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## **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 history and evolution timeline of object-oriented methodologies, and their relevant evaluation criteria (2 sessions – each session is 90 minutes in duration)
- 2) Analytical review of the *Fusion* methodology: A closer look at the distinguishing characteristics of the object-oriented approach (2 sessions)
- 3) Brief review of prominent First- and Second-Generation object-oriented methodologies: *RDD, Booch, OMT, OOSE* (3 sessions)
- 4) Analytical review of major Third-Generation object-oriented methodologies: *OPM, RUP, USDP, EUP, FOOM*, and *TSP-PSP* (7 sessions)
- 5) Analytical review of major Agile methodologies and frameworks: *XP, AUP, Crystal, FDD, DSDM, Scrum*, and *DAD* (9 sessions)
- 6) Software process patterns and antipatterns (3 sessions)
- 7) Software process metamodels (1 session)
- 8) Methodology engineering: Situational Method Engineering (SME) approaches (3 sessions)

### **Exams, Assignments, and Research Project**

- Two exams (Midterm and Final) – Comprising %60 of the total grade
- Three 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 the EPFC environment – Comprising %15 of the total grade

## Some of the Resources

- Ambler, S.W., Nalbene, 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.
- Shoval, P. 2007. *Functional and Object Oriented Analysis and Design: An Integrated Methodology*. Idea Group Publishing.
- 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.
- Rubin, K.S. 2012. *Essential Scrum: A Practical Guide to the Most Popular Agile Process*. Addison-Wesley.
- Ambler, S.W., Lines, M. 2012. *Disciplined Agile Delivery: A Practitioner's Guide to Agile Software Delivery in the Enterprise*. IBM Press.
- 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.