



Course-PM

Global Impact of Electrical Engineering Academic Year 2019/2020

EH1110 course covering 3 years of bachelor studies (7.5 hp)

EN1001 course covering 2 years of bachelor studies (6.0 hp)

TIME STAMP: FEBRUARY 17, 2020

COURSE COORDINATORS/EXAMINERS

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1. COURSE CONTENT

During their studies, electrical engineering students typically learn specialized skills in the various subfields of electrical engineering. However, due to the relevance of the rapid technological advancements of electrical engineering, there is also a need to holistically understand the development of electrical engineering as a field as well as its current and future role in society. This 3-years core course consists of various lectures, talks and reflection seminars, which help the students to become aware of the global impact of electric engineering and its interaction with society. It therefore complements the specialized education in the various subfields of electrical engineering as received by the bachelor students during their study.

LANGUAGE: Swedish and English, depending on the lecturer and mentor.

2. LEARNING OBJECTIVES

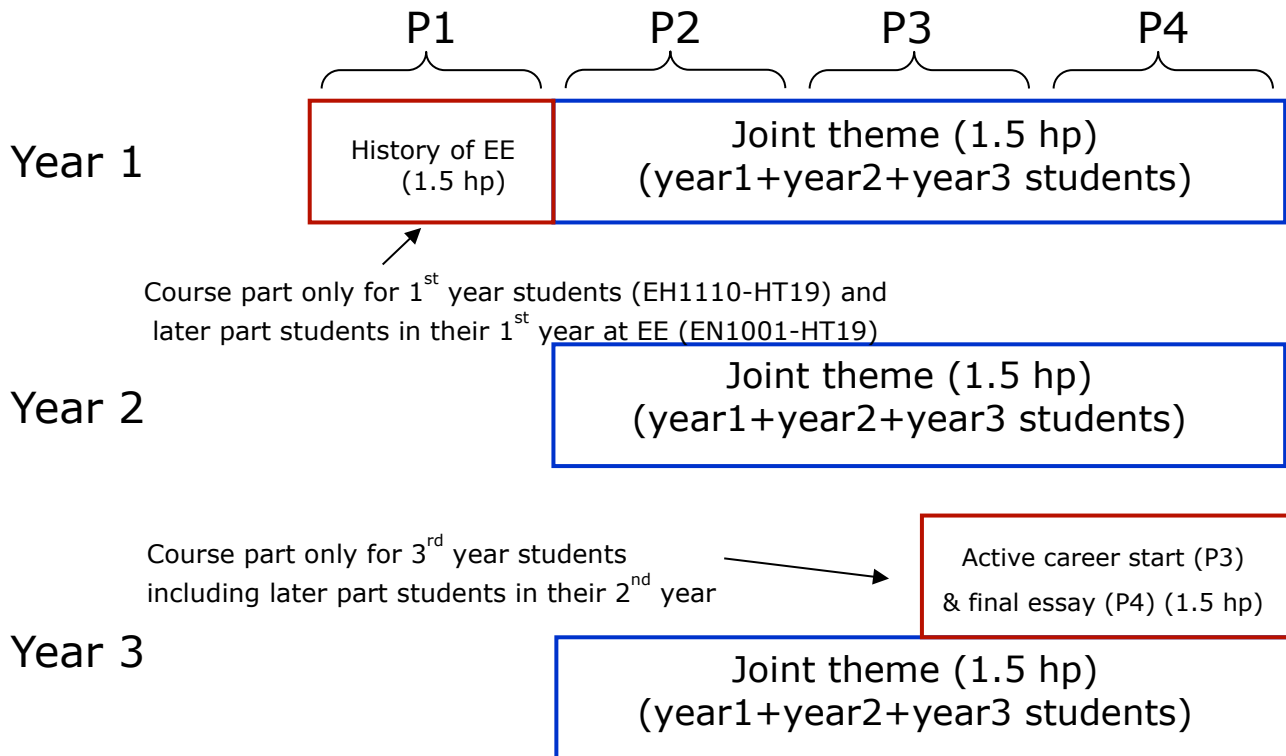
Students are expected to demonstrate their ability to reason about the relationship between electrical engineering and society, both in a historical context but also with respect to future challenges. This requires a background in the historical development of electrical engineering in general, knowledge of the current role that electrical engineering has in our society, as well as knowledge about the challenges our society is facing and how electrical engineering can contribute to solve those challenges.

The students are expected to develop/acquire the following abilities/knowledge during the course:

1. *Summarize the historical development of electrical engineering as an academic field and relate it to the technological development of major systems of electrical engineering.*
2. *Know and argue about the relationship between electrical engineering and society with respect to the broad fields 'sustainability', 'mobility' and 'quality of life'.*
3. *Reason about future challenges (as far as they are known today) with respect to electrical engineering and the digital society of the future.*
4. *Write and/or present orally own points-of-view in form of critical reflections that consist of a description about key technical concepts, the impact of these concepts on society and environment as well as future benefits and challenges of these concept*

3. ORGANISATION

Students starting electrical engineering studies in year 2 (open and later part students) follow the course only during 2 years under the course code EN1001 (6 hp). In their first year at EECS, they follow the same lectures and seminars as the first year students (CELTE-1), i.e. including history of electrical engineering in period 1. In their second year at EECS they follow the same lectures and seminars as all other third year students (CELTE-3), i.e., they also participate at the module Active Career Start and write their final essay.



Joint themes will be announced on a yearly base. For each joint theme a set of lectures (2 talks per period) is given. In addition to the lectures, one reflection seminar per study period will be organized. Prior to the reflection seminar, the students need to turn in a written essay (CELTE-3 students a ppt-presentation) covering one topic out of the two preceding lectures. Detailed instructions about how to write the essays are given during a seminar about essay writing in period 1. CELTE-3 students will give an oral presentation instead of a written essay during the reflection seminars. In the reflection seminars, the content of the essays and ppt-presentations is discussed in groups of 8 - 12 students. Each group is led by a senior researcher at EECS, who also acts as a mentor for that group. The group members can contact their mentor in case they need advice or help regarding their studies. The reflection seminars are also meant to be a platform where problems related to studying technique or certain courses can be discussed openly with the mentor and student colleagues. Hence, a part of each seminar is reserved for such discussions. That part of the seminar is not graded.

In the last year of their bachelor studies, the students will in addition to the common lectures and mentor sections a) participate in period 3 at the module Active Career Start where they investigate career possibilities, and train how to apply for job announcements and b) at the end of period 4 write a final essay containing a personal reflection about studying experience and career goals.

This academic year 2019/20, the joint theme will be sustainability. The topics span the subtopics energy consumption, Energy generation, and transportation of energy.

During the academic year 2018/2019, the focus was on quality of life. This included Big Data & social networks in period 2 (Sonja Buchegger: privacy and security, Mikael Skoglund: Big Data), health & aging in period 3 (Christian Smith: techniques for health and aging, Anna Herland: biomedical analysis), and smart environments in period 4 (Rafia Inam: 5G and AI, Jan Gulliksen: digitalization).

During the academic year 2017/2018, the focus was on mobility. Mobility of people in period 2 (Mats Leksell: electric cars, Karl H Johansson: autonomous driving), mobility of things in period 3 (Patric Jensfelt: robotics, Stefan Östlund: future railways), and the mobility of thoughts in period 4 (Stefan Parkvall: 5G, Peter Händel: mobile business).

4. GRADING

The EH1110 course is composed of three blocks: year 1: 3 hp, year 2: 1.5 hp, year 3: 3 hp (the EN1001 course is composed of two blocks: year 1: 3 hp, year 2: 3 hp). Note, grades are given only for the entire academic year (no hp after half a year). The individual blocks are graded on a pass/fail base. To pass the entire course, all blocks need to be passed. The entire course is graded with an A-F scale.

Requirements for passing each single block:

Per year the course is passed if at most one lecture was missed, at most one essay assignment was not turned in and all reflection seminars were attended. Students failing these criteria have to make up by complementary assignments at the end of the corresponding academic year. This means, each additionally missed lecture, each additionally missed essay and each missed reflection seminar need to be compensated by one extra assignment. Details of the assignments and the exact time period for handing in the completions will be announced towards the end of the academic year. No credit points will be given for the compensatory assignments but they will allow the students to pass the course block (to get hp for that year). Students who miss the completion period can still pass that block afterwards by handing in their extra assignments one year later during the next time period for completion.

Grading scale of the entire course:

The entire course is graded with a scale from A to F. To get the final grade, students have to pass each of the three course blocks. The final grade is composed of credits collected during the entire three years. Credits are given for each essay (0, 1, or 2 credits), for active participation at each reflection seminar (0 or 1 credit), for the course module Active Career Start (0, 1, 2 or 3 credits) in year 3, and the final essay (0, 1, 2 or 3 credits) in year 3. The final grade corresponds to the sum of all course credits. Table 1a shows how the sum of all course credits translates into grades A-E for EH1001 students (3 year course). As EN1001 students (students starting year 2 at EES) take this course during only 2 years, a different grading table applies, see Table 1b.

Students should inform their mentor in advance in case there is a serious reason for not being able to attend a lecture, seminar or hand in an essay (serious reasons are: severe sickness which is proven by handing in a 'läkarintyg', military service, work travel). In that case, the student still has to make up for the missed assignment at the end of the academic year, but will get credit points for the compensatory assignment. Note, the student needs to be able to prove the reason for the absence.

Table 1A: Grading scale for EH1110 students (3-year course)

Credit points	Final Grade
12-16	E
17-21	D
22-26	C
27-31	B
32-36	A

Table 1B: Grading scale for EN1001 students (2-year course for later part/ open students)

Credit points	Final Grade
8-11	E
12-15	D
16-19	C
20-23	B
24-27	A

5. THE ESSAY

General Instructions

In each period, CELTE-1 and CELTE-2 students need to write one essay where they have to discuss a key technical concept within electrical engineering and its influence on the development of our society and environment. CELTE-3 students will give an oral presentation instead (see next subchapter). Any technical concept that has been presented in the two preceding lectures may be chosen as topic for the essay. The chosen topic should not be a repetition of one entire lecture, but only focus on a special part of the lecture, that is discussed more in depth than during that lecture. Any subtopic presented in at least one slide of the lecture handouts can be chosen.

All essays need to have a certain structure and format and have to be uploaded to Canvas before the deadline has passed. Essays that are handed in too late (e.g. as email to the mentor) will not be accepted and are graded with 0 credit points. Here, all technical information about the essays is given.

The first essay (written only by EH1110 CELTE-1 students and EN1001 CELTE-2 students during period 1) will be handed in twice in Canvas. After feedback from fellow students during the seminar about essay writing, the first version of the essay is corrected and handed in a second time through Canvas. Only the second version is graded by the mentor.

Mandatory format of an essay:

- Font: 11 pt size, single-spaced
- Page margins: 2.5 cm (at most)
- Page length: 1-2 pages (excluding references)

Mandatory structure of an essay:

- Title, Author, Mentor group number
- Short introduction (1-3 sentences)
- Describe the (future) development of the chosen technical concept from a technical perspective (references necessary)
- Describe its (future) impact on society and environment (possibilities/challenges) (add references where appropriate)
- Conclusions:
 - Summarize in 1-3 sentences the text above.
 - Finish the essay with a personal statement. What is your opinion? Has the chosen technical concept a future (technically)? Will it be useful for society or not? Motivate your opinion! (contains usually no references)

Essay Grading

All essays that are turned in in time are graded with 0, 1 or 2 points. **The mentor is the final authority for grading the essays, i.e., issues regarding the grading should be directly discussed with him/her.**

Note, for the grading, the content is more important than the length of the essay. In general, it is not necessary to turn in essays with the maximum page length. It is more important that the content of the essay covers all mandatory subsections described above (see 'mandatory structure of an essay'). Students that belong to an English mentor group need to write their essay in English. All other groups should write their essays in Swedish. The essays are graded according to the following criteria:

- **0 credit points:** **You do not turn in your essay in time** or fail to provide an essay that shows you are familiar with the chosen topic. Examples of such a case include setting up a random text, simply dropping a few unconnected sentences, making up facts and figures as well as plagiarizing in any possible way. **In addition to receiving 0 points, plagiarized essays will be brought to the attention of the examiner. Note, that all essays will be automatically checked for plagiarism in Canvas!**
- **1 credit point:** The essay covers your topic of choice including a technical discussion and an analysis of its impact on society, and it is written in a satisfactory way. The text must show that you have taken sufficient information from the lecture(s) to compose the essay. If you receive 1 point, the essay has still some shortcomings, i.e. the presented concepts are addressed only partially and/or the arguments are not presented in a good way (poor language, no clear structure or weak argumentation), you do not support facts/arguments with references where appropriate, you chose a concept which is not so important (with respect to other key concepts) or perhaps you forgot to state an opinion.
- **2 credit points:** The essay fulfils all criteria for 1 credit point. In addition it is very well-written, contains a clear structure, and shows a deep understanding of the topic through a well-argued discussion.

Instructions for 3rd year students only: oral presentation instead of written essay

For the 3rd year students, the written essay is replaced by an oral presentation during the reflection seminar. The third year students need to turn in a ppt-presentation to Canvas covering one topic out of the two preceding lectures. The same deadline applies as for the essays. The content of the talk should be the same as the content required in the written essays. In the reflection seminars a short oral presentation is given.

Mandatory format of the submitted material:

- Powerpoint, or equivalent, 2-4 slides

Slide 1:

Title, Author, Mentor group number

Key technical concept considered, *described by a single illustration or picture*

Slide 2-4:

Impact on society **and/or** environment of key technical concept (a few bullets)

Your opinion about possibilities/challenges of the key technical concept (a few bullets)

References should be included (use an additional slide for the list of references. This additional slide is not encountered in the slides count.)

Mandatory format for the oral presentation:

- 4 minutes oral presentation

To be able to make a strong pitch in four minutes, it is recommended to **narrow the considered key technical concept**. Carefully select the title and picture to reflect your selected key technical concept.

The mentor is responsible to bring the submitted presentation and suitable AV equipment to the reflection seminar.

The presentations are graded with 0, 1 or 2 points and are based on the combined use of displayed (ppt) and oral content provided to the audience. **A no-show (no given oral presentation) counts as 0 points, even if a ppt-presentation exists. Maximal one of the three oral presentations can be missed without complementary assignment. Additionally missed oral presentations have to be compensated at the end of the academic year by holding the missed speeches in a classroom for all other students who have missed more than one oral presentation.**

A presentation that is very well-performed, contains a clear structure, and shows a deep understanding of the topic through a well-argued discussion (aka 2 credits points), but *significantly* exceeds the stipulated 4 minutes (less than 2 or more than 6 min), is awarded 1 credit point.

To be graded 2 points, at least the following requirements regarding the ppt-slides have to be fulfilled:

- The title reflects the key technical concept
- The figure/illustration on the first slide reflects the key technical concept
- Major development and impact of the key technical concept are listed in a condensed format
- At least one argument expressing your personal opinion is listed in a condensed form

and, at least the following requirements have to be fulfilled regarding the oral presentation:

- The oral presentation provides an extension to the condensed information put on the slides.
- Regarding the oral presentation on “Impact on society **and/or** environment of key technical concept”, the oral presentation can highlight your most important standpoints.

6. ACTIVE CAREER START (ONLY 3rd YEAR STUDENTS)

The module 'Active Career Start' takes place during spring term of the academic year for 3rd year EH1110 and EN1001 students only. It consists of four seminars and a number of assignments including an interview of an engineer, an application letter and a CV for a job advertisement. The goal is to reflect over and investigate your career alternatives, formulate your characteristic, motivation, interests, experiences and skills and to improve your skills in present yourself when applying for work.

Grading the course part Active Career Start

To pass the course, you need at least 1 credit point of the course part 'Active Career Start'. This course part is graded according to the following criteria:

- 1 credit point: You get 1 credit point in case you participate at 3 of 4 seminars, hand in the interview, CV and application letter in time.
- 2 credit points: You get 2 credit points in case (in addition to the requirements for 1 credit point) CV and application fulfil a minimum standard regarding language and structure, reflect the advertisement and meet the criteria specified in the exercise booklet.
- 3 credit points: You get 3 credit points in case (in addition to the requirements for 1 credit point) CV and application letter fulfil the requirements of the exercise booklet, are very well-written, reflect the content of the advertisement very well and your characteristics, motivation, interests, experiences and skills are well described.

Note, you will get 0 credit points, in case CV and application letter are not handed in in time.

7. FINAL ESSAY (ONLY 3rd YEAR STUDENTS)

The final essay is written at the end of the academic year by 3rd year EH1110 and EN1001 students only. The essay should be 1-3 pages long and is a reflection about studying experience and the professional future of each student. The following two questions must be addressed:

- a) Where do you see yourself in 10 years and in which way did your studies so far help you to reach this aim?*
- b) What are the most important challenges that you need to tackle in the coming years to reach your aim?*

Grading the final essay

The essay should address both questions in depth, should be written in a correct language, have a clear structure, and must not contain any plagiarism.

- 1 credit point: the essay fulfils a minimum standard regarding language and content.
- 2 credit points: the essay is well-written and the essay topic is addressed correctly.
- 3 credit points: the essay is very well-written, the essay topic is addressed in depth and it contains clear explanations and a conclusive argumentation.

8. COURSE HOMEPAGE

This course uses Canvas (kth.instructure.com) as course platform. All uploading of assignments and grading is done via Canvas. Lecture handouts will be available in Canvas after the lecture has been given. Please note, all uploaded files are checked automatically for plagiarism.

9. SCHEDULE FOR HT2019 and VT2020

SCHEDULE PERIOD 1 (EH1110: only CELTE-1 students; EN1001: only CELTE-2 students)

Date	Time	Room	Talk/Task	Lecturer
Lectures				
August 28, 2019	8-10	B2	Course introduction	James Gross
September 4, 2019	8-10	B2	History of Power Systems	Arne Kaijser
September 11, 2019	8-10	B2	History of Telecom Systems	Arne Kaijser
Deadline for turning in the preliminary version of essay 1				
September 18, 2019	23:59		Turn in your essay in Canvas!	
Seminar				
September 20, 2019	15-17	B2	How to write an essay (you need to take a paper copy of the essay to the seminar)	Anita Kullen
Deadline for turning in the final version of essay 1				
September 27, 2019	23:59		Turn in your essay in Canvas!	
Reflection Seminar				
October 4, 2019	15-17	TBA by mentor	Reflection Seminar	Mentors

SCHEDULE PERIOD 2 (all EH1110 and EN1001 students)

Date	Time	Room	Talk/Task	Lecturer
Lectures				
November 8, 2019	13-15	M1	Electrical power technology and Electricity Market	Mikael Amelin
November 22, 2019	13-15	F1	World Energy Supply	Lennart Söder
Deadline for turning in essay 2				
November 29, 2019	23:59		Turn in your essay in Canvas!	
Reflection Seminar				
December 6, 2019	13-15	TBA by mentor	Reflection Seminar	Mentors

SCHEDULE PERIOD 3 (all EH1110 and EN1001 students)

Date	Time	Room	Talk/Task	Lecturer
Lectures				
January 17, 2020	15-17	M1	Fusion energy – Stellarator	Per Helander
January 23, 2020	17-19	Q1	Wind power	Tomas Ackerman
Deadline for turning in essay 3				
January 30, 2020	23:59		Turn in your essay in Canvas!	
Reflection Seminar				
February 14, 2020	15-17	TBA by mentor	Reflection Seminar	Mentors

ACTIVE CAREER PART IN PERIOD 3 (CELTE-3 students only)

Date	Time	Room	Talk/Task	Lecturer
Seminar 1				
January 20, 2020	13-15	L41	Group A	Anneli Åkesson
January 23, 2020	15-17	Q13	Group B	Anneli Åkesson
January 24, 2020	8-10	Q13	Group C	Anneli Åkesson
Seminar 2				
February 10, 2020	13-15	U51	Group A+B+C	Anneli Åkesson
Seminar 3				
February 19, 2020	8-10	Q2	Group A+B+C	Anneli Åkesson
Seminar 4				
February 24, 2020	13-15	Q11	Group A	Anneli Åkesson
February 27, 2020	8-10	Q11	Group B	Anneli Åkesson
February 27, 2020	13-15	Q11	Group C	Anneli Åkesson
Deadline for turning in interview				
February 21, 2020	23:59		Turn in your essay in Canvas!	
Deadline for turning in CV & application letter				
March 16, 2020	23:59		Turn in your essay in Canvas!	

SCHEDULE PERIOD 4 (all EH1110 and EN1001 students)

Date	Time	Room	Talk/Task	Lecturer
Lectures				
April 3, 2020	15-17	M1	Sustainability	Daniel Pargman
April 8, 2020	13-15	Q1	Greenhouse gases and negative emissions	Cecilia Sundberg
Deadline for turning in essay 4				
May 4, 2020	23:59		Turn in your essay in Canvas!	
Reflection Seminar				
May 8, 2020	15-17	TBA by mentor	Reflection Seminar	Mentors
Deadline for turning in the final essay				
May 22, 2020	23:59	Turn in your essay in Canvas!		

10. DISABILITY ASSISTANCE

If you have a disability, you may receive support from Funka: www.kth.se/en/student/studentliv/funktionsnedsattning. We recommend that you inform the teacher regarding any need you may have. Funka does not automatically inform the teacher.

Good luck!