Software Development Methodologies (40-724)

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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: Coad-Yourdon, RDD, Booch, OMT, OOSE, BON, and Hodge-Mock (4 sessions)
4) Analytical review of major Third-Generation object-oriented methodologies: OPM, Catalysis, UML-Components, RUP/USDP, EUP, OPEN, and FOOM (7 sessions)
5) Analytical review of major Agile methodologies: DSDM, Scrum, XP, ASD, AUP, Crystal, and FDD (7 sessions)
6) Model-driven software development: MDA and MDD (1 session)
7) Software process patterns and antipatterns (2 sessions)
8) Software process metamodels (1 session)
9) Methodology engineering: Situational Method Engineering (SME) approaches (2 sessions)
10) Introduction to the EPFC tool for methodology engineering (2 sessions)

Exams, Assignments, and Research Project
• Two exams (Midterm and Final) – Comprising %60 of the total grade
• Three study assignments, and one practical method engineering assignment on the EPFC environment – Comprising %25 of the total grade
• Research Project: Based on a topic of the student's choice, the research project is conducted under the guidance and supervision of the instructor – Comprising %15 of the total grade
Main References