IT 224: Software Engineering

Credits: 3
Lecture Hours: 48

Course Objectives
This module aims to introduce students with problems in large-scale software production. It should be associated with laboratory experiments to augment the concepts taught in the class.

Course Description
Introduction, software processes, Agile Software development, Requirements Engineering, System modeling, Architectural Design, Design and Implementation, Software testing, Software evolution, Sociotechnical Systems, Dependability and Security, Dependability and Security Specifications

Course Details

Unit 1: Introduction **LH 3**

- Professional software development
- Software engineering ethics
- Case studies

Unit 2: Software processes **LH 3**

- Software process models
- Process activities
- Coping with change
- The rational unified process

Unit 3: Agile Software development **LH 5**

- Agile methods
- Plan-driven and agile development
- Extreme programming
- Agile project management
- Scaling agile methods

Unit 4: Requirements engineering **LH 5**

- Functional and non-functional requirements
- The software requirements document
- Requirements specification
- Requirements engineering processes
- Requirements elicitation and analysis
- Requirements validation
- Requirements management

Unit 5: System modeling **LH 4**

- Context models
- Interaction models
- Structural models
- Behavioral models

- Model-driven engineering

Unit 6: Architectural design **LH 5**

- Architectural design decisions
- Architectural views
- Architectural patterns
- Architectural architectures

Unit 7: Design and implementation **LH 6**

- Object oriented design using the UML
- Design patterns
- Implementation issues
- Open source development

Unit 8: Software testing **LH 4**

- Development testing
- Test-driven development
- Release testing
- User testing

Unit 9: Software evolution **LH 3**

- Evolution processes
- Program evolution dynamics
- Software maintenance
- Legacy system management

Unit 10: Sociotechnical systems **LH 3**

- Complex systems
- Systems engineering
- System procurement
- System development
- System operation

Unit 11: Dependability and security **LH 3**

- Dependability properties
- Availability and reliability
- Safety
- Security

Unit 12: Dependability and security specifications **LH 4**

- Risk-driven requirements specification
- Safety specification
- Reliability specification
- Security specification
- Formal specification

Text Book

Software engineering, Ian Sommerville, ninth edition

References

A software engineering approach to labVIEW, Jon Conway
Software engineering: A Practitioner's Approach, Roger Pressman
Software Engineering Best Practices: lessons from successful Projects in the top companies, Capers Jones