

## **Course PM for EP1200 Introduction to Computing Systems Engineering, 6 ECTS**

### **2019 P4**

Educational level: first cycle

### **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

### **Course structure**

This is a project based course where students watch the lecture videos, 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 consists of an opening lecture and 10 seminars. Participation at the seminars is compulsory. Students missing a seminar has to notify the group leader in advance.

To prepare for a seminar, students should:

- read the respective chapter in the book, watch the related video lecture,
- read the project descriptions carefully, and learn how to use the necessary tools to solve the project,

- and finally solve the project.

Each seminar consists of four parts:

- short quiz on the theory part and on the project,
- project solution discussion and presentations by the students,
- outlook given by the seminar leader,
- introduction of the next topic by the seminar leader.

In addition, office hours are scheduled where students can get support for solving the projects. Office hours are not compulsory.

## Grading

Grades in this course are A-F. The grade is calculated by combining your results in the projects, quizzes and the final exam.

The project has three moments: LABA, LABB and Exam. To pass the LABA moment, you need at least 20 points from the five first projects and quizzes. You need at least 35 points from the projects and the quizzes together to pass the LABA and LABB moments, and to be allowed to take the exam.

Maximum points:

- Projects 55 points
- Quizzes 15 points
- Written exam 35 points

Grading plan, small changes are possible, if they are motivated by the exam result (sum of points for quiz, project and exam):

- A: 90-105
- B: 80-89
- C: 70-79
- D: 60-69
- E: 50-59
- Fx (points for the exam): 13-14.99 (Possibility to complement to E)

## Project

1) At each project submission, you need to declare the list of sub-projects you have solved. You get points for the solved parts. You can receive maximum 55 points for the projects.

2) At each of the seminars several students present parts of the projects. Students are selected randomly, and you can be asked to present a part you declared to be solved. If you can not present your solution, you get 0 points for that project!

3) No-show up: you have to inform the seminar leader before the seminar if you can not attend. You still have to submit the solutions by the given deadline. Then, you should book a time with the group leader to present all of your solutions and receive points. If you fail to do so, you get 0 points for that project. As you do not write the quiz, you will not get points for it.

## Quiz

There will be 10 quizzes during the course. You can get a maximum of 3 points per quiz. You get 0 points if you are not at the seminar. Note, the quiz will be at the beginning of the seminar, so arrive on time. The points for the quiz are normalized for a maximum of 15 points for the grading.

## Written exam

It is compulsory to take and pass the written exam at the end of the course. To pass the exam, you need to have at least 15 out of the 35 points. For the final grade in the course, points from the projects, quizzes and exam are added up.

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.
- A maximum point is given for each problem.

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

## Make-up exam and students of earlier years

Students are allowed repeat the exam, if they want to improve their grade. The best exam result counts.

The final points received for projects and quiz are reported for moment LABB and are considered for the final grade independently from the time of the written exam.

Students who passed LABA but not LABB behold the points received for LABA and can continue the course from Seminar 6.