UNIVERSITY
OF SKÖVDE

COURSE SYLLABUS

Domain-specific Conceptual Modeling and Method Engineering, third-cycle level
5 credits

Course code: IT0934F
Version number: 4.4
Valid from: 1 July 2024
Ratified by: Curriculum Committee for Third-cycle Studies
Date of ratification: 11 March 2024

1. General information about the course

The course is provided by University of Skövde and is named Domain-specific Conceptual Modeling and Method Engineering, third-cycle level (Domänspecifik begreppsmodellering och metoddesign, forskarnivå). It comprises 5 credits.

The course is a part of the third-cycle subject area of Informatics.

2. Entry requirements

The prerequisites for this course are general entry requirements for third-cycle courses and study programmes, i.e. a second-cycle qualification or satisfied requirements for courses comprising at least 240 credits of which at least 60 credits were awarded in the second cycle (or the equivalent).

In order to fulfil the specific entry requirements, the applicant must have completed course requirements of at least 60 credits, including an independent project of at least 15 credits at the second cycle, within the subject Informatics, applicable areas of a similar kind or other fields assessed as directly relevant for thesis work in the subject Informatics.

An additional requirement is proof of skills in English equivalent of studies at upper secondary level in Sweden, known as the Swedish course English 6. This is normally demonstrated by means of an internationally recognized language test, e.g. IELTS or TOEFL or the equivalent.

3. Course content

The course targets postgraduate students whose research area includes the need to create conceptual models of their domain. A background and interest in formal representations such as predicate logic is necessary to understand the course subjects.

Method engineering is the activity of designing domain-specific information systems development methods that only include the constructs needed for the target domain, in particular when several modeling viewpoints need to be integrated. A viewpoint is for example the data viewpoint, which makes statements about the data concepts of the considered domain. At the end of the course, students are able to create their own modeling methods by defining their constructs and semantics.

Outline of the course: information modeling, metamodeling, logical foundation, querying models, method engineering case study, re-engineering the Yourdan method, multiple perspectives in information systems design, intra- and inter-notational constraints, argumentation models, software process models, model quality, and domain specific conceptual modeling. The course aims at students who need to develop such methods for their PhD research. The course uses method engineering tools for domain-specific modeling.

The course includes the following topics:

- The role of (conceptual) modeling in informatics
- Analysis of existing conceptual modeling for static and dynamic aspects of systems
- Ontologies, predicate logic and Datalog
- Conceptual metamodeling as a facility to describe modeling languages
- Multi-level modeling

4. Objectives

After completed course the PhD student should be able to:

- understand the role of conceptual modeling in Informatics and the semantics of existing semantic modelling languages,
- design domain-specific conceptual modeling languages with a firm semantic foundation,
- create and use domain-specific conceptual modeling languages as so-called metamodels,
- understand the principles of abstraction used in conceptual metamodels, and
- apply method engineering to the student's own research domain.

5. Examination

The course is graded G (Pass) or U (Fail).

To receive the grade Pass on the course, all examination parts have to be graded Pass.

The examinations of the course consist of the following modes of assessment:

- **Written assignments**
  5 credits, grades: G/U

Doctoral students with a permanent disability who have been approved for directed educational support may be offered adapted or alternative modes of assessment.

6. Types of instruction and language of instruction

The teaching is comprised of workshops and seminars.

Each seminar has a theme that is based on course literature and prepared by a group of up to three students. The workshops are supporting the student in solving the assignments.

The teaching is conducted in English.

7. Course literature and other educational materials

The course literature consists of a set of chosen scientific articles and book chapters. A list of these are provided by the course director and are listed on the course homepage for each time the course is given.

These will normally include:

Jeusfeld, M.A., Jarke, M., & Mylopoulos, J. (2009): *Metamodeling for Method Engineering*. Cambridge, MA: The MIT Press.

Karagiannis, D., Mayr, H.C., & Mylopoulos, J. (eds) (2016): *Domain-specific Conceptual Modeling - Concepts, Methods, Tools*. Springer.

Gonzalez-Perez, C. & Henderson-Sellers, B. (2008): Metamodelling for Software Engineering. John Wiley & Sons.

8. Doctoral student influence

Doctoral student influence in the course is ensured by means of course evaluation. The students are informed about the results of the evaluation and potential measures that have been taken or are planned, based on the course evaluation.

9. Additional information

Further information about the course, as well as national and local governing documents for higher education, is available on the website of the University of Skövde.