Course analysis
EI2460 Batteries for Energy Storage in Electrical Systems 6.0 credits VT21 (p3)

LAB1 – 1 cr.
INL1 – 1 cr.
TEN1 – 4 cr.
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         6 cr.

By:
Daniel Månsson: examiner, teacher and course responsible for ei2460.

Parts
Lectures: 11 á 2h
Lab: 1 á 2h
**Tutelage for report:** 2 á 2 h

Course literature:
- Different books available via KTHB library and/or search engine, e.g.:
    - "*Electrochemistry - A Guide for Newcomers*" H.Baumgärtel,
    - "*Energy storage for power systems*" A.G. Ter-Gazarian
    - "*Energy storage*" R. A Huggins
    - "*Energy storage systems and components*" A. Rufer
- Relevant articles and reports related to subjects discussed.
- Lecture notes with reference to the above.

General thoughts from the course round and the LEQ
1. **Only 25% answered the LEQ** (6 out of 24, all male international master students) so the results are not reliable. In addition, only few comments were made so there is not much to go on.
2. Surprisingly, there were some comments that the format and grading of the exam was not announced until very late which is strange as e.g. the exam was the same format as last year (which was in Canvas) and we did discuss it that it would be like this due to the pandemic. As I tried even more to match course ILO to the exam questions I did however implement a strict policy of awarding a "F" if a single question was not passed (as should be done) and some students were affected by this. I think this is what the comments refer to but I will make it more clearly in the future.
3. Some comments was hard to fulfill, e.g., introducing other storage systems more in-depth (as the course is about batteries in the power grid).
4. Overall I feel the course went good this time and many things I changed from the last (first) time was implemented and worked well but there is of course still things to tune (as it is a "young" course). But I think many things would be naturally improved if the course wouldn't have been forced to be online (e.g. lectures, exams etc.).
5. Guest lectures was very well liked and I hope I will be able to keep them.

Thoughts for next course round

I. The new labs I introduced, using GAMS, seems to be liked and I will expand upon them, as some commented they were too easy. I will add more tasks to broaden the implementation to batteries in the power grid (e.g., adding more on reactive power compensation, peak shaving and other services). It should be added that I originally feared that the students would think GAMS was too difficult to work with but it seems not. Also, I will introduce GAMS earlier.

II. I will change so that INL1 is done individually, but keep the peer review (that then will be more easily implemented as there was some problems with automating this in Canvas).

III. I added and improved many lecture topics this year but I will add few more that I have identified during the course but there is space in the schedule for this.

IV. I will next time, hopefully, not have to use non-proctored exams (as the risk of cheating is too great) but I will have it in computer rooms (students supervised and using Canvas). I will try to make it part quiz like question and part longer text questions.
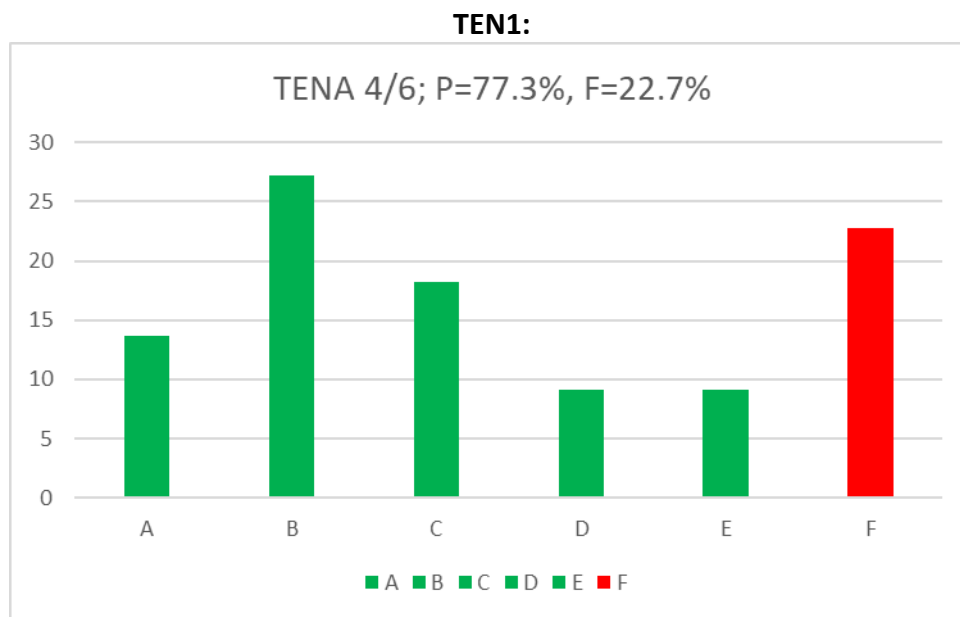
TEN1:

Figur 1, approximately 77 % passed the TEN1 exam.

Conclusion: The course was improved much since last (first) year, especially I am happy with the lectures and how LAB1 turned out. But still the Covid-19 pandemic, subsequent isolation and remote teaching puts difficulties for the course. Some things to add and improve for next year have been identified.