# 19CS2104 - SOFTWARE ENGINEERING

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| **Course Category:** | Program Core | **Credits:** | 3 |
| **Course Type:** | Theory | **Lecture - Tutorial - Practical:** | 3-0-0 |
| **Prerequisite:** | Require the fundamental concepts of computers and basic analytical capabilities | **Sessional Evaluation:**  **Univ. Exam Evaluation:**  **Total Marks:** | 40  60  100 |
| **Objectives** | * To define various software engineering phases. * Explore the concepts of software products and processes. * To facilitate the environment of software development in the outside world. * To expose the importance of risk management and strive for quality assurance. | | |

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| **Course Outcomes** | Upon successful completion of the course, the students will be able to: | |
| CO1 | Understand the basics of software engineering layers. |
| CO2 | Learn the engineering principles, planning and construction of analysis models. |
| CO3 | Study the data modeling concepts to create a behavioral model and exposure on design concepts. |
| CO4 | Identify various architectural styles to get the support for designing conventional components. |
| CO5 | Examine different Testing Strategies for conventional software and metrics to evaluate the product. |
| CO6 | Study various risk strategies and improve software quality assurance. |
| **Course Content** | UNIT-I  **Introduction to Software Engineering:** Software evolution, Software and its nature, Legacy software, Software myths.  **A Generic View of Process:** Software engineering layers, Process frame work, Capability Maturity Model Integration (CMMI), Personal and team process models.  **Process Models:** Prescriptive models, Waterfall model, Incremental process models, Evolutionary process models and Unified process.  UNIT-II  **Software Engineering Practice**: Engineering Principles, Communication, Planning, Modeling and Construction practices, Deployment.  **Requirements Engineering:** Requirements engineering tasks, Initiation, Eliciting requirements, developing use-cases, Building the analysis model, Negotiating and validating requirements.  UNIT-III  **Building the Analysis Model:** Analysis model, Analysis modeling approaches, Data modeling concepts, Object-oriented analysis, Scenario based modeling, Flow-oriented modeling, Class-based modeling, Creating a behavioral model.  **Design Engineering:** Design process, Design quality, Design concepts, and Design model.  UNIT-IV  **Creating an Architectural Design:** Software architecture, Data design, Architectural styles and patterns, Architectural design, Mapping data flow into software architecture.  **Modeling Component-level Design:** Nature of component, Designing class-based components, Conducting component level design, Object constraint language, Designing conventional components.  UNIT-V  **Testing strategies:** A strategic approach to software testing, Test strategies for conventional software, Test strategies for object-oriented software, Validation testing, System testing, Art of debugging.  **Product metrics:** Software quality, metrics for analysis model, metrics for design model, metrics for source code, metrics for testing, metrics for maintenance.  UNIT-VI  **Risk management:** Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM plan.  **Quality Management**: Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability. | |
| **Text Books and References:** | Text Books:   1. Pressman R S, Software Engineering-A Practitioner‟s Approach, 6th edition, McGrawHill | |
| Reference Books:   1. Sommerville I, Software Engineering, 5th edition, Pearson Education, 1996. 2. Jawadekar W S, Software Engineering – Principles and Practice, Tata McGraw-Hill, 2004.Hill, 2005. 3. Carlo gezzi, Fundamentals of Software Engineering ,Second edition, Prentice Hall | |
| **E-Resources** | 1. <https://nptel.ac.in/courses> 2. <https://freevideolectures.com/university/iitm> | |