23CS22T2 - SOFTWARE ENGINEERING

(Common to CSE and IT)

Course Category:	Professional Core	**Credits:**	3
Course Type:	Theory	**Lecture-Tutorial-Practical:**	3-0-0
Prerequisite:	• Understanding of user interface design principles. • Usability testing, and user experience (UX) design considerations.	**Sessional Evaluation:** **Univ. Exam Evaluation:** **Total Marks:**	30 70 100
Objectives:	**Students undergoing this course are expected:** • Software life cycle models, Software requirements and SRS document. • Project Planning, quality control and ensuring good quality software. • Software Testing strategies, use of CASE tools, Implementation issues, validation & verification procedures.		

Course Outcomes	**Upon successful completion of the course, the students will be able to:**	
	CO1	Perform various life cycle activities like Analysis, Design, Implementation, Testing and Maintenance (L3)
	CO2	Analyse various software engineering models and apply methods for design and development of software projects. (L4)
	CO3	Develop system designs using appropriate techniques. (L3)
	CO4	Understand various testing techniques for a software project. (L2)
	CO5	Apply standards, CASE tools and techniques for engineering software projects (L3)
Course Content	**UNIT-I** **Introduction:** Evolution, Software development projects, Exploratory style of software developments, Emergence of software engineering, Notable changes in software development practices, and Computer system engineering. **Software Life Cycle Models:** Basic concepts, Waterfall model and its extensions, Rapid application development, Agile development model, Spiral model. **UNIT-II** **Software Project Management:** Software project management complexities, Responsibilities of a software project manager, Metrics for project size estimation, Project estimation techniques, Empirical Estimation techniques, COCOMO, Halstead's software science, risk management. **Requirements Analysis and Specification:** Requirements gathering and analysis, Software Requirements Specification (SRS), Formal system specification, Axiomatic specification, Algebraic specification, Executable specification and 4GL.	

	UNIT-III **Software Design:** Overview of the design process, How to characterize a good software design? Layered arrangement of modules, Cohesion and Coupling. Approaches to software design. **Agility:** Agility and the Cost of Change, Agile Process, Extreme Programming (XP), Other Agile Process Models, Tool Set for the Agile Process. **Function-Oriented Software Design:** Overview of SA/SD methodology, Structured analysis, Developing the DFD model of a system, Structured design, Detailed design, and Design Review. **User Interface Design:** Characteristics of a good user interface, Basic concepts, Types of user interfaces, Fundamentals of component-based GUI development, and user interface design methodology. **UNIT-IV** **Coding And Testing:** Coding, Code review, Software documentation, Testing, Black-box testing, White-Box testing, Debugging, Program analysis tools, Integration testing. **Software Reliability and Quality Management:** Software reliability. Statistical testing, Software quality, Software quality management system, ISO 9000. SEI Capability maturity model. **UNIT-V** **Computer-Aided Software Engineering (Case):** CASE and its scope, CASE environment, CASE support in the software life cycle, other characteristics of CASE tools, Towards the second generation CASE Tool, and Architecture of a CASE Environment. **Software Maintenance:** Characteristics of software maintenance, Software reverse engineering, Software maintenance process models and Estimation of maintenance cost. **Software Reuse:** Reuse- definition, introduction, reason behind no reuse so far, Basic issues in any reuse program.
Text Books & References Books	**TEXTBOOKS:** 1. Fundamentals of Software Engineering, Rajib Mall, 5th Edition, PHI. 2. Software Engineering A practitioner's Approach, Roger S. Pressman, 9th Edition, McGraw Hill International Edition. 3. **REFERENCE BOOKS:** 1. Software Engineering, Ian Sommerville,10th Edition, Pearson. 2. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
E-Resources	1. https://nptel.ac.in/courses/106/105/106105182/ 2. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01260589506387148827_shared/overview