

Advanced Topics in Contemporary Computer Science, 3 credits

Avancerad Datavetenskaplig orientering, 3 hp

Course Code/Codes	50DT059
Subject Area	Computer Science (Datavetenskap)
School/equivalent	School of Science and Technology (Institutionen för naturvetenskap och teknik)
Valid from	2020-11-01
Approved	2020-11-26
Revised	
Approved by	Head of School
Translation to English, date and signature	N/A

1 Course content

The aim of this course is to provide all doctoral students with a common layer of knowledge and understanding about the fundamental concepts, principles and methods of contemporary computer science. The course is meant to be complementary to the course “Topics in Contemporary Computer Science”, 50DT056, 4.5 credits. It provides students who have completed that course with additional knowledge about the main principles of computer science, as well as its social and ethical dimensions.

The course is organized in self-studies about a selection of specific advanced topics; presentation of the self-studies in front of the entire classroom; and joint discussion of the topics with the active participation of all students. Students will be assigned three topics for their self-study, taken from the following set (which may be extended based on the students’ interests):

- The concept of “problem reduction” in computer science
- The concept of “information” in computer science
- The concept of “uncertainty” in computer science
- Safety and security in computer systems
- Relations between computer science and system theory
- Distributed systems and distributed computation
- Non-classical models of computation
- Classical and modern computer architectures
- Human-computer interfaces
- Ethical issues in computer science
- The gender dimension in the history of computer science
- The geographic dimension in the history of computer science
- Computer science and creativity

2 Outcomes

2.1 The course in relation to the doctoral programme

The course shall primarily refer to the following intended learning outcomes for third-cycle courses and study programmes as described in the Higher Education Ordinance, i.e. the doctoral student shall demonstrate:

Knowledge and understanding

- broad knowledge and systematic understanding of the research field (part of outcome 1)
- familiarity with the methods of the specific field of research in particular (part of outcome 2)

Competence and skills

- the ability to identify and formulate issues with scholarly precision critically, autonomously and creatively (part of outcome 4)
- the capacity to support the learning of others (part of outcome 8)

The intended learning outcomes are listed in the same order as in the general syllabus for the programme.

2.2 Intended course learning outcomes

To obtain a passing grade, the doctoral student shall demonstrate:

- An understanding of selection of advanced topics in computer science, that allows the students to better grasp and apply the basic concepts and principles of computer science, and to broaden the scope of their knowledge in this. (Relates to outcome 1)
- Knowledge of how the history of computer science has evolved. (relates of outcomes 1 and 2)
- The ability to encode a given problem in terms of data and algorithms that operate of those data. (Relates to outcome 4)
- Knowledge of how different formalisms can be used to model and solve different computational problems. (Relates to outcome 2)
- The ability to critically convey the main concepts of an advanced topic to the other students. (Relates to outcome 8)

3 Reading list and other teaching material

The following course readings and teaching material will be used on the course:

- Elaine Rich. Automata, Computability and Complexity: Theory and Applications. Prentice-Hall, 2008.
- Selected books and papers about specific advanced topics, provided by the teacher.
- Additional books and papers about each specific advanced topic, provided by the students.
- Slides on each specific advanced topic, provided by the students.

4 Teaching formats

Teaching on the course takes the following format:

- Guided self-study on each specific advanced topic;
- seminars delivered by the students on these specific topics;
- Joint discussion on each specific topic.

5 Examination

The course is assessed through an examination consisting of the components listed below. The individual components are not graded separately but together they provide the basis for assessment and grading.

- A guided self-study for each student about a specific topic agreed with the teacher, leading to a seminar presentation;
- A group discussion after each seminar, where each student must show understanding of the topic, as well as the ability to critically assess the current advances on that topic.

6 Grades

Examinations on third-cycle courses and study programmes are to be assessed according to a two-grade scale with either of the grades 'fail' or 'pass' (local regulations).

The grade shall be determined by a teacher specifically nominated by the higher education institution (the examiner) (Higher Education Ordinance).

To obtain a passing grade on examinations included in the course, the doctoral student is required to demonstrate that he/she attains the intended course learning outcomes as described in section 2.2. Alternatively, if the course consists of multiple examinations generating credit, the doctoral student is required to demonstrate that he/she attains the outcomes that the examination in question refers to in accordance with section 5.

A student who has failed an examination is entitled to a retake.

If an examination consists of several examination components, and a student fails an examination component, the examiner may, as an alternative to a retake, set a make-up assignment with regard to the examination component in question.

A doctoral student who has failed an examination twice for a specific course or course element is entitled, upon his/her request, to have another examiner appointed to determine the grade.

7 Admission to the course

7.1 Admission requirements

To gain access to the course and complete the examinations included in the course, the applicant must be admitted to a doctoral programme at Örebro University.

7.2 Selection

Selection between applicants who have been admitted to doctoral programmes at Örebro University and who otherwise meet the admission requirements as listed above is made according to the following order of precedence:

If no other selection criteria are specified in this section, priority shall be given to applicants with a lower number of course credits left before the award of their degree over applicants with a higher number of remaining course credits. Should two or more students have equal number of credits, selection will be done through the drawing of lots. This also applies within any selection groups listed unless otherwise stated.

7.3 Other applicants than doctoral students admitted at Örebro University

Other applicants than doctoral students admitted at Örebro University may be given access to the course on the grounds of provisions for and/or agreements regarding contracted courses, joint degrees, national graduate schools or cooperation in other respects with other universities.

Any decisions on what such other applicants may be given access to the course are made separately and on the basis of the provisions and/or agreements that occasion the student to apply for the course.

For participation in the course in other respects, the same provisions shall apply as for doctoral students admitted to Örebro University.

8 Transfer of credits for courses, study programmes and other experience

Provisions on the transfer of credits can be found in the Higher Education Ordinance and on the university's webpage.

9 Other information

The course is taught in English

Transitional provisions

None