

Course Analysis

El2439 Power System Protection 6p

HT17 P1 / P2 (Sep 2017 - Dec 2017, exam Jan 2018)

Organization

Responsible department: Electromagnetic Engineering (EES/ETK)

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

Examiner (formally): Hans Edin

Course “moments” and points

The course's 6 points are distributed between the written exam (TEN1, 3p, A-F grade) and projects (PRO1, 3p, P/F).

Numbers and results

7 students took the course: another submitted a few task solutions then stopped participating.

The exam grades were

A (2) B (2) C (1) D (2).

All who passed the exam also completed the project work, so got the same whole-course grades.

Events

Meetings: 14 double-period sessions, i.e. one per week.

Guest lectures: Anna Pettersson [SvK], and Jianping Wang [ABB]

Comments: The majority of the class was present at meetings.

Course material

As in 2016: The main sources are *Fundamentals of Power System Protection* (Paithankar and Bhide) and *Network Protection and Automation Guide* (GE Relays); further sources and our own material to cover gaps are provided on the course webpage, along with tasks, solutions, and old exams.

Structure

The same structure of topics was used as in 2015 and 2016, and there were again 14 meetings.

However, this year we spread the course over two periods, so there is just one meeting and topic per week. This makes it far easier to schedule a task in any week it's desired, with a deadline before the next topic starts.

Changes to tasks

The lab task that was very popular when introduced in 2016 was missed this year, because of the chaotic situation when several divisions were moving offices and equipment from temporary places back to the renovated building.

Extra tasks were added for LV overcurrent, LV shock-protection, and simple settings-calculation of line-differential protection. The earlier tasks of asymmetric fault current, current-transformer saturation, and transformation by DFT/FFT were kept largely as last year.

The project was the same application as last year: line-differential protection implementation. Its change was in the demands for presentation and peer review, which was made more formal to encourage serious attention (risk of failing, even if not getting bonus for better work - see discussion in last year's analysis).

Comments from my observations and a discussion session in the last class

There was a range of views of the level, from “very time-consuming project” through to “all reasonable”.

This class was, as in 2014-2015, a broad mixture. Two students had small related experience. Two were exchange students who turned out to have been given the course as a misunderstanding, as a similarly named course at their home university includes introductory power-systems calculations, which should be prerequisites for us: by immense work, some extra tutoring, and dropping another of their courses, they got through respectably, but the situation was notified to the administrators hoping that they would ask the course-responsible in the case of any doubt in the future.

The guests were appreciated. Anna Pettersson was new this year, and gave a really interesting view of work at the transmission system operator, as well as some specifics of protection schemes in Sweden. All students on the Electric Power Engineering MSc program were invited, and we more than doubled the number on the course for this lecture. A repeat is expected next year.

Plan for 2018

Similar principle for structure. Definitely keep the course spread over two periods.

Even more tasks, moving towards one per topic: getting more structured.

Still tempting to have more simulation, and to use some industry-standard programs.

Have the same guests (if willing), and preferably also have a *distribution* utility represented.

Have a lab task again, like 2016.