# 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: | 3070100 |
| 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 anddevelopment 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 softwaredevelopments, 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, Rapidapplication 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 softwaredesign? 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, Structuredanalysis, Developing the DFD model of a system, Structured design, Detailed design, andDesign 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 reverseengineering, 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 &ReferencesBooks | **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.
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| 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
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