CS/DSC/T/ 251: Software Engineering

Total Credits : 02 **Total Contact Hours : 30 Hrs.**

Maximum Marks : 50

Learning Objectives of the Course:

i) Understand the fundamental principles and lifecycle of software development.
ii) Explore various software development process models.
iii) Learn the techniques involved in requirement analysis, design, coding, testing, and maintenance.
iv) Understand project management concepts including cost estimation, risk analysis, and quality assurance.

Course Outcomes (COs) :

After completion of the course, students will be able to

i) Identify and apply suitable software development models based on project requirements.
ii) Analyze and specify software requirements and transform them into appropriate design models.
iii) Apply software testing methods and tools for quality assurance.
iv) Recognize the importance of software process standards and documentation.

Module No.	Topics / Actual Contents of the Syllabus	Contact Hours
I	**Introduction to Software Engineering:** Nature and goals of software, engineering, Characteristics of good software, Software development lifecycle (SDLC), Software myths and process maturity. **Software Development Models:** Waterfall model, Incremental model, Spiral model, V-Model, Agile development and Scrum overview.	10 Hrs.
II	**Software Requirements and Analysis:** Requirement types: functional and non-functional, Requirement engineering process, SRS (Software Requirement Specification), Use cases and requirement validation **Software Design and Coding:** Design concepts and principles, Design diagrams: DFDs, ER diagrams, UML basics, Coding standards and documentation, Structured programming and modular design.	10 Hrs.
III	**Software Testing:** Testing principles and types: unit, integration, system, acceptance, Black-box and white-box testing, Test case design and defect tracking, Basics of automation testing. **Software Project Management & Quality Assurance:** Project scheduling and estimation (LOC, FP, COCOMO), Risk management, Configuration management, Software quality, ISO and CMMI models, Ethics in software engineering.	10 Hrs.

References:

1. "Fundamentals of Software Engineering" – Rajib Mall, PHI Learning.
2. "Software Engineering" – K.K. Aggarwal, Yogesh Singh, New Age International Publishers
3. "Introduction to Software Engineering" – R. S. Pressman, McGraw Hill.
4. "An Integrated Approach to Software Engineering", Pankaj Jalote, Narosa Publishing.