

Software Engineering (CSE3004)

Course Introduction



Instructor:
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National Institute of Technology Rourkela

Course Objective

- To discuss the software engineering discipline, its evolution, impact and emergence of software engineering
- To explain the development and use of different software life cycle models for real-life industrial applications.
- To discuss different aspects of software project management, risk management and configuration management and explain various requirement elicitation, analysis and specification techniques.
- To discuss various software design methodologies, the impact of cohesion and coupling measures on the goodness of the software design.
- To discuss the importance of practicing different coding standards, guidelines and different testing strategies along with software reliability metrics and software quality management techniques & standards.

Course Outcomes

- After reading this subject, students will be able to:
 - Choose a proper life cycle model for different real-life industrial projects, prepare the SRS document, design the software using function-oriented approach (DFDs) and object-oriented approach (UML diagrams), code it, and test the developed software using different software testing strategies.
 - Understand the concepts of computer aided software engineering (CASE) and use different CASE tools in the development, maintenance and reuse of software systems.

Course topics

- **Software development life cycle** and Software development life cycle (SDLC) models
- **Project Management:** software project management, project planning, project estimation, project scheduling, staffing Organization and team structure, risk management, configuration management
- **Requirements analysis and specification:** Feasibility study, Requirements gathering and analysis, software requirements specification, formal systems specification, axiomatic specification, algebraic specification.

Course topics

- **Software Design:** Outcome of a design process, cohesion and coupling, layered arrangement of modules, approaches to software design
- **Function-oriented software design:** overview of SA/SD methodology, structured analysis, DFDs, structured design, detailed design,
- **Object-oriented software design:** UML diagrams, OOD goodness criteria
- **User interface design,** types of user interfaces, component-based GUI development

Course topics

- **Coding:** coding standards and guidelines, code review, software documentation
- **Testing:** unit testing, black-box testing, white-box testing, debugging, integration testing, system testing.
- **Software reliability and Quality management:** Software reliability, software quality, ISO 9000, SEI CMM, PSP, Six sigma, CASE Tools, Software maintenance, Software reuse.

Textbook references



■ Text Book:

- Rajib Mall, “Fundamentals of Software Engineering”, 5th edition, PHI, 2018
- R.S. Pressman, “Software Engineering: A Practitioner's Approach”, 7th Edition, McGraw
- Sommerville, “ Introduction to Software Engineering”, 8th Edition, Addison-Wesley, 2007
- Grady Booch et al, Object-Oriented Analysis and Design with Applications, Addison Wesley , 2007

■ SUPPLEMENTARY READING

- James Rumbaugh, Ivar Jacobson, Grady Booch, “The Unified Modeling Language Reference Manual”, Second Edition, Addison- Wesley, 2004.

■ JOURNAL AND CONFERENCES

- Journal: IEEE Transaction on Software Engineering, www.computer.org/csdl/journal/ts
- Journal: Journal of system software, www.journals.elsevier.com/journal-of-systems-and-software
- Conference: Int. conference on Software Engg. <http://www.icse-conferences.org/>
- Conference: Software engineering and knowledge engineering <http://ksiresearch.org/seke/seke20.html>

Evaluation Methods:

Item	Weightage
Quiz/Assignment/Project	20
Midterm	30
Endterm	50

****Tentative****

Quiz: There will be two announced quizzes for 10 marks each.

Assignments: Regular assignments will be given on the topics covered in the class

Attendance requirements: As per the institute rules

Issues related to any evaluation component should be raised within 3 days from the conduction or deadline mentioned of the respective component.

Feedback!!

- Course material and delivery
- Your expectations from the course

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