Sharif University of Technology

Department of Computer Engineering

Software Development Methodologies (40-724)

Dr. Raman Ramsin

Graduate Course, 3 Units, Core Elective (for MS in Systems and Software Engineering)
Prerequisites: None

Overview

The aim of this course is to familiarize graduate students with software development methodologies and their relevant concepts and principles. In addition to gaining knowledge and insight on prominent methodologies, students will also be introduced to methods for analyzing and evaluating methodologies, software process patterns/antipatterns, process metamodels, and Situational Method Engineering (SME) approaches. This course has been modeled on the "Methods" course proposed by the Software Engineering Institute (SEI). Since the object-oriented paradigm is dominant in modern software development, the course is mainly focused on object-oriented approaches.

Topics and Schedule

1) Introduction to the concepts and history of object-oriented methodologies (2 sessions – each session is 90 minutes in duration)
2) Methodology analysis and evaluation criteria (3 sessions)
3) Analytical review of the *Fusion* methodology: A closer look at the distinguishing characteristics of the object-oriented approach (2 sessions)
4) Analytical review of major Third-Generation object-oriented methodologies: *OPM, RUP, USDP, and EUP* (7 sessions)
5) Methodology engineering: Situational Method Engineering (SME) approaches (1 session)
6) Analytical review of major Agile methodologies: *Scrum, XP, Crystal, FDD, DSDM,* and *DAD* (11 sessions)
7) Software process metamodels (1 session)
8) Software process patterns and antipatterns (3 sessions)

Exams, Assignments, and Research Project

- Two exams: Midterm and Final (comprising 60% of the total grade)
- Two study assignments (comprising 25% of the total grade)
- SME project: A software development situation is defined, and students are required to design a bespoke methodology, tailored to fit the situation, by using an SME tool (comprising 15% of the total grade + a bonus of 10%)

Main Resources

- Arlow, J. and Neustadt, I. 2005. *UML 2 and the Unified Process: Practical Object-Oriented Analysis and Design, 2nd ed.* Addison-Wesley.

- Ambler, S.W., Nalbone, J., and Vizdos, M.J. 2005. *The Enterprise Unified Process: Extending the Rational Unified Process.* Prentice-Hall.

- Cockburn, A. 2006. *Agile Software Development: The Cooperative Game, 2nd ed.* Addison-Wesley.

- OMG. 2008. *Software and Systems Process Engineering Metamodel Specification (v2.0).* OMG, Available online at: http://www.omg.org/spec/SPEM/2.0/.

- Ramsin, R., and Paige, R.F. 2008. *Process-centered review of object-oriented software development methodologies.* ACM Computing Surveys 40, 1, Article 3, 1-89.

- Neill, C.J., Laplante, P.A., and DeFranco, J.F. 2012. *Antipatterns: Managing Software Organizations and People.* CRC Press.

- Rubin, K.S. 2012. *Essential Scrum: A Practical Guide to the Most Popular Agile Process.* Addison-Wesley.

- Henderson-Sellers, B., Ralyté, J., Agerfalk, P.J., and Rossi, M. 2014. *Situational Method Engineering.* Springer-Verlag.

- Agile Business Consortium. 2014. *The DSDM Agile Project Framework Handbook.* DSDM Consortium.

- Ambler, S.W. and Lines, M. 2020. *Choose Your WoW: A Disciplined Agile Delivery Handbook for Optimizing Your Way of Working.* Project Management Institute.