

**PSE 204 ADVANCED TOPICS IN SOFTWARE ENGINEERING**

L	T	P	Cr
3	0	2	4.0

**Course Objectives:** To apply advance topics in software engineering. To specify, abstract, verify and validate solutions to large-size problems, to plan, develop and manage large software using state-of-the-art methodologies and learn emerging trends in software engineering

**Formal Methods:** Basic concepts, mathematical preliminaries, Applying mathematical notations for formal specification, formal specification languages, using Z to represent an example software component, the ten commandments of formal methods, formal methods- the road ahead.

**Cleanroom Software Engineering:** approach, functional specification, design and testing.

**Component-Based Software Engineering:** CBSE process, domain engineering, component-based development, classifying and retrieving components, and economics of CBSE.

**Client/Server Software Engineering:** Structure of client/server systems, software engineering for Client/Server systems, analysis modeling issues, design for Client/Server systems, testing issues.

**Web Engineering:** Attributes of web-based applications, the WebE process, a framework for WebE, formulating, analyzing web-based systems, design and testing for web-based applications, Management issues.

**Reengineering:** Business process reengineering, software reengineering, reverse reengineering, restructuring, forward reengineering, Economics of reengineering.

**Computer-Aided Software Engineering:** Building blocks for CASE, taxonomy of CASE tools, integrated CASE environments, integration architecture, CASE repository, case Study of tools like TCS Robot.

**Mobile Development Process:** Model View Controller, Presentation Abstraction Control, UML based development, Use cases, Testing: Mobile infrastructure, Validating use cases, Effect of dimensions of mobility on testing, Case study: IT company, Requirements, Detailed design, Implementation.

**Real Time Operating Systems:**Real-time and non-real time applications. Classification of Real-Time Task scheduling algorithms, Event-driven scheduler- Simple priority-based, Rate Monotonic Analysis, Earliest Deadline First, The simplest of Task assignment and scheduling, priority scheduling, characteristics of tasks, task assignment and multi-tasking.

**Software Engineering Issues in Embedded Systems:**Characteristics of embedded systems I/O, Embedded systems/real time systems. Embedded software architecture, control loop, interrupts control system, co-operating multitasking, pre-emptive multitasking, Domain analysis, Software element analysis, requirement analysis, Specification, Software architecture, Software analysis design, implementation, testing, validation, verification and debugging of embedded systems.

**Laboratory Work:** To implement the advance concepts in the lab using related tools and to develop the project using related technologies

#### **Recommended Books**

1. Software Engineering a Practitioners Approach, Roger S. Pressman, McGraw-Hill , 8<sup>th</sup> Edition, 2014
2. Formal Specification and Documentation using Z - A Case Study Approach, J.Bowan , International Thomson Computer Press, 2003
3. Software Engineering for Embedded Systems: Methods, Practical Techniques, and Applications,RobertOshana, Mark Kraeling, Newnes Publisher, 2013