Software Development and Management

Proposal for the Fourth Year IT Specialization

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1 Goals

The goals of the specialization are to enable students to design, evaluate, and apply software systems in a systematic manner and according to varying behavioral features, as well as to organize and manage software projects at different scales and for different practical demands. Upon completion students are prepared for positions as senior software designers and project managers in industry as well as for a Ph.D. program in software engineering. More specifically, a student should

- be able to plan software projects of various sizes and at various stages of the software life-cycle; know how to ensure that software quality and software functionality requirements are met;
- be prepared to lead a group of programmers or system designers; to organize software development in a team; and to communicate technical decisions to non-experts;
- be familiar with various methodologies of software system design; be able to map user requirements to effective system features and to transfer domain knowledge into usable software;
- understand the impact of design decisions on the actual behavior of a system and apply theoretical and practical means for system analysis;
- have a broad overview of trends in software development and enabling technologies;
- have experience with software systems; know and follow the major software standards; know, apply, or be able to easily learn tools for software planning, development, implementation, and documentation.

2 Graduation requirements

The specialization comprises 25 points (of a total of 40 points of the 4th year IT program), which are further broken down into a core curriculum of compulsory courses (15 points) and elective courses within the specialization (10 points). For successful completion of the specialization a student must have passed all compulsory courses and must have earned 10 points from the electives within the specialization.

Prerequisites for enrollment Students enrolling in the program know the fundamentals of system design (equivalent to Objectorienterad systemutveckling TDA 480) and should have substantial experience with developing software in a team (equivalent to Projektkurs IT 2 & 3, TDA410, TDA475). All IT students meet these requirements by the end of the 3rd year.

3 Courses

The courses in the specialization can be grouped into two parts of roughly the same weight: the core curriculum and free electives. In the core curriculum students take one course each in software design, team-based software development, and project planning, along with a year-long seminar that gives a broad overview over

the field. In the free electives students can choose among courses in the following areas: software processes, system design and implementation, formal methods of software, economics, and project leadership.

Compulsory courses (15 p)

SUIT	Systemutveckling i team (EDA 380, 5p)
SOC	Software Constraints (new course 5p)
PL	(new version of Projektledning I, IEK 346,3p)
MOS	Modern systemutveckling (EDA 375, 2p)

Electives in the specialization (10 p)

- Validation:
  Software Engineering using Formal Methods (TDA 291/INN 170 4p), Hardware Description and Verification (TDA 955/INN 180, Lp 4);
- Processes:
  IPOP: Individuell programvaruutveckling och processförbättring (EDA 395, 4p)
- Leadership:
  Chefskap-Ledarskap (EKA040), Project supervision (under consideration as new course)
- Systems:
  Distribuerade databehandlingssystem (TIN 160/INN 240), Realtidssystem (EDA 221), Operativsystem (EDA 091), Databaser (TDA355), Fault-tolerant computer systems (EDA 121), Tillämpad datasäkerhet (EDA 361)
- Economics:
  Affärsjuridik I (IIN060 3p), Affärsplanering för tillväxtföretag (Venture Cup) (IN010 3p), Arbetsorganisation (IAR020 3p) (or Produktionsledning, IAR070 4p)

Suggested course plan

Lp I	Lp II	Lp III	Lp IV
Projektledning	Software constraints	Systemutveckling i team (3+2)	
Modern systemutveckling			
Free Electives			

Course development

The core curriculum requires new development, or substantial revising, of 3 courses: the course Projektledning, taught by the economics department, will be revised and geared as much as possible towards the specifics of software projects; the existing course Systemutveckling i team will undergo a major restructuring and include fundamentals of software management; the course Software Constraints, finally, will be newly developed.

For the selection of elective courses it is desirable to offer more choices than are currently available across the already existing curricula. It is furthermore desirable to offer specialization courses at an advanced level, both to improve the quality of the education and to raise interest among students in continuing their studies at the post-graduate level. Because of the on-going discussion about the implementation of the Bologna model, however, we decided at this point against developing new courses. Instead, we will explore to what extent our respective suggestions can be integrated into the restructuring of existing courses that Bologna-compliance will make necessary.