UNIVERSITY OF SKÖVDE

TRANSLATION FROM SWEDISH

COURSE SYLLABUS

Scientific Theory in Informatics, third-cycle level

7.5 credits

Course code: IT0919F
Version number: 8
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 the University of Skövde and is named Scientific Theory in Informatics, third-cycle level (Vetenskaplig teoribildning inom informationsteknologi, forskarnivå). It comprises 7.5 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 addresses central scientific theories in informatics. At the University of Skövde, informatics is defined as the discipline that addresses how information is represented, processed, and communicated in artificial and natural systems. As such, it is the study of the design and development of systems that effect the timely, effective, and efficient provision of information for individuals, organizations, and society.

A representative sample of core theories techniques are drawn from the body of knowledge in the of informatics discipline. The topics may include the following:

- Complexity theory
- Computability and automata theory
- Basic cognitive psychology
- Intelligent systems
- Organizational theory
- Serious games
- Discrete probability
- Information theory
- Decision theory
- Cognitive systems
- Management theory
- Algorithmic strategies
- System and software quality
- Industrial informatics

This list of topics will be revised periodically to reflect the evolution of research and teaching at the School. The students will learn to:

- apply some course theories to their own research area;
- distinguish between different styles of Informatics theory, and different discipline approaches to constructing theory; and
- understand the role of theory in their own research work, including how to design a prototype theory appropriate for their research area.

4. Objectives

After completed course the doctoral student shall be able to:

- know and apply a variety of scientific theories representative of research and teaching within Informatics;
- explain the scientific method and its limitations;
- distinguish between scientific and un-scientific theories;
- understand differences between theory forms, purposes and components in the Informatics disciplines;
- understand and use the terminology of scientific theory, for example: model, framework, concept, variable, proof; and
- construct a representative theory in the context of their own study discipline, which could in principle be developed and/or tested so that it could be published.

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:

- **Assignments**
  7.5 credits, grades: G/U

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

6. Types of instruction and language of instruction

The teaching is comprised of seminars and lectures.

Lecturers concentrate on delivery of Informatics theories, whereas seminars focus on analysis of the theories through group discussion, and article presentation.

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 home page for each time the course is given. These will normally include:

Gregor, S. 2006. The nature of theory in information systems. *MIS Quarterly*, 30, 611-642.

Holton, G. 1979. Constructing a theory: Einstein's model. *The American Scholar*, 309-340.

Lucas, J. W. 2003. Theory-testing, generalization, and the problem of external validity. *Sociological Theory*, 21, 236-253.

Winter, R. G. 2016. The structure of Scientific Theories. In: Zalta, E. N. (ed.) The *Stanford Encyclopedia of Philosophy*. Stanford University.

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.