RCS6C001 Software Engineering

Objectives

- To introduce concepts in software engineering
- To identify different software development models
- To apply software engineering knowledge in real-world problem solving

Module I   **(09 hours)**

Software Process Models: Software Product, Software crisis, Handling complexity through Abstraction and Decomposition, Overview of software development activities, Process Models, Classical waterfall model, iterative waterfall model, prototyping mode, evolutionary model, spiral model, RAD model, Agile models: Extreme Programming, and Scrum.

Module II   **(09 hours)**

Software Requirements Engineering: Requirement Gathering and Analysis, Functional and Non-functional requirements, Software Requirement Specification (SRS), IEEE 830 guidelines, Decision tables and trees. Structured Analysis & Design: Overview of design process, High-level and detailed design, Cohesion and coupling, Modularity and layering, Function–Oriented software design: Structured Analysis using DFD Structured Design using Structure Chart, Basic concepts of Object Oriented Analysis & Design. User interface design, Command language, menu and iconic interfaces

Module III   **(09 hours)**

Coding and Software Testing Techniques: Coding, Code Review, documentation. Testing: - Unit testing, Black-box Testing, White-box testing, Cyclomatic complexity measure, coverage analysis, mutation testing, Debugging techniques, Integration testing, System testing, Regression testing. Software Reliability and Software

Module IV   **(09 hours)**

Maintenance: Basic concepts in software reliability, reliability measures, reliability growth modelling, Quality SEI CMM, Characteristics of software maintenance, software reverse engineering, software reengineering, software reuse. Emerging Topics: Client-Server Software Engineering, Service-oriented Architecture (SOA), and Software as a Service (SaaS)

Outcomes
- Ability to relate practical problems to software engineering concepts
- Ability to model problems using standard software development models
- Ability to apply software engineering skills in real-world problem solving

Books
- Fundamentals of Software Engineering, Rajib Mall , 5th Ed, PHI, 2018.
- Software Engineering, A Practitioner's Approach, Roger S. Pressman, 8th Ed, TMG Hill. 2019
- Software Engineering, I. Sommerville, 9th Ed., Pearson Education, 2011

Digital Learning Resources:

Course Name: Software Engineering
Course Link: https://nptel.ac.in/courses/106/105/106105182/
Course Instructor: Prof. Rajib Mall, IIT Kharagpur
Course Name: Software Engineering
Course Link: https://nptel.ac.in/courses/106/101/106101061/
Course Instructor: Prof. N.L. Sarda, Prof. R. K Joshi, Prof. U. Bellur IIT Bombay