



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DIT401 Operating Systems, 7.5 credits

Operativsystem, 7,5 högskolepoäng

Second Cycle

Confirmation

This course syllabus was confirmed by Department of Computer Science and Engineering on 2017-02-10 and was last revised on 2018-02-09 to be valid from 2018-08-19, autumn semester of 2018.

Field of education: Science 100%

Department: Department of Computer Science and Engineering

Position in the educational system

The course is offered within the framework of several degree programmes. The course is also a single subject course at the University of Gothenburg.

The course can be part of the following programmes: 1) Computer Science, Master's Programme (N2COS), 2) Applied Data Science Master's Programme (N2ADS) and 3) Computer Science, Bachelor's Programme (NICOS)

Main field of studies

Computer Science

Specialization

A1N, Second cycle, has only first-cycle course/s as entry requirements

Entry requirements

To be eligible for the course students should have successfully completed courses corresponding to 60 higher education credits of studies within the subject Computer Science, or equivalent, including the following courses:

- a 7.5 credits course in machine oriented programming (e.g., DIT151 or equivalent),
- a 7.5 credits course in data structures (e.g., DIT960 or equivalent),
- a 7.5 credits course in programming (e.g., DIT440, DIT012 or equivalent).

Applicants must prove knowledge of English: English 6/English B or the equivalent level of an internationally recognized test, for example TOEFL, IELTS.

Learning outcomes

On successful completion of the course the student will be able to:

Knowledge and understanding

- explain how internal components of modern operating systems work,
- explain key concepts and algorithms in operating system implementations,
- state how research domains (ranging from parallelism to security) meet in the context of modern operating systems,

Competence and skills

- demonstrate the core functionality of modern operating systems,
- write programs that interface with the operating system at the system-call level,
- implement a piece of system-level code,
- demonstrate programming using multithread synchronization constructs (with example environment languages such as C, C++, Java),

Judgement and approach

- analyze and critically weight the trade-offs in the design and implementation of operating systems' internal components.

Course content

The course focuses on the design and implementation of operating systems. Topics covered include: concurrent processes, resource management, deadlocks, memory management techniques, virtual memory, processor scheduling, disk scheduling, file systems, distributed file systems, micro kernels, multiprocessor operating system issues and virtual machines. Examples or case-studies are provided for all the subjects covered during the course.

Sub-courses

- 1. Written exam** (*Tentamen*), 6 higher education credits
Grading scale: Pass with Distinction (VG), Pass (G) and Fail (U)
- 2. Laboratory work** (*Laboration*), 1.5 higher education credits
Grading scale: Pass (G) and Fail (U)

Form of teaching

Lectures, exercises and labs. The labs place emphasis on hands-on experience with operating systems design. Students practice by using and constructing essential modules

in operating systems, such as multiprogramming, memory management, implementation of unix-like shell functionality.

Language of instruction: English

Assessment

The course is examined by Laboratory work and a final individual written exam carried out in an examination hall. The Laboratory work is normally carried out in pairs.

If a student, who has failed the same examined component twice, wishes to change examiner before the next examination, a written application shall be sent to the department responsible for the course and shall be granted unless there are special reasons to the contrary (Chapter 6, Section 22 of Higher Education Ordinance).

In cases where a course has been discontinued or has undergone major changes, the student shall normally be guaranteed at least three examination occasions (including the ordinary examination) during a period of at least one year from the last time the course was given.

Grades

The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U).

To pass the course, grade Pass (G) is needed on both the sub-courses. To be awarded a Pass with Distinction (VG) the student must get the grade Pass with Distinction (VG) on the sub-course Written exam and the grade Pass on the sub-course Laboratory work.

Course evaluation

The course is evaluated through meetings both during and after the course between teachers and student representatives. Further, an anonymous questionnaire is used to ensure written information. The outcome of the evaluations serves to improve the course by indicating which parts could be added, improved, changed or removed.

Additional information

The course is a joint course together with Chalmers.

The course replaces the DIT400 Operating systems course. The course cannot be included in a degree which contains DIT400. Neither can the course be included in a degree which is based on another degree in which the course DIT400 is included.

Course literature is to be announced the latest 8 weeks prior to the start of the course.