Aggrawal, SK Kataria

Lab Work (2 Credits: 60 Hours)

- Students are required to create a mini project using the software development methodologies studied, involving all critical phases of the SDLC while choosing technologies that align with their skills and project requirements. A comprehensive documentation will also be required.
- Students will work in teams to design, develop, test, and deliver a software solution using their choice of front-end and back-end technologies. The course aims to integrate theoretical knowledge with practical application in a real-world context.