

Course Analysis

EI1120 Elkretnalys för Energi och Miljö (CENMI program) 7.5p

VT23 P3 (2023-01-17 - 2023-03-15)

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Staffing

Responsible department: Electromagnetic Engineering and Fusion Science (KTH/EECS/EMF)

Course-responsible, Lecturer, Examiner: Nathaniel Taylor (writing this analysis)

Other teachers (övning, medrättande): - (none this year)

Registered students

103 students participated at some point during the course.

Like 2019 this is unusually high, compared to typically around 80 or 85.

Of the 103 students, 7 were exchange students, 3 from Electrical Engineering (via Open program), and around 15 who had already been on one of the two course-rounds that happened during covid restrictions. 80 of the students were newly registered this year.

Events

Lectures: 15 sessions, usually two per week: 8 of them 2 x 45minutes and 7 of them 3 x 45 minutes

Tutorial (övning): 0: due to lack of other teachers in the course, there was not the usual 2h övning per 2h lecture the extra hour added to 8 of the lectures was used as a partial substitute to allow more examples

Laboratory tasks: 2 (obligatory), each within 2h sessions.

Homeworks: 14 quiz-based tasks, with requirement of $\geq 90\%$ in all of them

On-campus (not online) was the choice for all meetings and labs.

Course 'moments' and points

The course's 7.5 points consist of the final exam (TEN1, 5.0p) and two other 'moments' (PRO1, 1.5p; PRO2 1.0 p).

Part-exams (KS) are an alternative to sections of the final exam, whereby the better of the KS or exam section is used.

PRO1 is passed by a required mean score on homework quizzes, and PRO2 is passed by passing both labs.

The final course grade (A-F) is the same as the exam grade, when all three moments are approved.

Results

The usual principle: a final exam, and two partway exams (KS) that can contribute to parts of it.

Like 2022, the KSs, exam and re-exam were all done as invigilated Canvas quizzes.

Exam, 2023-03-15: 81 students, 92% pass after Fx completion: A (18), B (11), C (13), D (16), E (17), F (6)

Re-exam, 2023-06-08: 8 students: A (0), B (0), C (1), D(2), E (5), F(0)

This is a somewhat higher pass-rate than the "mid-eighties %" that I'd call most typical. But it's not very different; the fairly high proportion of exchange and/or repeating students might have helped it, and variance in the KS/exam difficulty can't be ruled out as a sufficient explanation.

Out of the newly registered students, 89% passed by the time that the re-exam was completed.

Prerequisites

No complaint. The prerequisites are small for this course (maths) and were not seen as a source of trouble.

Course material

The main material for subject introductions was as in several previous years: “notes”, “chapters”, “exercises”, and past exams/solutions. All this material was available online on the course webpage from before the start of the course.

The Canvas quizzes that were started last year were edited a bit and used again for homeworks. The Canvas quizzes used for last year’s KSs and exams were copied into this year’s course as practice material, able to be taken at any time during the course, but without the score counting for anything.

Evaluation sources

Sources of feedback were the partial and final ‘link-meetings’ in the program (2 student representatives) besides comments by email and in lectures. As this course and program are well familiar to me, and I’m confident I’d hear of strong views about problems even without asking, I have not pushed to get other feedback this year: the new parallel course has far more need of development.

The main direction of received comments was that the separate tutorials (övningar: practice-sessions) were missed, and that the attempt at substituting for them by some 3h lectures with more examples put too much time on the same thing all in one shot - i.e. hard to keep focus. This is reasonable, but my need of being often on another campus for another course made it often necessary to schedule events close in time; with a further teacher it would be easy to have our usual ~1 day between all events.

There wasn’t anything particular about goodness or badness of the quiz format. This year there was a previous year’s actual exams to use as practice material, which must have been reassuring. One student emailed after the exam to observe the security weakness that one could leave the exam, or not even show up, and then answer the quiz from outside without invigilation. This was something I’d considered, which had motivated me to request from the exam administration an attendance list with leaving times. The simpler solution used for the re-exam was restriction of the quiz to internet addresses supplied by IT support for the exam rooms.

Significant Changes

Since 2022:

No covid restriction: all events on-campus.

Due to lack of any other available teachers, 14 tutorials were reduced to just 7 extra lecture-hours. It was of interest to see whether the availability of course material, exercises with solutions, and peer-groups for study, made students not perceive a lack. There were however some comments that it would be good to have longer time for going through exercises.

Treatment of proposals from the 2022 analysis

Keeping the quiz-based homeworks and KSs / exams: yes.

Reducing tutorials (övnings) due to staffing shortage: yes.

Updating course material: no - not currently justified in time.

Having access to a calculation program (e.g. Octave) on the locked-down exam-room computers: this was discussed last year as a regrettable lack that was due to KTH having not sorted out a procedure. It was unfortunately still not available this year. I have talked with others connected to e-learning who were surprised by this, since they also saw this “authentic” way of working as one of the key purposes of computer-room exams. It seems the responsible group is very short-staffed at the moment. Students therefore had to use physical calculators or the rather poor calculator in the Canvas quizzes. Half or so of the questions are not numeric in this course, but the computer calculations would really extend what we can do with AC and 3-phase AC tasks.

For the next (VT2024) round

Summary: hope to get a teaching assistant again; otherwise, largely unchanged.

Long version:

Just now, I'm teaching a parallel course that is quite new and needs a fair bit more development work. So there will not be changes to EI1120 without clear need. No clear need of change is seen for 2024, except that it would be better if another teacher (e.g. PhD student) can be found to take some practice sessions (tutorials) with the students and to free me from at least some of the labs.

This course has worked well for some 10 years, other than some covid-related deviation in 2021 and more mildly in 2022. There have been small issues with how much requirement and pressure to put on the homeworks, which has resulted in changes between and within years to try to fit to what is seen as a good level. There have been a few students each year who find the subject particularly hard and need to continue the course in a later year; this is not surprising in a group with a diverse range of interests from which many students will not go into electrical specializations. But many of the group have gained an impressive ability to do circuit solutions, although only in the rather abstract way that the course focuses on. It seems that the course is at a reasonable level.

We have recently made some significant changes: exams in computer rooms, and homeworks also as online quizzes. We consider that these have not worsened the quality for students, but have probably improved it by interactivity and faster feedback, besides making the course more manageable when there is one teacher. For at least the next year we can continue in largely the same style. Further refinements may come with time.

There's a temptation to consider more fundamental changes. Even in 2015 (analysis) there was some discussion of a change of character, e.g. to focus more on 'conceptual' solutions, applications, deciding a circuit-model based on a real situation to model, etc. There was some good discussion of potential changes of the "base courses" in a report in 2020 that the CENMI program requested from students for long-term planning of the program, but that hasn't affected EI1120 in the final revision of the program. Then there's the possibility of smaller changes, as discussed in recent years, such as updating the notes with stylus-drawn diagrams and computer text, which would definitely be good if the course will run for several more years with similar content.