This is a joint course for students of:

EP1200 Introduction to Computing Systems Engineering 6.0 credits

DD1377 Low Level Programming and Computer Architecture 6.0 credits

Educational level: first cycle

General information

Intended learning outcomes

After the course the students will be able to:

- discuss the fundamental concepts of how to build a modern computer from the ground up
- construct a computing system, by building key components themselves
- use software emulation tool for computer architecture design

Course main content

Architecture, elements and concepts of modern computing systems and how they relate to each other. The content will include:

- computer architecture
- machine language and assembler
- virtual machine and higher level programming languages
- compilers
- operating systems

Literature

Noam Nisan and Shimon Schocken, The Elements Of Computing Systems: Building a Modern Computer from First Principles

Disposition

Both Swedish and English will be used for instruction.

Recommended prerequisites

- IE1205 Digital design or similar
- DD1316 Programmeringsteknik och C or similar

Examination

Grading scale: A, B, C, D, E, FX, F

Moments and grading for EP1200

- LABA - Laboratory, 1.5 credits, Grading scale: P, F
- LABB - Laboratory, 1.5 credits, Grading scale: P, F
- TEN1 - Examination, 3.0 credits, Grading scale: A, B, C, D, E, FX, F

Moments and grading for DD1377

- LAB1 - Laboratory Assignments, 4.5 credits, Grading scale: A, B, C, D, E, FX, F
- TEN1 - Examination, 1.5 credits, Grading scale: A, B, C, D, E, FX, F

Detailed course information

Course homepage

See Canvas, EP1200/DD1377VT201

Course structure

Note: New course structure from VT2020.

This is a project based course where students watch video lectures, read the course book and solve small projects at home. The course follows the book The Elements of Computing Systems, with somewhat modified projects.

The course contains the following activities:

Projects: The course consists of ten projects. You will have to solve one or two projects per week and submit the solution before the following lecture.

Lectures (Föreläsning): There are eleven lectures in the course. The participation at the lectures is strongly recommended and is necessary to be able to pass the course. On the lecture we discuss the solution of the project that was to be submitted before the lecture, and we introduce the topic of the next project.

Tutorials (Handledning): There are one or two tutorial sessions for each project. During the tutorials teaching assistants answer your questions related to the project, and related to the course material in general. Attending the tutorials is not compulsory.

Presentations (Redovisning): Each lecture is preceded by a presentation session. You will be called to a handful of the presentation sessions (not all), and you will then have to present your solution for some of the projects to a teacher or to a teaching assistant.

Tests (Kontrollskrivning): There are three tests during the course, where you have to answer questions related to the theoretical content of the course, as well as questions related to the projects. The tests are compulsory and you can not pass the course without a decent performance at these tests. We discuss the answers immediately after the test.

Exam (Tentamen): There is a written exam at the end of the course. The exam is compulsory.

Examination and grading

Project presentations

At each project submission, you need to declare the list of sub-projects you have solved, indicating any potential issues your solution may have. Your solution will be assessed for correctness and you will get points for the solved parts. You can get partial points if you have properly reported the issues that you solution has. You can receive maximum 55 points for the projects.

The students that are selected to present at the presentation sessions will be notified 24 hours in advance of the session. At the presentation session you should be able to explain your solutions to the last 3 projects. If you can not present your solution, you get 0 points for that project.

No show: If you are called to present, but can not come, you have to inform the course responsible in advance and give a valid reason, otherwise you get 0 points. You still have to submit the solutions by the given deadline, and you will be called to present at the next presentation time where you may be asked about any of the already completed projects.

Tests

There will be 3 tests during the course. You can get a maximum of 5 points per test.

No show: Inform the course responsible if you can not come to the test, and provide a valid reason for missing it. In this case you will have the opportunity to do an oral test with the responsible teacher.

Exam

The exam consists of two parts. To pass the exam, you need to receive at least 15 points from the maximum available 20 points for the compulsory questions, and you have to have at least a partially correct answer for each of them. You can receive maximum 35 points for the exam.

The written exam is given once in the exam period right after the course in period 4, and in the re-exam period in August.

Allowed help at the exam is only English-Swedish dictionary, the students are not allowed to bring any other material to the exam. At the exam the students receive the problem set in Swedish and in English, and the ''exam handbook" extracts from the course book with tables of chips, assembler instructions, VM commands and Jack grammar. In addition, the followings apply:

Students are allowed to answer in Swedish or in English.

Unreadable text or answer that can not be interpreted does not give any points. All answers have to be motivated, codes need to be commented.

Suspected cheating at all the examination moments are reported to the disciplinary board.

Final grade

In addition to the exam, there are two compulsory moments in the course, graded P/F:

To pass the LABA moment, you need at least 15 points from the five first projects and the first test.

To pass the LABB moment, you need at least 20 points from the last five projects and the second and third tests.

(For student in DD1377: LABA and LABB are reported together as moment LAB1 according to the course syllabus. Otherwise the same rules apply.)

You can take the exam, if you completed both moments. Otherwise you have to repeat the uncompleted moment in the next academic year, which will delay your exam with one year.

Requirements to pass the course with grade E: pass the moments LABA and LABB, as well as pass the exam.

Requirements for higher grades: For the final grade in the course, points from the projects, tests an exam are added up.

The maximum available points are:

- Projects 55 points
- Tests 15 points
- Exam 35 points

The preliminary grade limits are:

- A: 90-105
- B: 80-89
- C: 70-79
- D: 60-69
- E: 50-59
- Fx: 13-14.99 points on the compulsory parts of the written exam.