Requirements

- Elicitation
- Analysis
- Stakeholders
- Specification
- IEEE Std 830
- Formalization
- Validation & verification

- Use-case
- Actor
- Use-case diagrams (x2)
- Class diagrams
- ER-diagrams
- Functional requirements
- Non-functional requirements
- Features
- RAM (what it is)
- User stories
Project management

- Project definition
- Dependent parameters
- Project stakeholders
- Risk management
  - Kinds
  - Magnitude indicator
  - Planning
- Managing people
- Roles
- Teamwork

- Project planning
  - SMART goals
  - GANTT chart, Critical path
  - Effort estimation: COCOMO, Delphi, Planning poker
  - Time-boxing
  - Activity, Milestone, Tollgate
  - Customer value vs. effort
  - Brook’s law
  - Project plan
  - Status report
Software life cycle and process

• Process definition
• Software life cycle
  • Requirements
  • Design
  • Implementation
  • Testing
  • Integration
  • Deployment
  • Support
• Life cycle models
  • Waterfall
  • V-model
  • Iterative development
  • Incremental model
• RUP
• Lean
• Agile software development
  • Extreme programming (XP)
  • Scrum
  • Kanban
Design and Architecture

- Communication, Early Decisions, Reuse
- Prototyping (2x)
- Box-and-line diagram
- Views
  - Implementation (code) View
  - Execution View
  - Deployment View
- Coupling – Cohesion
- Architecture styles
  - Client-server (x3)
  - Layered
  - Pipe-and-filter
  - SOA
- Design patterns
  - Strategy
  - Observer
  - Façade
- UML: sketching, blueprinting, programming language
  - class diagram: attributes, association, composition, generalization
  - sequence diagram
  - state machine diagrams
  - Packages
  - deployment
  - (activity diagrams)
- What to document
Testing and SCM

- Error, Fault, Failure
- Black-box testing
- White-box testing
- Oracle
- Equivalence class testing
- Boundary value testing
- Control graph testing coverage
- Unit testing
- Regression testing
- Integration testing
  - Bottom – up, top-down, Sandwich, big-bang
  - Stubs, Drivers
- System testing
- Performance Testing
- Acceptance testing
  - Pilot testing
  - alpha test
  - beta test
  - Installation testing
  - Parallel testing
- Revision control
  - Versions
  - Trunk
  - Branch
- Centralized (SVN)
- Distributed (Git)
- Continuous Integration
Quality

- Usability engineering
  - Relevance
  - Efficiency
  - Attitude
  - Learnability

- Reliability engineering, Failure intensity

- Security
  - Confidentiality
  - Integrity
  - Availability

- Safety, Maintainability, Availability, Performance, Testability, Reusability, Portability

- Inspection
  - Roles
  - Process
  - Other s/w reviews

- Software metrics

- CMMI selected PA’s levels 2 and 3

- ISO 9000-3 (Principles)

- Total Quality Management (Principles)