# TU/e Procedure 2<sup>nd</sup> year SENSE students

#### 2023-2024

SENSE is a MSc programme aiming for "Smart Electrical Networks and Systems". This programme is part of the EIT (European institute of Innovation and Technology) KIC (Knowledge & Information Community) InnoEnergy programme. More information can be found here <u>https://www.innoenergy.com/for-students/master-school/master-s-in-smart-electrical-networks-and-systems/</u>

The SENSE master programme is divided in a first year at KTH, Stockholm or UPC, Barcelona and a second year at one of other participating universities. This document describes the educational programme for the SENSE 2<sup>nd</sup> year at the Electrical Energy Systems (EES) group of the Electrical Engineering (EE) department at the Eindhoven University of Technology (TU/e).

## Master's programme 2<sup>nd</sup> year SENSE at TU/e

The educational programme consists of two parts, namely electives and a graduation project – totalling 60 ECTS (1 ECTS = 28 hours of workload). The electives aim to deepen the knowledge needed for the graduation project. Course preferences are discussed with the SENSE programme coordinator at TU/e (**dr. N. Paterakis**, <u>n.paterakis@tue.nl</u>), also in view of timing since electives are given throughout the one year that SENSE students reside at TU/e.

## Electives (15 ECTS)

In principle, the same courses as for "regular" Electrical Engineering students are available as electives, with the restriction that the focus is on "Smart Electrical Networks and Systems" as a part of specialisation. Table 1 presents a preferential list of courses which fit within the KIC InnoEnergy – SENSE programme. Also a few courses which are a bit more distant from smart grid related topics are included, but they may be of interest for some specialisations. They are offered as a choice of maximum one out of two/three. Other courses outside the list can be taken instead, if convincingly motivated to be relevant for a student's desired specialisation, and approved by the TU/e SENSE here: coordinator. А list of all the electives can be found programme https://educationguide.tue.nl/programs/graduate-school/masters-programs/electricalengineering/curriculum/elective-courses

Note that courses to be selected should not overlap with the content of courses from the 1<sup>st</sup> year at KTH or UPC. This may eliminate a few options from Table 1.

Students should register both to enrol the courses and to take the exams via the OSIRIS system (both actions have a deadline per quarter, indicated on the OSIRIS course information). Furthermore, this academic year 2023-2024, the administrative costs arrangement also applies for master students, i.e. after the deadline for registration, master students have to pay 20 euro per course to be registered for that course under specific conditions. See the OER articles 3.7 and 3.8 for more details.

Here, you can find more information about enrolling for courses and examinations and the deadlines: <u>https://educationguide.tue.nl/practical-info/student-administration/enrolling-courses-and-examinations/?L=2</u>

Code	ECTS	Quarter	Title
5LEL0	5	Q1	Power quality phenomena
2DME20	5	Q1	Non-linear optimization
5CPA0	5	Q1	Numerical methods in electrical engineering
5SC28	5	Q1	Machine learning for systems and control
7LY3M0	5	Q1	Building performance and energy systems simulation
5SEE0	2.5	Q2	Planning & operation of electrical power systems
5SED0	2.5	Q2	Electrical energy systems in transition
5SVA0	5	Q2	High voltage technology
1ZM20	5	Q2	Technology entrepreneurship
5LEP0	2.5	Q3	Electricity markets: modeling and optimization
5LEA0	2.5	Q3	Protection and automation of distribution networks
5SEF0	5	Q3	Smart grids, ICT and electricity markets
5LEG0	5	Q3	Pulsed Power Technology
5SVB0	5	Q3	Electromagnetic compatibility
5SWB0	5	Q3	Advanced power electronics
5LEN0	2.5	Q4	Power system stability and dynamics
5LEM0	5	Q4	Dynamic control of power conversion in renewable energy systems
5LEC0	5	Q4	Underground & submarine power cables

#### Table 1: Overview of elective courses for 2<sup>nd</sup> year SENSE programme at TU/e

## Graduation project (45 ECTS)

The graduation project can be internal or external (at a company). In either case, supervision from TU/e is required. The graduation project can be proposed by the student or selected from the available options from the Master Marketplace (<u>https://master.ele.tue.nl</u>). Since the Master Marketplace is not always up-to-date, it is strongly recommended to proactively contact EES staff members if you are interested in an internal project in the area of their expertise. Except for the duration of the graduation project, all requirements posed on "regular EE students" apply. This includes the requirement on formal procedures, on the reporting and on the panel that grades the graduation work. For more information, refer to <u>https://educationguide.tue.nl/programs/graduate-school/masters-programs/electrical-engineering/curriculum/graduation-project?L=2</u>

The topic of the graduation project needs to comply with the program of SENSE. If the topic of the graduation project is not defined by the EES group, or lies outside the scope of the research that is carried out in the EES group, then the graduation project needs to be approved by the TU/e coordinator of the SENSE program. Upon approval, the coordinator can delegate the supervision to another capacity group within the Department of Electrical Engineering (but not within another department). Capacity groups have the right to refuse the coaching of projects of SENSE students if the student has a curriculum or transcript that is viewed incompatible or inadequate to carry out the graduation project.

After agreement on the topic, place and supervision, a graduation registration form needs to be filled (<u>https://educationguide.tue.nl/programs/graduate-school/masters-programs/electrical-engineering/curriculum/graduation-project/graduation-project-ee-registration-form/?L=2</u>).

<u>A student is allowed to start his/her graduation if a maximum of two electives remain – this includes</u> <u>the first-year courses at KTH as well</u>. This registration form defines the starting date for the graduation project, mid-term evaluation, and expected graduation date. The starting date should ideally be at the beginning of Q2.

Approximately 16 weeks after the start of the project, a graduation panel should be formed, and a mid-term presentation should be organized, to obtain feedback of the whole panel for the remainder of the project. The panel is composed by the examination rules of the Electrical Engineering faculty, and should consists of:

- the graduation professor (needs to a full professor), as the chair of the committee
- a supervisor (an assistant professor, associate professor or a full professor) from the EES group
- a KTH delegate as it is a dual-degree MSc program
- additional advisors are optional, e.g. company supervisor(s) and/or PhD student supervisor

The final product is a graduation paper, in line with the IEEE publications format with a length between 8 and 12 pages. More details on paper requirements can be found at:

https://educationguide.tue.nl/programs/graduate-school/masters-programs/electricalengineering/curriculum/graduation-project/?L=2

The project and the paper are judged by a graduation panel. The paper should be delivered to the panel and CSA at least 10 working days before the presentation.

After finalisation of the graduation work and paper, the panel meets with the student, giving him/her the opportunity to present and defend the graduation work. At the end of the meeting the grade is determined by the voting members of the graduation panel. The standard EE requirements and grading sheet are used for evaluation. Potentially, the graduation defences are organized in sessions of one or two days to allow for the presence, preferably in person, of the KTH panel delegate. Note, that SENSE candidates, according to TU/e registration regulations, need to finalize all obligations related to their master study before September 1.

The presentation should be done at least 10 working days before the examination committee meeting date. A list of examination committee meetings and graduation dates is available at:

# https://educationguide.tue.nl/programs/graduate-school/masters-programs/electricalengineering/graduation-procedure/?L=2

Registration for a graduation date is done via the OSIRIS system, first by selecting the examination date and then also later by making a "qualification request" (via the Progress of the graduation), with deadlines indicated on OSIRIS.

The closing date for registration for the final examination is about four weeks before the date the examination committee meets. In this meeting the student is discussed, and it is checked whether all Master obligations (including those from KTH in the 1<sup>st</sup> year) have been fulfilled. It is also decided, whether a cum laude (with distinction) applies. This requires at least 9.0 for graduation project, unweighted average of at least 8.0 over all courses and assignments (including those obtained at KTH) and no grade below 6.0.

# Timeline 2023-2024, TU/e

**September 2023**: Intake students by ESA; meeting with SENSE coordinator EES-group on proposal electives and planning 2<sup>nd</sup> year: 15 ECTS electives; 45 ECTS graduation. Typical planning (slight modifications can be considered when taking electives in Q3 and Q4):

- Quarter 1 (Sep-Nov): 15 ECTS or 10 ECTS electives + searching for a graduation project
- Quarter 2,3 and 4 (November-July): 45 ECTS graduation project and finalizing any courses

**October/November 2023**: Update information on individual status regarding electives and chosen graduation project topics

February/March 2024: Update information remaining electives / graduation project & contract

**April/May 2024** Mid-Term presentation of the graduation work to the graduation panel/selection of the panel members (different from the SENSE MEET event)

May/June 2024 Presentation status graduation at KTH;

July/August 2024 Final defence at TU/e and decision exam committee

September/October 2024: Graduation ceremony