# 23CS22T2 - SOFTWARE ENGINEERING

**(Common to CSE and IT)**

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| 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. | | |

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| 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.   **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 | |