EDUCATION AND EXAMINATION REGULATIONS

MASTER'S DEGREE PROGRAMMES EEMCS

A. FACULTY SECTION
B. PROGRAMME-SPECIFIC SECTION

2025-2026 academic year

Introduction to the Education and Examination Regulations for Master's degree programmes at the Faculty of Electrical Engineering, Mathematics and Computer Science.

General

The Dutch Higher Education and Research Act (Dutch abbreviation: WHW) of 1993 requires a broad outline of the teaching programme and examining for each degree programme to be recorded in the Education and Examination Regulations (EER (Dutch: OER)).

In accordance with Section 7.13, Paragraph 1, of the WHW, the EER must contain sufficient and clear information about the degree programme or group of degree programmes to which they apply. Section 7.13, Paragraph 2, of the WHW lists those issues that must, as a minimum, be stipulated in the EER with respect to procedures, rights and responsibilities relating to the education and examinations that are part of each degree programme or group of programmes. The WHW also includes a number of separate obligations relating to the inclusion of rules within the EER.

The EER is subdivided into two sections (Section A and Section B), which together form the EER. Section A, which can be seen as the faculty section, includes provisions that may apply to several Master's degree programmes. Section B contains the provisions that are specific to the particular Master's degree programme.

The EER is part of the UT Student Charter, which governs the rights of students and the way we treat each other at the UT. It gives an overview of the rights and obligations of our students and of the academic provisions. The charter consists of two parts: 1) the institutional section which applies to all students, irrespective of the degree programme and 2) the programme section, which is different for each degree programme and can be found in the Education and Examination Regulations (EER).

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SECTION A: FACULTY SECTION

A1 General provisions

Article A1.1 Applicability of these Regulations

1. This Faculty Section A contains general provisions that apply to education and examinations for all students in the following Master's degree programmes: Applied Mathematics, Business Information Technology, Computer Science, Electrical Engineering, Embedded Systems, Interaction Technology, Systems & Control, and Robotics provided by the Faculty of Electrical Engineering, Mathematics and Computer Science (hereinafter referred to as: the faculty or EEMCS) of the University of Twente.
2. Each degree programme also has its own Section B.
3. Section B of these Education and Examination Regulations may include additions to the general provisions in Section A only applicable to that specific degree programme.
4. Together the Faculty Section A and the Programme-specific Section B form the Education and Examination Regulations for the Master's degree programme concerned.
5. The Education and Examination Regulations apply to anyone enrolled in the degree programmes, irrespective of the academic year in which the student first enrolled in the programme.
6. The Education and Examination Regulations also apply *mutatis mutandis* to the joint Master's degree programmes and study units provided by the faculty, pursuant to Section 7.3c of the WHW.
7. The general provisions and the programme-specific provisions to the Education and Examination Regulations are determined by the Faculty Board.
8. Students attending study units organised by another degree programme[1] are subject to the assessment rules laid down in the assessment schedule of the study unit concerned, in the Education and Examination Regulations and in the Rules and Guidelines of the Examination Board of the degree programme that organises the study unit. Special facilities according to article A7 can only be granted by the degree programme for which the student is enrolled.
9. The Examination Board sets down rules with regard to the execution of its tasks and powers in accordance with Section 7.12b of the WHW. These regulations are specified in the Rules and Guidelines of the Examination Board and include provisions about the rules of order during tests and rules in case of emergencies.
10. The institute section of the Student Charter includes a definition of what the University of Twente considers to be academic misconduct (fraud). The Rules and Guidelines of the Examination Board for the degree programme in question include additional rules about academic misconduct (fraud), such as which measures the Examination Board may take if it establishes misconduct (fraud).
11. Requests for exemptions in respect of provisions laid down in the Education and Examination Regulations should be submitted to the Examination Board or the Programme Director of the student's own degree programme, as laid down in the relevant articles of these Regulations.

[1] This does not apply, unless otherwise agreed, for units that are organised by a programme specifically for another programme, so-called service education.

Article A1.2 Definitions

The terms used in these Regulations should be interpreted as follows:

a. **Academic year:** The period beginning on 1 September and ending on 31 August of the following calendar year.
b. **Admission Board:** The committee that assesses, on behalf of the Faculty Board, whether a candidate meets the requirements for admission to the Master's degree programme of their choice. If no Admission Board has been appointed for the degree programme, the Programme Director functions as the Admission Board.
c. **Assessment schedule:** a schedule showing the method of assessment for a study unit.
d. **Combined Programme:** A programme of courses representing an amalgamation of two separate degree programmes and covering the requirements and the programme intended learning outcomes of both individual Master's degree programmes, yielding two degrees.
e. **Course catalogue:** The guide for the Master's degree programme concerned that provides further details of courses and other information specific to the programme. The course catalogue is available at www.utwente.nl/coursecatalogue.
f. **Course:** A study unit of the degree programme, as defined in Article 7.3, Paragraph 2 and 3 WHW.
g. **Credit (EC):** A unit of 28 hours of study load, in accordance with the European Credit Transfer System; a full academic year consisting of 60 EC or 1680 hours (Article 7.4 WHW).
h. **Curriculum:** The aggregate of required and elective study units constituting a degree programme as laid down in Section B.
i. **Double degree:** two degrees awarded by two institutions of higher education that offer a joint study programme; the joint programme covers the programme intended learning outcomes related to the degrees awarded..
j. **Examination (also: exam):** An evaluation, performed to conclude a study unit, of the student's knowledge, understanding and skills as well as an assessment of the outcomes of that evaluation (Article 7.10 WHW); an examination may consist of a number of tests**.**
k. **Examination programme**: All study units of a study programme counting towards the degree. Not including extracurriculars or other study units that do not count towards the degree.
l. **Examination Board:** The body that objectively and professionally assesses whether a student meets the conditions laid down in the Education and Examination Regulations regarding the knowledge, understanding and skills required to obtain a degree (Article 7.12 WHW).
m. **Examiner:** The individual appointed by the Examination Board to administer examinations and tests and to determine the results, in accordance with Article 7.12 Paragraph c WHW.
n. **Exemption:** The decision of the Examination Board that the student has knowledge and skills which are comparable in terms of content, scope, and level with one or more study units or components of study units. An exemption is granted based on acquired competencies, i.e., previously passed examinations in higher education or in view of knowledge and skills attained outside higher education.
o. **Executive Board:** Executive Board of the University of Twente.
p. **Faculty Board:** Head of the faculty (Article 9.12, Paragraph 2 WHW).
q. **Final Examination:** A degree programme is concluded with a final examination. If the study units in the degree programme have been completed successfully, then the final examination is deemed to have been completed (Article 7.10 WHW).
r. **Higher Education and Research Act (abbreviated to 'WHW'):** The Dutch Higher Education and Research Act, Bulletin of Acts and Decrees 1992, 593, and its subsequent amendments.

s. **Homologation:** Study units that can be offered to students who are admitted to the Master's degree programme but who nevertheless have insufficient knowledge, understanding or skills, according to Article 7.30b. WHW.
t. **Learning Management System (LMS):** System that supports online learning and teaching. In this case: Canvas.
u. **Master's degree programme (also: degree programme):** The Master's degree programme, as referenced in Article 7.3a Paragraph 1 subparagraph b WHW: the entirety of the course components, teaching activities/methods, contact hours, testing and examination methods and recommended literature.
v. **Master's thesis project / final project:** A study unit comprising literature research and a contribution to scientific research, which always results in a written report.
w. **Practical exercise:** A practical exercise as referred to in Article 7.13, Paragraph 2d WHW is a study unit or a study unit component emphasising an activity that the student engages in, as described in Section B.
x. **Pre-Master's programme**: A combination of study units that can be offered to students who cannot yet be admitted to the Master's degree programme due to insufficient knowledge, understanding or skills, in accordance with Article 7.30e. WHW.
y. **Programme Committee (PC):** Committee referred to in Article 9.18 WHW.
z. **Programme Director:** The person appointed by the Faculty Board to administer the programme (Article 9.17 WHW).
aa. **Quartile (also: quarter):** A part of a semester as specified in the academic calendar of the university.
bb. **Semester:** Half an academic year, as specified in the academic calendar of the university.
cc. **Senior Examiner:** Specific examiners, appointed by the Examination Board to take the role as chair of an assessment committee for the final Project.
dd. **Student:** Anyone enrolled in a degree programme in accordance with Article 7.34 and 7.37 WHW.
ee. **Student Information System (SIS)**: System designated by the Executive Board for registration and for providing information on all relevant data related to students and the degree programme, as referred to in the WHW. In this case: Osiris.
ff. **Study Adviser:** Person appointed by the Faculty Board who acts as contact between the student and the university, and in this role represents the interests of the student, as well as fulfilling an advisory role.
gg. **Study load:** The time an average student needs to learn the course material. The study load comprises project work, independent study, lectures and writing assignments, for example. The study load is expressed in credits according to the European Credit Transfer System, where 1 credit equals 28 hours.
hh. **Study Programme:** All study units followed by the student as part of their Master's degree programme, including study units not counting towards the degree.
ii. **Study unit:** A programme component as defined in Article 7.3, Paragraph 2 and 3 WHW. Also referred to as course.
jj. **Teaching Period:** The period in which a study unit is offered. The teaching period starts in the first week in which an educational activity takes place for the study unit concerned and ends in the final week in which an educational activity takes place and/or a test is administered for the study unit concerned. Resits are not part of the teaching period. An academic calendar is provided.

kk. **Test:** An evaluation of the student's knowledge, understanding and skills as well as an assessment of the outcomes of that evaluation. A test is part of an examination. If the examination for a study unit consists of a single test, then the result of that test will count as the result of the examination in accordance with Article 4.7 WHW.

ll. **UT:** The University of Twente (UT).

mm. **Working day:** Any day from Monday to Friday with the exception of public holidays and the prearranged compulsory holidays ('brugdagen') on which the staff are free.

The definition of all other terms used in these Regulations is in accordance with the definition accorded by the main text of this document, the programme-specific section of the EER, the student charter or the WHW.

A2 Previous education and admission

Article A2.1 Previous education

1. In order to qualify for enrolment in a Master's degree programme, either a Bachelor's degree obtained through academic higher education (WO) is required, or a Bachelor's degree from a university of applied sciences (HBO) in addition to the successful completion of an appropriate pre-Master's programme. The requirements that the Bachelor's degree must meet are specified in Section B.
2. The Admission Board of the Master's degree programme assesses the candidate's suitability for admission to the degree programme on the basis of the requirements stipulated in Section B.
3. The Admission Board can admit students who lack a limited number of credits in a topic regarding required prior knowledge, provided they judge that this does not reduce the student's likelihood of successfully completing the degree programme.
4. The Bachelor's degrees that entitle students to automatic admission are listed in Section B.
5. Additional admission requirements are stipulated in Section B.

Article A2.2 Language requirements

1. To be admitted to the degree programme, students must be proficient in English.
2. Proof of proficiency in English is required by the successful completion of one of the following examinations or an equivalent:
    a. IELTS (academic) certificate, not older than two years, with an overall band score of at least 6.5, and a minimum score on each section of at least 6.0.
    b. TOEFL iBT (internet-based) certificate, not older than two years, with an overall score of 90, and a minimum score on each section of at least 21[2].
    c. Cambridge C1 Advanced, formerly known as; Cambridge English Advanced (CAE) from 2015 onwards (when the subscores were introduced) and Cambridge C2 Proficiency, formerly known as; Cambridge English Proficiency (CPE) from 2015 onwards (when the subscores were introduced). Obtained an A, B or C grade, with an overall score of at least 176 and a minimum score on each section of at least 169.
3. Any exemptions to the Language requirement can be found at the UT Master website.

[2] By exception, you can also take the TOEFL iBT (Special) Home Edition test (only valid for the September 2024 and February 2025 intake). This is only the case when you cannot use a regular language test as listed in this table because the onsite language test centre is closed because of unsafe situations in your country.

Article A2.3 Application and enrolment

1. The deadline for application for admission to the Master's degree programme is stipulated on the website www.utwente.nl/master. Different application deadlines apply to different types of applicants.
2. After admission, the student must enrol before 1 September or 1 February thereafter. The rules and regulations regarding enrolment are laid down in the UT Enrolment Regulations.

Article A2.4 Admission Board

Each programme has an Admission Board, which is appointed by the Faculty Board. The Faculty Board appoints this board after consulting with the Programme Directors and Examination Boards of the relevant Master's degree programmes.

Article A2.5 Admissions procedure

1. The Admission Board is responsible for the admissions to the programme in relation to any students who cannot be admitted directly (see Paragraph A2.1.4).
2. With a view to admission to the programme, the Admission Board assesses the candidate's knowledge, understanding and skills, including relevant language skills. The Board may request experts from inside or outside the University to test certain types of knowledge, understanding and skills, in order to supplement written evidence from the degree programmes the student has already completed.
3. In addition to the requirements, the Admission Board also assesses requests for admission on the basis of the following documents:
    a. motivation letter;
    b. English proficiency scores according to Article A2.2;
    c. Diploma;
    d. transcript of records;
    e. curriculum vitae;
    f. abstract of (Bachelor) thesis;
    g. course descriptions for programme-specific courses, research methodology courses, mathematics courses and a table of content for the course materials.
4. The Admission Board may decide that particular units must be included in the student's study programme to compensate for lack of knowledge on the part of the student (homologation courses).
5. Candidates receive either confirmation of their admission to the Master's degree programme, admission to a pre-Master's programme or a negative decision. An appeal against a decision can be lodged with the UT Complaints Desk within six weeks.

Article A2.6 Refusal or termination of enrolment (unsuitability/judicium abeundi)

1. Based on the provisions of Section 7.42a of the WHW, the Faculty Board or the Examination Board may, in exceptional cases, ask the Executive Board to terminate or refuse a prospective student's enrolment in a programme, if that student's actions or words show that the student is unsuitable either for practising one or more of the professions for which the programme in question would prepare the student or for practical preparations for professional practice.
2. If it is believed that a prospective student is unsuitable for the programme, as described in Paragraph 1, the Examination Board or the Faculty Board will initiate an inquiry, and the student is informed of this promptly. The Examination Board or the Faculty Board does not issue any

recommendation without carefully considering the interests involved and giving the prospective student the opportunity to be heard.

Article A2.7 Pre-Master's programme

1. The Admission Board may decide to admit a candidate to the Master's degree programme on the condition that a pre-Master's programme is completed successfully before their admission.
2. A pre-Master's programme is a bridging programme with a study load of 15 to 30 ECs, to be decided by the Admission Board. The courses in the pre-master are subject to the Bachelor Education and Examination Regulations.
3. The pre-Master's programme is assembled by the Admission Board. A fixed programme may be defined for specific groups of students. However, a student may also be given a personalized programme.
4. Proof of the successful completion of the pre-Master's programme, together with the related Bachelor's degree, serves as proof of admission to the relevant Master's degree programme, in the same and in the subsequent academic year.
5. Candidates are required to complete the pre-Master's programme within a year unless otherwise specified.
6. Students from Dutch Universities of Applied Sciences may be allowed to attend a pre-Master's programme during their Bachelor's programme. Paragraph 5 applies to these students. In this case, the relevant Bachelor's degree, together with the successfully completed pre-Master's programme, serves as proof of admission to the relevant Master's degree programme.

A3 Programme content, structure, and rules

Article A3.1 Aim of the programme

The qualities relating to the knowledge, understanding, and skills that the student should have acquired upon completing the programme (aims and learning outcomes) (Article 7.13 Paragraph 2 (a) of the WHW) are set out in Section B.

Article A3.2 Programme structure

1. Section B describes the Master's degree programme in accordance with Article 7.13, Paragraph 2 WHW.
2. The scope of the Master's degree programme is at least 120 EC. These 120 credits must not include any courses for which credits have been obtained during a previous Bachelor's programme.
3. Registration is required prior to participating in a study unit, this is only possible for students during the periods designated for that purpose.
4. Every Master's degree programme has a nominal duration of two years, with each year divided into two semesters, both divided into two quarters[3]
5. Master's degree programmes are taught on a full-time basis.

Article A3.3 Language of Instruction

1. The language of instruction for all EEMCS Master's programmes is English.

[3] See www.utwente.nl/en/ces/planning-schedules/academic-calendar/academic-calendars/ for a more detailed explanation of the academic calendar at the UT.

Article A3.4 Exemptions

1. The Examination Board may grant an exemption to students at their request for one or more examinations or tests. To this end, the student should demonstrate having sufficient knowledge and skills in relation to the examination concerned or the test in question.
2. An exemption granted by the Examination Board is registered in SIS under the study unit or study units, or components thereof, by means of an EX (exemption).
3. Students cannot be compelled to take additional study units or components of study units in their curriculum instead of an exemption that has been granted.
4. Exemptions may be granted to a maximum of 30 EC.
5. Students may also be exempted from practical assignment if they can demonstrate that a required practical assignment will likely give rise to a personal moral dilemma. In such cases, the Examination Board determines whether the component can be completed in another manner and in what way.

Article A3.5 Flexible-degree programme

1. The Examination Board decides on requests for permission to take a flexible-degree programme as referred to in Article 7.3j WHW. The Examination Board assesses whether a flexible-degree programme is appropriate and consistent within the domain of the educational programme and whether the level is high enough in light of the attainment targets of the programme.
2. The content of the flexible-degree programme is determined and motivated by the student and must be equivalent to a regular Master's degree programme in terms of scope, breadth and depth.
3. The following requirements must be met in order to be eligible for the Master's degree:
    a. the deviation from the regular Master's degree programme must be at least 30 EC while still ensuring coherence in terms of content.
    b. the level of the programme must match the objectives and programme intended learning outcomes that apply to the degree programme for which the student is enrolled.

Article A3.6 Combining programmes

1. A student can obtain diplomas for two UT Master's degree programmes on the basis of a combined programme.
2. Students need to be admitted and enrolled in both degree programmes in order to combine two programmes.
3. Approval for the programme and overlap in courses is required from the Examination Boards of both Master's degree programmes.
4. The following requirements apply to the composition of a combined programme:
    a. The programme of courses represents an amalgamation of the separate degree programmes and satisfies the requirements of each individual degree programme, including the programme intended learning outcomes.
    The minimum size of the combined programme in EC, EC_{P_C}, is expressed as:
    $$\mathrm{EC_{P_C}} = \mathrm{EC_{P_1}} + 0.5 \sum_{i=2}^{n} \mathrm{EC_{P_i}}$$
    where EC_{P_1} corresponds to the ECs of the largest programme in EC, and n is the total number of programmes the student combines.
    b. The combined programme must include two separate Master's final projects, or one larger combined Master's final project.

c. Two separate Master's final projects may only be combined into one larger one, if the topic is relevant and suitable to both Master's programmes. The minimum study load of a combined Master's Final Project (MFP) in EC, EC_{MFP_C}, is:
$EC_{MFP_C} = EC_{MFP_{P_1}} + 0.5 \sum_{i=2}^{n} EC_{MFP_{P_i}}$
where $EC_{MFP_{P_1}}$ is the number of ECs of the largest MFP in EC, where here P_1 could be a programme that is not the largest in study load.[4]
d. In case there is a Standard Programme for a combined study programme defined by two UT Master's degree programmes, the requirements laid down in the Standard Programme apply.
e. The requirements on examiners and supervision for the internship and Master's final project of both programmes must be met.

5. Students who complete a programme as described take a combined final examination which they pass if the assessments included in their file would result in a pass for the final examination of both degree programmes individually in accordance with the applicable regulations. The Examination Boards of the degree programmes involved decide whether a student passes the final examination. The degree programmes provide instructions concerning the date of a combined final colloquium.

Article A3.7 Master's final project

1. Requirements for starting the final project:
   a. Students must have no more than 10 ECs still to complete, other than the final project.
   b. As an exception to the rule above, if the programme allows for a combined final project and internship, 10 ECs in unfinished courses other than the internship and final project are allowed.
2. The student and examiner(s) must agree on the start date and completion date for the Master's final project.
3. This agreement is to be documented in a plan that takes into account the nominal length of the final project, a reasonable holiday period and any uncompleted study units.
4. The schedule for completion must be approved by the examiner and signed by the student.
5. The final project is concluded with an oral presentation in public at the University of Twente unless the project is carried out at another university as part of the exit year of a double degree programme.
6. Programme-specific regulations regarding the final project are stipulated in Section B.

Article A3.8 Composition of the assessment committee for the Final Project

1. The committee consists of at least two examiners, of which at least one is senior examiner; it is chaired by a senior examiner.
2. The examiners must belong to at least two different UT research groups.
3. All supervisors of the project are members of the assessment committee. Supervisors who are not examiners serve on the committee in an advisory capacity.
4. The examiners are collectively responsible for grading the thesis. In case of different opinions among the examiners, the chair of the assessment committee takes the ultimate decision on the grade.

[4] For some EEMCS programmes graduation is divided into a 10EC preparatory study unit and 30EC thesis project. For the purpose of this rule A3.6.4d only, they are considered one single 40EC project.

5. In the event that the assessment committee cannot meet the above specifications, a motivated request to the Examination Board may be made by the Programme Director. The approval for the particular assignment remains valid during the academic year in which the request was granted or the duration of the final project in question with the maximum of one year.

Article A3.9 Internship

1. The internship is a period of study-related professional practice amounting to 20 EC and is carried out by the student at a company, university, or organization outside the University of Twente.
2. Requirements for starting the internship:
    a. students must already have obtained at least 45 EC of their examination programme.
    b. additional requirements may apply for each degree programme and are stipulated in Section B.
3. A description of the internship must be drawn up and approved by a member of UT staff appointed as examiner. This approval must be obtained before commencing the internship.
4. Students must contact the internship office for an intake at least three months before their preferred start date of the internship.
5. The day-to-day supervisor for the internship is the company supervisor: a member of the organization where the internship is carried out. This supervisor must be named in the project description, mentioned in Paragraph 3.
6. The UT supervisor mentioned in Paragraph 3 supervises the student remotely during the internship. If, in the opinion of this UT supervisor, adequate supervision by the company supervisor is not – or no longer – possible, the UT supervisor may decide to take over as the student's day-to-day supervisor.
7. During the internship, the student writes a report about their work. At the end of the internship period, this report is submitted to the company supervisor. The company supervisor assesses the internship using the relevant assessment form. The assessment is based on the supervisor's observations of the student and on the report submitted by the student.
8. The UT supervisor acts as the examiner for this unit and bases their grade on the assessment made by the company supervisor, the report written by the student and a discussion with the student. The student must submit the report to the UT supervisor within two months after finishing the internship. The internship report is *not* publicly available.

Article A3.10 Duration of the internship

1. According to the study load of 20 EC, the duration of an internship is the equivalent of 14 weeks of full-time work including writing a report. An extension with two weeks of this period is allowed to compensate for unforeseen delays.
2. If the host organisation and the student want to maintain a working relation after this period, the student must complete the internship first. After completion of the internship, the working relation between the student and the company falls outside the scope of the student's study programme and outside the responsibility of the University of Twente.

Article A3.11 Confidentiality

1. The final-thesis report is made public unless confidentiality has been deemed necessary.
2. The Programme Director may declare a final thesis report to be confidential for a limited period upon receiving a motivated request to do so.
    a. A confidentiality request must be made by the examiner as soon as possible, but no later than four weeks before the end of the final project.

   b. A confidential report remains accessible to the supervisor, the Programme Director, and any members of bodies with the authority to assess the quality of the grading of the entire programme.
   c. All parties mentioned in Paragraph 2b are required to respect the confidentiality of the report.
3. The confidentiality period is by default set at 2 years up to a maximum of 5 years.
4. If confidentiality is deemed necessary as described in Paragraph 2, the contents of the public final thesis presentation may be adapted to avoid making public those matters that are considered confidential.
5. Section B of these Education and Examination Regulations may include additional provisions.

Article A3.12 Evaluation

1. The Programme Director is responsible for monitoring the quality of the degree programme.
2. The Programme Director is responsible for evaluating the degree programme.
3. To monitor and to improve the quality of teaching, the EEMCS Master's degreeprogrammes use information about the students' learning experiences obtained from:
   - Internal evaluations
     - Periodic course evaluations at the end of each course
     - Additional (panel) evaluations, on request from lecturer, students, Programme Committee, Examination Board or Programme Director
   - External sources
     - National Student Survey (NSE)
     - National Alumni Survey
     - International Student Barometer
4. Section B can include further details on how the education in the degree programme is evaluated.

A4 Teaching and assessment

Article A4.1 Examinations

1. Each study unit concludes with an examination.
2. The examination consists of one or more tests.
3. A test or examination can have various forms[5] and can be administered online or offline.
4. The time allotted to administering a test may not exceed three hours. Exceptions in this regard are listed in Article 7.2.
5. If the examiner wishes to use a form of assessment that requires more than three hours, the examiner must, with due regard for Article 4.2.3, ask the examination board for approval to deviate from the above.
6. A student has the right to inspect recent model test questions, model tests, or old tests that are representative of the test or examination, as well as the associated answer keys, along with the norm for assessment and time estimated for answering the example test.

[5] A test or exam can have the following forms: a written test, an assignment, an oral test, a presentation, practical assignment, or a combination of these forms.

7. If an examination or test is administered online using *online surveillance*[6] or *online proctoring*[7], the Examination Board may set further rules and conditions for online (*proctored*) assessment. General information and detailed rules on online assessment is presented at the university's website.

Article A4.2 Course Catalogue and Assessment Schedule

1. The Programme Director publishes at least the following details of the study units in SIS not less than four weeks in advance: scope, intended learning outcomes and content, language of tuition and assessment, prerequisites, required and recommended study materials, design of teaching methods, and assessment.
2. The assessment schedule of a study unit is drawn up by the examiner or examiners and is determined by the Programme Director. The Examination Board provides advice on the assessment schedule.
3. At least two weeks prior to the start of the study unit an assessment schedule must be published in the Learning Management System (LMS).
4. The assessment schedule includes at least all items as included in the course catalogue yet shall also include:
    a. The intended learning outcomes of the study unit and how they are assessed and when they are attained.
    b. when examinations, tests, and resits are held (the precise times and dates are announced via the timetable).
    c. the relative weighting of the tests.
    d. any required minimum grade per test; a minimum grade for a test may not be set higher than 5.5.
    e. if applicable: information on resits (such as conditions, compensation options and grading periods).
5. The Programme Director may modify the assessment schedule during the study unit:
    a. The assessment schedule may only be changed in consultation with the examiners of the study unit.
    b. The Programme Director consults the Examination Board before any changes to the form or manner of administering an examination or one or more tests. If the change only involves moving tests to a timeslot other than as shown in the timetable, the Programme Director informs the Examination Board of the decision as soon as possible.
    c. Students must be informed immediately of the change.
6. Changes to the assessment schedule may not put students at an unreasonable disadvantage. The Examination Board may take special measures in individual cases.

Article A4.3 Examination and test opportunities

1. There will be an opportunity to take written or oral tests at least twice a year. Other forms of examination can be completed at least once a year.

[6] Camera surveillance of the student or students during an *unrecorded* test, using for example Canvas, Teams, etc.

[7] Surveillance of the student or students using special *proctoring* software, such as Proctorio.

2. In the event that a study unit is discontinued, at least one opportunity is provided in the year subsequent to discontinuation to take the examination or parts thereof, and a transitional arrangement must be included in Section B for the subsequent period.
3. At the student's request, the Examination Board may permit a different form of examination than that stipulated in the course catalogue. The examiner may ask the Examination Board to permit a different form of examination on condition that all students participating in the test agree.

Article A4.4 Registering for courses, tests and examinations

1. Registration in SIS is required prior to participating in a course[8]. It is also mandatory to register before every test opportunity.
2. Notwithstanding Paragraph 1, any student who has correctly registered to participate in the instruction/classes for a particular course and has been admitted will also automatically be registered for the subsequent tests, unless the course description specifies otherwise. Only if as student has passed a test and the student still wants to take part in the subsequent test, the student has to register in SIS manually prior to the test opportunity.
3. Before the start of a study unit, the student must meet the prior knowledge prerequisites for that study unit
4. With respect to possible prior knowledge requirements of subsequent study units a student is allowed to assume that they passed an examination at the examination date, as long as the result of the examination is pending.
5. Notwithstanding Paragraph 4, if the pending result turns out to be a fail and because of that the student violates the prior knowledge requirements of a subsequent unit, the Examination Board can decide that the student must interrupt their participation in this subsequent unit pending a repair of the fail.

Article A4.5 Examination date

1. The examination date of a study unit, mentioned in the SIS, is the date on which the student fulfilled the last obligation, necessary for an assessment of the unit.
2. If a student agrees with an examiner about an examination date for a certain unit, the submission of additional material by the student after this date leads to a new examination date, being the date of the submission of this additional material.

Article A4.6 Oral tests

1. If the student or the examiner wishes a third party to be present when administering an oral test, then a request to this end must be submitted to the Programme Director at least fifteen working days prior to the oral test. The student and the examiner are notified of the Programme Director's decision not less than five working days in advance. The Programme Director must inform the Examination Board of the decision. Public graduation colloquia, public presentations and group tests are excluded from this provision.
2. If the Examination Board has decided that members of the Examination Board or an observer on behalf of the Examination Board is to be present during the administration of an oral test, then the Examination Board must make this known to the examiner and the student at least one working day before the oral test.

[8] The applicable registration deadlines are mentioned on the webpage www.utwente.nl/en/education/student-services/education/courses-and-modules/ .

Article A4.7 Examination results

1. The examination result of a study unit, as determined by the examiner, is expressed in half grades from 1.0 to 5.0 and from 6.0 to 10.0[9] or as *'pass' / 'fail'.* With grades only being rounded in the final phase[10] of the assessment of a study unit and in accordance with the schedule below:

If digit before the decimal (n) ≠ 5	
Grade ≥n.00 and <n.25	⇨ n.0
Grade ≥n.25 and <n.75	⇨ n.5
Grade ≥n.75 and <(n+1).00	⇨ (n+1).0
If digit before the decimal = 5:	
Grade ≥5.00 and <5.50	⇨ 5.0
Grade ≥5.50 and <6.00	⇨ 6.0

2. Test results are expressed in a grade from 1 to 10 with a single decimal, or as *'pass' / 'fail'*.
3. Examination results of 6.0 or higher respectively '*pass'* are a pass.
4. Examination results, if a pass, obtained at foreign universities are registered as a P (*pass*). Examination results obtained at Dutch universities are adopted one-to-one, with due regard for the provisions in Paragraph 1.
5. Credits may only be issued for a study unit if the study unit has been completed with a pass mark.
6. If more than one examination or test result has been recorded in SIS for one and the same unit of study, the highest grade applies.

Article A4.8 Determining and announcing results

1. The result of a written test or practical assignment is published via SIS within 20 working days.
    a. The examiner determines the result of a written test within 15 working days after the test.
    b. The examiner needs to pass on the result to the examination office or process the results in SIS within 5 working days of determining the result.
    c. No rights can be derived from test results published on the LMS or communicated via any medium other than SIS.
2. The examiner has to inform the student of the result of an oral examination within one working day, unless, for the examiner, the oral examination is part of a series of oral examinations of the same study unit which are administered on more than one working day. In that case, the examiner is to determine and announce the result within one working day following the conclusion of the series of oral examinations.
3. In case the result for a study unit is based on multiple tests, the date of completion of the final test counts as the examination date.
4. In case the examiner is unable to meet the terms described in Paragraphs 1 and 2 due to extraordinary circumstances, they must inform the Examination Board of this, providing reasons for this situation. The student is then informed of the delay by the Examination Board as soon as

[9] In SIS, a comma is used based on the Dutch grading system (e.g., 7.0).

[10] Final phase: the calculation of the examination result after all test results have been announced.

possible, whereby a new deadline for the result is also determined. If the Examination Board concludes that the examiner has not met their obligations, it may appoint another examiner to ascertain the result of the examination.

5. Notwithstanding Paragraph 1, the results of the first test have to be published at least five working days before the resit to give the student time to prepare.

Article A4.9 Period of validity

1. The period of validity for the results of an examination that has been passed is unlimited. The validity of an examination result can only be restricted if the tested knowledge, insight, or skills are proven to be out of date. The Examination Board ensures that these results are invalidated.
2. Test results are only valid in the academic year in which they were obtained unless the assessment schedule explicitly states otherwise.
3. The Examination Board may extend the validity of test results in individual cases at the request of the student.

Article A4.10 Post-examination right of inspection and discussion

1. Students are entitled to discuss and review their test together with the examiner, and the examiner has to explain the assessment. This can be done individually or in a group setting, either in person or by using an online tool. The examiner chooses the setting of methods and tools for discussion.
2. Individual and group discussions must take place no later than five weeks after the publication of the test results, but at least five working days prior to the next test opportunity, in the (online) presence of the examiner or a substitute designated for that purpose.
3. If the examiner holds a group discussion of the assessment, the student must use that opportunity to exercise the right to discussion referred to in Paragraph 1. If a student is not given the opportunity at the group discussion to discuss the reasons for the examiner's assessment of the test with the examiner, the student may submit a request for individual discussion with the examiner within five working days after the group discussion. The individual discussion has to take place no later than five working days prior to the next test opportunity.
4. If there is no group discussion of the test scheduled by the day of the publication of the results, then a student may submit a request to the examiner for an individual discussion within ten days after publication of the results. The individual discussion has to take place no later than five working days prior to the next test opportunity.
5. The student has the right to inspect their work for a period of two years after the assessment.

Article A4.11 Retention period for tests

1. The retention period for test assignments, keys, papers, and the assessments of written tests is two years.
2. The retention period for final thesis reports is seven years.

A5 Final Examination

Article A5.1 Master's final examination and degree

1. The Master's final examination is considered to be complete when the student has passed all study unit examinations in the Master's degree programme. The examination board may find,

under conditions that it has set, that not every examination has to be passed to determine that the master's final examination has been successfully completed (Article 7.12b paragraph 3 WHW).

2. The date of the final examination is the date on which the student completes the final study unit of the degree programme.
3. A diploma can only be awarded after the student has received formal approval for their examination programme as described in Section B.
4. A student may submit a written request, giving reasons, to the Examination Board to postpone the final examination, and thus to postpone the awarding of the diploma. The maximum duration of any postponement that can be granted is twelve months, in principle. In exceptional cases[11], the student may have valid reasons for requesting that the awarding of the diploma be postponed for more than twelve months.
5. If the student has requested postponement based on the provisions of Paragraph 4, then the date of the examination is the date on which the Examination Board decides that the student has passed the final examination subsequent to the postponement.
6. Students who have successfully met all requirements for the Master's final examination are awarded a Master of Science (MSc) degree.
7. The degree conferred is stated on the diploma.

Article A5.2 Diploma

1. The Examination Board awards a diploma as proof that the student has satisfied all the requirements of the examination once the Executive Board has confirmed that the procedural requirements for awarding the diploma have been met. The date indicated on the diploma (i.e., the date of the final examination) is the date on which the student completed the final study unit of the degree programme.
2. The diploma is signed by the chair of the Examination Board. If the Chair is absent, one of the members of the Examination Board may also sign the diploma.
3. The diploma is in English and complies with the European format for such diplomas and WHW Article 7.11.
4. An International Diploma Supplement is appended to the diploma. This supplement is intended to provide insight into the nature and content of the degree programme to promote the international recognition of the degree programme (WHW, Article 7.11, Paragraph 4).
5. If the Examination Board has awarded a specific distinction (e.g., cum laude) to the student, then this is mentioned on the diploma.
6. Students who have successfully completed more than one examination but cannot be awarded a diploma as referred to in Paragraph 1, receive, at their own request, from the Student Services Desk a statement prepared by or on behalf of the Examination Board which in any case states the results of the examinations the student has passed.

Article A5.3 Cum Laude

1. The Examination Board checks whether the student has fulfilled all requirements. If the *judicium Cum Laude* ('with distinction') applies, this is stated on the diploma and the diploma supplement.
2. The *judicium Cum Laude* can be awarded provided the following requirements are met:

[11] Some examples (by way of illustration, not to exclude other situations): the student attends a double degree or combined degree programme, or an extensive extra-curricular activity requires more than twelve months.

a. The precise weighted average[12] of the grades for all study units of the Master's examination programme, excluding the Master's thesis (final project) and the internship (if applicable), is at least 8.00; Results for study units outside the examination programme, are not taken into account.
b. Those parts of the examination programme for which an exemption was granted, or which were not graded with a number[13] are not considered when calculating the average grade.
c. Exemptions within the examination programme may be granted to a maximum of 15 ECs.
d. The study unit of the Master's thesis (final project) is graded at 9.0 or higher.
e. If an internship is part of the examination programme, it is graded at 8.0 or higher.
f. No more than one study unit of the examination programme has been graded lower than 7.0.
g. The programme has been completed within 125% of the nominal duration, starting from the start date recorded in SIS.

3. Students who have been found guilty of academic misconduct in academic activities related to the degree programme for which the cum laude is to be awarded, are excluded from the judicium cum laude.
4. In individual cases the Examination Board may grant the judicium Cum Laude even if not all requirements are met due to extenuating circumstances. It is noted that the distinction of cum laude is never awarded automatically, but only following individual assessment of the student's academic achievements.

A6 Student guidance and study progress

Article A6.1 Study progress report

1. Every student can access their list of the results achieved in SIS. The student can request a certified study progress overview from the Student Services Desk if required.

Article A6.2 Student guidance

1. The Faculty Board is responsible for student guidance.
2. Student support and guidance includes 'decentralised' guidance, as provided within degree programmes, and 'central' guidance, as provided by the Centre for Educational Support.
3. Student guidance includes guidance with questions or problems with regard to career orientation and career choices and guidance with problems that affect study progress. Students are offered personal and professional student (career) guidance for optimal study progress. Where possible, needs for specific guidance are met.
4. Each student is assigned a study adviser.
5. The study adviser supervises students and advises them on all aspects of the studies, also on personal circumstances that may be affecting the student's studies.

[12] The weighted average is proportional to the number of credits.

[13] With the exception of EIT Digital Master school programmes

6. A systematic method on how students are monitored and obstruction in study progress is signalled is documented by the degree programme (for example in a policy plan or an annual cycle).
7. Information about the guidance facilities of the degree programme is in any case available on the website of the degree programme.

Article A6.3 Special Facilities

1. If students wish to exercise their right to specific supervision or special facilities, they should contact the study adviser. The study adviser records the agreements made with the student in SIS.
2. A student is entitled to special facilities in case of demonstrable circumstances beyond the student's control or extenuating personal circumstances. The facility may provide for dispensation from or an additional opportunity to sit examinations or tests to be granted and/or for specific facilities to be made available. Such dispensation and additional resits may only be granted by the Examination Board.

A7 Studying with a functional impairment

Article A7.1 Studying with a functional impairment

1. A functional impairment is defined as having an illness condition, impairment, or handicap that might impede or otherwise constitute a barrier to the student's academic progress.
2. Facilities are aimed at removing individual barriers in attending the degree programme and/or when it comes to taking examinations and tests. These facilities may be related to access to infrastructure (buildings, classrooms, and teaching facilities) and study materials, adjustments to the form of assessment, alternative learning pathways, or a customised study plan.

Article A7.2 Request for facilities

1. The study adviser and the student concerned discuss the most effective facilities that can be provided for the student as referred to in Article 2 of the Equal Treatment of Disabled and Chronically Ill People Act (WGB h/cz).
2. Based on the discussion referred to in Paragraph 1, the student has to submit a request for facilities. This request should be submitted to the study adviser, who has been mandated by the Faculty Board, preferably three months before the student participates in classes, exams, and tests for which the facilities are required.
3. The request should be supported by documents that are needed to enable an assessment to be made.
4. The study adviser decides on the admissibility of the request and informs the student of the decision within twenty working days after receipt of the request, or sooner if the urgency of the request dictates.
    a. Should the request be granted, the period of validity is also indicated.
    b. If the request is not granted, or only partly granted, the study adviser informs the student of the justification for not granting the request as well as the possibilities for filing an objection and an appeal with the Complaints Desk.
    c. Students who are dyslexic, are granted a maximum of 15 extra minutes for each hour that a test or exam is officially scheduled.

5. The study adviser informs the relevant parties in due time about the facilities that have been granted.
6. The applicant and the study adviser evaluate the facilities before the end of the period for which they have been granted. During this evaluation, the parties discuss the effectiveness of the facilities provided and whether they should be continued. No evaluation takes place of facilities granted to students because of the functional impairment dyslexia.

A8 Amendments, transitional arrangements, appeals and objections.

Article A8.1 Conflicts with the regulations

If other additional regulations and/or provisions pertaining to education and/or examinations conflict with these Education and Examination Regulations, the provisions in these Education and Examination Regulations prevail.

Article A8.2 Administrative errors

If, following the publication of a result, a marks sheet, or a student's progress report a manifest error is discovered, the discoverer, be it the university or the student, is required to make this known to the other party immediately upon finding the error and to cooperate in rectifying the error.

Article A8.3 Amendments to the regulations

1. Substantive amendments to these Education and Examination Regulations are enacted by the Faculty Board in a separate decision.
2. In principle, substantive amendments to these Regulations do not apply to the current academic year. Amendments to these Regulations may apply to the current academic year if the interests of the students are not prejudiced within reasonable bounds, or in situations of force majeure.
3. Amendments to these Regulations have no effect on earlier decisions by the Examination Board.

Article A8.4 Transitional arrangements

1. In the case of amendments to the Education and Examination Regulations, the Faculty Board adopts a transitional arrangement, as necessary.
2. The transitional arrangement must to published on the degree programme's website or published in Section B of these regulations.
3. The following principles are applicable to any transitional arrangement if a Master's programme is changed:
    a. Changes to the curriculum are to be announced prior to the academic year in which the changes take effect.
    b. No guarantee can be made that all study units that were part of the curriculum when students enrolled in a degreeprogramme continue to be part of the curriculum. The final Master's examination is to be based on the curriculum most recently adopted by the Faculty Board.
4. Transitional arrangements always include:
    a. which discontinued study units are equivalent to study units or components thereof in the revised Master's degree programme that is included in Section B.
    b. if a study unit without practical exercises is discontinued, there will be at least one opportunity in the subsequent academic year to take a written or oral examination or to ensure assessment by some other means.

c. if a study unit that involves practical exercises is removed from the programme, and during the subsequent academic year no opportunities are provided to complete these practical exercises, at least one study unit is designated as a suitable replacement for the discontinued study unit.
d. the term of validity of the transitional arrangement.

5. The transitional arrangement must be approved by the Examination Board.
6. In exceptional cases and to the student's benefit, the Examination Board may deviate from the prescribed number of opportunities to sit exams and/or tests related to study units that have been dropped from the curriculum.

Article A8.5 Assessment of the Education and Examination Regulations

1. The Faculty Board is responsible for the regular assessment of the Education and Examination Regulations, with specific emphasis on the study load.
2. In accordance with article 9.18 of the WHW, the Programme Committee has a partial right of consent of and a partial right to be consulted on parts of the Education and Examination Regulations.
3. The Programme Committee is responsible for the annual assessment of the manner in which the Education and Examination Regulations are implemented.

Article A8.6 Appeal and objections

An appeal and objections must be submitted in writing to the University of Twente Complaints Desk within six weeks after notification of a decision to the student.

Article A8.7 Hardship clause

In cases of demonstrable unreasonableness and unfairness of a predominant nature, the Examination Board or the Programme Director may allow the provisions in these Regulations to be deviated from. This depends on which body is authorised or has the duty according to these Regulations to take a decision on or make an exception to a provision in these Regulations.

Article A8.8 Publication

The Education and Examination Regulations and the Examination Board's Rules and Guidelines are to be published on the degree programme's website.

Article A8.9 Entry into force

These Regulations enter into force on 1 September 2025 and replace the Regulations dated 1 September 2024.

SECTION B: PROGRAMME-SPECIFIC SECTION

SECTION B - PROGRAMME-SPECIFIC SECTION ELECTRICAL ENGINEERING

About this Section

The Education and Examination Regulations (EER) are subdivided into two sections (Section A and Section B), which together form the EER. Section A, which can be seen as the faculty section, includes provisions that apply to all EEMCS Master's degree programmes. Section B contains the provisions that are specific to the particular degree programmes, in this case the Master's programme Electrical Engineering.

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B1 General Provisions

Article B1.1 Definitions

In addition to the definitions in Article A1.2, the following definitions are used in this Section B:

a. **Electrical Engineering discipline**: The group of chairs of the Faculty of Electrical Engineering, Mathematics and Computer Science, taking part in the Electrical Engineering Master's programme. They are mentioned in the table of Article B2.3.
b. **Programme mentor**: a staff member, who is appointed by a chair to supervise students who joined the specialisation of this chair, until they start their Master's Final project.
c. **Graduation committee**: the committee that supervises the Master's final project and will carry out the assessment of the project.

B2 Programme objectives and final attainment targets

Article B2.1 Aim of the programme

The programme aims to train Master students in a spectrum of professional and personal competencies to enable them to expand their knowledge and methodology in design, through analysis and research, of innovative systems in the Electrical Engineering discipline.

Article B2.2 Final qualifications

The final qualifications of the Electrical Engineering master's programme have been obtained by combining the Meijers criteria with the Intended Learning Outcomes, obtained from the Domain Specific Frame of Reference. In Appendix BIV, this is elaborated in detail.

Competence in one of the fields of Electrical Engineering

A graduate

a. Has a thorough mastery of one of the application fields of Electrical Engineering extending to the forefront of knowledge (latest theories, methods, techniques and topical questions).
b. Is able to apply advanced theories and models from Electrical Engineering and related disciplines in this field.
c. Is able to apply methods for carrying out experiments, gathering of data and simulations, independently in the context of more advanced ideas or applications in this field.
d. Is able (independently) to spot gaps in his / her own knowledge, and to revise and extend it through study.

Research

A graduate

a. Is able to study a topic in the application field or a related field by critically selecting relevant scientific literature.
b. Is able (independently) to produce and execute a research plan, choosing the appropriate level of abstraction for each stage.
c. Is able, and has the attitude to, where necessary, draw upon other disciplines in his or her own research.
d. Is able to deal with the changeability of the research process through external circumstances or advancing insight. Is able to steer the process on the basis of this.

Design

A graduate

a. Has creativity and synthetic skills with respect to design problems in the field.
b. Is able (independently) to produce and execute a design plan, choosing the appropriate level of abstraction for each stage.
c. Has the attitude, where necessary, to draw upon other disciplines in his or her own design.
d. Is able to deal with the changeability of the design process through external circumstances or advancing insight.

Scientific approach

A graduate

a. Is able to identify and take in relevant developments.
b. Has insight into the nature of science and technology and has knowledge of current debates about this.
c. Has insight into the scientific practice and has knowledge of current debates about this.
d. Is able to document adequately the results of research and design with a view to contributing to the development of knowledge in the field and beyond and is able to publish these results.

Intellectual skills

A graduate

a. Is able to critically reflect independently on his or her own thinking, decision making, and acting and to adjust these on the basis of this reflection.
b. Is able to reason logically within the field and beyond, both 'why' and 'what-if' reasoning and Is able to recognise fallacies.
c. Is able to ask adequate questions, and has a critical yet constructive attitude towards analysing and solving complex (real-life) problems in the field.
d. Possesses basic numerical skills, and has an understanding of orders of magnitude.

Cooperation and communication

A graduate

a. Is able to communicate verbally and in writing about research and solutions to problems with colleagues, non-colleagues and other involved parties.
b. Is characterised by professional behaviour. This includes: drive, reliability, commitment, accuracy, perseverance and independence.
c. Is able to perform project-based work in complex projects: is pragmatic and has a sense of responsibility.

Temporal and social context

A graduate

a. Understands relevant (internal and external) developments in the history of the fields concerned.
b. Is able to analyse and to discuss the social consequences (economical, social, cultural) of new developments in relevant fields with colleagues and non-colleagues. Integrates these consequences in scientific work. Is able to analyse the consequences of scientific thinking and acting on the environment and sustainable development. Integrates these consequences in scientific work.

c. Has an eye for the different roles of professionals in society. Chooses a place as a professional in society.
d. (Working experience) Must have some working experience in a professional environment outside the own university at the academic level of the Electrical Engineering programme.

Article B2.3 Fields of specialisations

There is only one Master's programme in Electrical Engineering and the field of specialisation determines the contents of the programme (study programme). This specialisation is defined by the chair where the Master thesis is carried out. The study programme corresponds to the specialisation. In this way graduates maintain a broad Electrical Engineering qualification while being specialized in one of the specific fields. The field of specialisation is indicated in the addendum of the degree diploma. The following specialisations are defined in the Electrical Engineering programme:

Specialisation	Name of the chair	Abbreviation
Biomedical Signals and Systems	Biomedical Signals and Systems	BSS
Dependable Integrated Systems	Computer Architecture for Embedded Systems	CAES
Communication Networks	Design and Analysis of Communication Systems	DACS
Integrated Circuit Design	Integrated Circuit Design	ICD
Integrated Optical Systems	Optical Sciences	OS
Nanoelectronics	NanoElectronics	NE
Computer Vision and Biometrics	Data Management and Biometrics	DMB
Micro Sensors and Systems	BIOS Lab-on-a-Chip Integrated Devices and Systems RAM-3D printed sensing	BIOS, AMBER IDS RAM
Semiconductor Devices and Technology	Integrated Devices and Systems	IDS
Radio Systems	Radio Systems	RS
Power Electronics	Power Electronics	PE

B3 Further admission requirements

See Chapter A2, for general regulations regarding admission and enrolment

Article B3.1 Programme specific admission requirements

1. Admission to the Master's programme is possible for an individual who can demonstrate that he/she has the knowledge, understanding and skills as defined in the Attainment Targets of the Electrical Engineering Bachelor's programme of the University of Twente as described in Article A2 of the Programme Specific Part of the Education and Examination Regulations for the Bachelor's Degree Programme in Electrical Engineering.
2. Any individual who has obtained a Bachelor's degree in academic higher education on one of the following degree programmes meets the requirements referred to in paragraph 1:
    a. Bachelor's programme Electrical Engineering at the University of Twente.
    b. Bachelor's programme Electrical Engineering at the Technical University of Delft.
    c. Bachelor's programme Electrical Engineering at the Technical University of Eindhoven.
3. In addition to the language requirements stipulated in Article A2.2, the IELTS and IBT-TOEFL test results should satisfy requirements regarding the sub-scores. In case of an IELTS test all sub-scores should be at least 6.5. In case of an IBT-TOEFL test, all sub-scores should be at least 21.

Article B3.2 Pre-Master's programme for students from a Dutch University of Applied Sciences

See Article A2.7, for general regulations regarding pre-Master's programmes.

1. Students seeking admission on the basis of a Bachelor's degree awarded by a Dutch University of Applied Sciences must complete a pre-Master's (bridging) programme that includes the following subjects:

Code	Course	Study load (EC)
202001171	Calculus A	5
202001178	Linear Algebra	3
201500252	Digital Logic and Computer Organization	3
202001173	Calculus B	4
202001185	Linear Systems	6
191403070	Electromagnetism PM	5
202000238	Academic Research Skills	4
	Total	**30**

2. Small changes in the programme are possible. The final programme should be announced to the students before the start of the programme.
3. The programme assumes a minimal knowledge level VWO-B in mathematics and a VWO-level in English. (VWO being the Dutch preparatory secondary school for the universities).
4. The conditions for admission to the Master's programme are as stipulated in Article A2.7.
5. Students from a Dutch University of Applied Sciences may be allowed by the Admission Committee to attend the pre-Master's programme as a part of their bachelor's programme.

B4 Curriculum structure

Article B4.1 Composition of programme

The curriculum consists of the following elements:

Year	EC	Topic
First	20..25	Compulsory units of study
	5..10	Philosophical and Societal courses
	30..35	Electives (Including possible homologation courses)
Second	20	Internship
	40	Master's thesis project

Article B4.2 Compulsory units of study

Depending on the specialisation the set of compulsory courses may be fixed, or choices for compulsory courses will be made by the programme mentor after discussion with the student. For each specialisation the process of obtaining the compulsory courses is described in Appendix BI.

Article B4.3 Philosophical and Societal courses

1. The units Perspectives on Engineering Design (201900007) and Philosophy of Engineering: Ethics (201100137), worth 5 EC in total, are compulsory.
2. Students can choose the other 5 ECs from non-technical units with a workload of at least 2.5 EC provided by any university. For a course from outside the University of Twente approval by the Examination Board is necessary. If students so desire, they can also complete 5 ECs in a technical subject, in which case the rules of Article B4.4 apply. In exceptional cases, the Examination Board may, upon a written and motivated request from the student, approve an alternative way of fulfilling this 5 EC requirement or even extend the substitution to a total of 10 EC. Such exceptions may be granted on the basis of the student's prior education, or other demonstrable knowledge and experience.

Article B4.4 Electives

Students shall select their elective units, after consultation with the programme mentor responsible for the chosen specialisation, from the following list:

- University of Twente: the Master's subjects, offered by the studies in Electrical Engineering, Embedded systems, Robotics, Computer Science, Applied Mathematics, Mechanical Engineering, Applied Physics, Nanotechnology and Sustainable Energy Technology.
- The Technical University in Delft and the Technical University in Eindhoven: the Master's subjects, as listed for the study in Electrical Engineering.
- If subjects are included that do not fulfil the above, then permission will have to be obtained from the examination board.

The programme of electives requires approval by the programme mentor. See Article B5.1 for the procedure.

Article B4.5 Homologation courses

The rules for homologation courses are stipulated in Article A2.5, paragraph 4.

Article B4.6 Internship

The general regulations for the internship are stipulated in Article A3.9.

1. Requirements for starting the internship
    a. Students must have submitted a study programme to the educational office which was approved by their programme mentor. If the courses, they actually attended, deviate from the courses in the study programme, they have to submit a new proposal to their programme mentor and submit that to the education office after approval.
    b. Students must already have obtained at least 45 ECs of their course programme, including all compulsory specialisation courses, mentioned in Article B4.2, and the compulsory non-technical courses, mentioned in Article B4.3.1.
2. Students having a Bachelor's degree awarded by a Dutch University of Applied Sciences (HBO) will carry out an individual research project according to paragraph 3.
3. In certain cases, the Admission Committee (programme coordinator and/or director) may decide that the internship will be replaced by an individual research project in one of the research groups

participating in the programme. The study load of such a project is 10EC. The remaining 10EC of the internship will be spent on elective courses.
This arrangement is standard for students holding a Bachelor's degree from a Dutch University of Applied Sciences (HBO), as specified in paragraph 2. However, students with a different background may also be eligible for this alternative if they have gained substantial work experience through one or more internships during their prior education but lack experience with research projects in an academic environment.

4. In case the internship is replaced by an individual research project, the requirements from paragraph 1 apply for starting the project.

Article B4.7 Master's final project (Master's thesis)

The general regulations for the Master's final project are stipulated in Article A3.7.

1. The composition of the graduation committee is stipulated in Article A3.8.
    a. In addition, the committee should be composed of at least two EE examiners, of which at least one is an EE senior examiner. Also, one of the EE examiners must belong to one of the chairs of the Electrical Engineering discipline.
2. A student will carry out the final project subject to the accountability of the chair of the Electrical Engineering discipline responsible for the student's specialisation.
3. A description of the Master's project that a student will do must have been drawn up and approved by one of the members of the graduation committee.
4. The Master's final project shall take place according to a planning as stipulated in Article A3.7 and in Article B5.4. This planning must satisfy the following requirements:
    a. According to the study load of 40EC, 28 weeks of full time work (40 hours each) are available.
    b. To cope with unforeseen delays, four additional weeks may be added to this period.
5. The Master's project will normally be carried out within the chair, mentioned in paragraph 2. A Master's project may only be carried out external to one of the chairs of the Electrical Engineering discipline, subject to the explicit accountability of one of the chairs of the Electrical Engineering discipline. The chair concerned carries out the supervision as described in the paragraphs of this Article and in Article A3.7. The programme board regards the project as being carried out in the chair concerned. If a project is carried out external to the chair, this should be reported in advance to the examination board.

Article B4.8 Confidentiality

The general regulations for the confidentiality of the master's thesis is stipulated in Article A3.11.

1. If a longer confidentiality period than five years is absolutely necessary for the master's thesis to enable the student to participate in the project, then a confidentiality period of maximally 10 years is possible.
2. For such a longer period consent is required from the programme director.

Article B4.9 Sequence of examinations

1. There are no general conditions regarding the sequence in which the course units have to be attended. Prior knowledge requirements may be given in the individual course descriptions that can be found in the online study prospectus. The student should take them into account when planning the study programme.

2. See Article B4.6, paragraph 1 for the requirements to start an internship.
3. Conditions for starting the Master's thesis are stipulated in Article A3.7.
4. If in the student's study programme the internship has been replaced by an individual project, this project must have been completed before the Master's thesis is started.

B5 Planning, procedures, guidance and assessment during the Master's study

Article B5.1 Specialisation and subject combination

1. Before starting the Master's study, students choose one of the specialisations of the programme and with this the chair of the Electrical Engineering discipline in which the final project will be carried out. The student determines his study programme, together with the programme mentor of the chair, and draws up a schedule for attending the subjects, and for carrying out the internship and the final project.
2. The study programme should be approved by the programme mentor and then submitted to the registry of the examination committee, at the latest by six months after the start of the Master's study.
3. An alteration in the study programme may only be made with the programme mentor's agreement. If the study programme has already been submitted to the registry of the examination committee, then a new version of the study programme should be submitted after an alteration.

Article B5.2 Practical exercises

1. The study prospectus states which units include a practical exercise. If a unit involves a practical exercise, the examiner will give an assessment, by the latest, at the end of the period in which the subject is scheduled. This will be used to arrive at the final grade for that unit. If the results for the practical exercise are unsatisfactory, then the student has time available until the end of the next quarter to complete the exercise with a satisfactory result. If satisfactory results have still not been obtained, then the student can only obtain satisfactory results for the exercise by carrying out the whole exercise again.
2. The assessments of the practical exercises can only be obtained after the student has participated in the exercise concerned.

Article B5.3 Internship

General rules for the internship are stipulated in Article A3.9

1. The topic of the internship must be such that the student can apply his/her knowledge and competences obtained from the student's course programme.
2. The examiner must be on the list of examiners for internships and master's theses, maintained by the examination board. A qualified staff member, who is not on this list, can be appointed as examiner by the examination board.
3. The examiner of the internship must justify his/her assessment by filling out the assessment form for the internship, shown in Appendix BII.
4. All internship reports are confidential unless otherwise agreed upon with the host organization.

Article B5.4 Master's final project

See Article A3.7 and Article B4.7 for regulations regarding the start and the planning procedure of the Master's final project.

1. Not later than four weeks before the planned graduation date the student should register for the final audit of the Electrical Engineering programme.
2. Before registering, the student will discuss the progress of his master's thesis with the graduation committee. The chair of the graduation committee must co-sign the application form for the final audit. By co-signing the application form, the graduation committee entitles the student to give a final presentation and receive a final grade for the master's thesis (green light declaration).
3. The student must hand over the final version of the project report to the committee not later than one week before the planned graduation date. The student and the committee are allowed to agree upon a different point of time for the delivery of the report.
4. If the final grade is a fail then the student must carry out a supplement to the project within a period of two months, after which the graduation committee will state its opinion again, which will lead at the most to a 6. In exceptional cases a higher grade is possible.
5. This new final grade will be regarded as the result of a resit.
6. If the result of a resit is a fail, then the student shall have to carry out a new Master's final project.
7. The graduation committee of the Master's final project must justify its assessment by filling out the assessment form for the Master's final project, shown in Appendix BIII.
8. If any of the rubrics for the assessment, "Scientific Quality", "Organization, planning, collaboration" or "Communication", has been assessed as insufficient (less than 5.5), the final grade cannot be higher than 5.
9. If the student cannot complete the master's thesis within the period according to the plan as mentioned in Article A3.7 and Article B4.7 for reasons of force majeure, the student can submit an application for an extension of this period to the examination board. If the force majeure is recognised by the board, an extension will be allowed, compensating for the time loss the student suffered.
10. If no extension can be given in the situation, mentioned in paragraph 9, then the arrangement of paragraphs 4 to 6 will be applied.

Article B5.5 Study counselling

Regulations for study counselling are stipulated in Chapter A6.

B6 Special opportunities

Article B6.1 Extended examinations.

1. On request a student can be given an extended audit by the Examination Board about courses not part of this or another programme, but which could have been part of this programme and for which the student has successfully taken interim examinations. The examinations for these courses may have taken place before or after the final degree audit.
2. As proof that the extended audit has been completed successfully, the Examination Board can, upon request, issue a separate statement.

Article B6.2 Additional regulations regarding Flexible Degree programmes

General regulations for flexible degree programmes are stipulated in Article A3.5.

1. The flexible degree programme shall include at least one unit comparable with the Master's final project of the EE Master's study; this unit shall have a workload of no less than 30 EC and no more than 50 EC.

2. A Flexible Degree programme that can be regarded as belonging to the Electrical Engineering Master's programme contains a substantial number, in the order of 20%, of the courses for this programme.
3. An applicant who submits a Flexible Degree programme can include a number of electives, to be chosen later from a list attached to his request. These electives will have to be approved by the committee that will assess the final project.
4. In case of a Flexible Degree Programme the planning, procedures and guidance during the Master's study deviate from the setup in Article B5.1.
    a. A (provisional) description of the Master's final project should be part of the programme proposal.
    b. The chair accountable for the Master's thesis and the chairperson of the graduation committee of the Master's thesis should be known.
    c. This chair person should approve the study programme and the description of the Master's thesis and confirm that the study programme forms a suitable preparation of the Master's thesis.
    d. If the accountable chair is not part of the Electrical Engineering discipline, then a full or associate professor from the Electrical Engineering discipline must be a member of the graduation committee. He/she must co-approve the items in paragraph c.

Article B6.3 Additional regulations regarding double/combined programme

Regulations for a double/combined programme are stipulated in Article A3.6

1. On behalf of the Electrical Engineering programme a senior examiner (appointed by the examination board) from a group participating in the student's specialisation must be a member of the common graduation committee. This senior examiner will carry out the duties for the EE programme, normally dedicated to the chair of the graduation committee.

Article B6.4 Combined specialisations

1. It is possible to combine multiple specialisations in one study programme of 120EC.
    a. To this, the study programme of the student must contain the compulsory courses of all specialisations.
    b. The programme mentors of all specialisations must approve the student's course programme.
    c. The master's thesis must be supervised and assessed by members of all chairs, connected to the specialisations. One of the chairs will deliver the chair of the committee, all others will deliver a senior examiner.
    d. All examiners must approve the project description of the master's thesis.
2. All specialisations will be mentioned on the diploma.

APPENDIX BI - SPECIALISATIONS AND THEIR COMPULSORY COURSES

Biomedical Signals & Systems

The specialization of Biomedical Signals & Systems is divided into 3 profiles: Neurotechnology BSS, Human movement analysis BSS, and eHealth BSS.

The following courses are compulsory for all students in the specialisation:

Code	Course	Study load (EC)
201400282	Bioelectromagnetics	5
193810020	Advanced Techniques for Signal Analysis	5

Two additional compulsory courses for 10EC will be chosen according to the profile that students follow.

Profile of Neurotechnology BSS:

Code	Course	Study load (EC)
191211350	Neurophysiology	5
202400798	Dynamic Behaviour of Neural Networks	5

Profile of Human movement analysis BSS:

Code	Course	Study load (EC)
201800156	Biomechanics of Human Movement	5
201200133	Biomechatronics	5

Profile of eHealth BSS:

Code	Course	Study load (EC)
202500300	Data Science (quartile 1B)	5
193810010	Biological Control Systems	5

Dependable Integrated Systems

The following courses are compulsory for all students in the specialisation:

Code	Course	Study load (EC)
191210750	System-on-Chip Design	10
192130240	Embedded Computer Architectures 1	5

One additional compulsory course will be chosen by the programme mentor from the following list, after discussion with the student:

Code	Course	Study load (EC)

192130200	Real-time systems 1	5
202200135	Dependable Computing Systems	5

Communication Networks

The following courses are compulsory for all students in the specialisation:

Code	Course	Study load (EC)
192620010	Mobile and Wireless Networking	5
192620300	Performance Evaluation	5
201700074	Internet Security	5

One more compulsory course will be chosen by the programme mentor from the following ones, after discussion with the student:

Code	Course	Study load (EC)
201400177	Cloud Networking	5
201700073	Ad-Hoc Networks	5
201400176	Dependable Networking	5
201700077	Advanced Networking	5
201700083	Security Services for IoT	5
202100073	Empirical Security Analysis and Engineering	5
202001579	Internet Measurements	5

Computer Vision and Biometrics

The following courses are compulsory for all students in the specialisation:

Code	Course	Study load (EC)
202500276	Machine Learning I	5
201500040	Introduction to Biometrics 3TU	5
191210910	Image Processing and Computer Vision	5
201100254	Advanced Computer Vision and Pattern Recognition	5

Integrated Circuit Design

The following courses are compulsory for all students in the specialisation:

Code	Course	Study load (EC)

191210750	System-on-Chip Design	10
191210850	Advanced Analog IC-Electronics	5

One additional compulsory course will be chosen by the programme mentor from the following list, after discussion with the student:

Code	Course	Study load (EC)
191211500	Wireless Transceivers Electronics	5
191210840	A/D Converters	5
191210860	Advanced Electronics Project	5
191211720	Microwave Techniques	5

Micro Sensors and Systems

The specialization of Micro Sensors and Systems (MSS) is divided into 3 profiles: 3D printing MSS, Physical MSS, and Chemical MSS.

The following courses are compulsory for all students in the specialisation:

Code	Course	Study load (EC)
191211300	Micro Electro Mechanical Systems Design	5
202200253	FEM theory and COMSOL simulations for micro- and nanodevices	5

Two additional compulsory courses for 10EC will be chosen according to the profile that students follow.

Profile of 3D printing MSS:

Code	Course	Study load (EC)
201400103	3D Printing; Processes And Use	5
191210930	Measurement Systems for Mechatronics	5

Profile of Physical MSS:

Code	Course	Study load (EC)
191210730	Fabrication of Micro- and Nanodevices	5
191210930	Measurement Systems for Mechatronics	5

Profile of Chemical MSS:

Code	Course	Study load (EC)
191210730	Fabrication of Micro- and Nanodevices	5
191211120	Lab on a Chip	5

Semiconductor Devices and Technology

The following courses are compulsory for all students in the specialisation:

Code	Course	Study load (EC)
191210730	Fabrication of Micro- and Nanodevices	5
201900135	Advanced Semiconductor Device Physics	5

From each of the following two groups one additional compulsory course will be chosen by the programme mentor from the following list, after discussion with the student:

Code	Course	Study load (EC)
191210740	Material Science	5
193400141	Nanoelectronics	5
191211440	Integrated Circuit Technology	5
191211000	Semiconductor Project	5

Code	Course	Study load (EC)
191210930	Measurement Systems for Mechatronics	5
191210750	System-on-Chip Design	10
201700025	Solar Energy	5
191211300	Micro Electro Mechanical Systems Design	5

Integrated Optical Systems

The following courses are compulsory for all students in the specialisation:

Code	Course	Study load (EC)
193400131	Nano-optics	5
191210880	Integrated optics	5

Two more compulsory courses will be chosen by the programme mentor from the following ones, after discussion with the student:

Code	Course	Study load (EC)
191210740	Materials science	5
191211080	Systems engineering	5
191210730	Fabrication of Micro- and Nanodevices	5
193520030	Non-linear optics	5
201300139	Laser physics	5

NanoElectronics

The following courses are compulsory for all students in the specialisation:

Code	Course	Study load (EC)
191210740	Materials Science	5
193400141	NanoElectronics	5

Two additional compulsory courses will be chosen by the programme mentor from the following list, after discussion with the student:

Code	Course	Study load (EC)
202500276	Machine Learning I	5
202200093	Quantum Mechanics 2	5
201600071	Machine Learning II	5
191210730	Fabrication of Micro- and Nanodevices	5
191211440	Integrated Circuit Technology	5
191211000	Semiconductor Project	5
201900135	Advanced Semiconductor Device Physics	5

Power Electronics

The specialization of Power Electronics (PE) is divided into 2 profiles: Physics & Devices PE and Systems PE

The following courses are compulsory for all students in the specialisation:

Code	Course	Study load (EC)
201900254	Power Electronic Converters	5
202001505	Energy Conversion: People, Planet, Prosperity	5
202001506	Advanced Power Electronic Systems	5

One additional compulsory course of 5EC will be chosen according to the profile that students follow.

Profile of Physics & Devices PE:

Code	Course	Study load (EC)
201900135	Advanced Semiconductor Device Physics	5

Profile of Systems PE:

Code	Course	Study load (EC)
201900255	Electric Machines and Drives	5

Radio Systems

The following courses are compulsory for all students in the specialisation:

Code	Course	Study load (EC)
202300066	5G/6G Communication and Sensing Channels	5

202300065	Advanced Communication and Radar Systems	5
201200231	Smart Antennas	5
202400588	Wireless Communication Systems	5
191211040	Electromagnetic Compatibility	5

TRANSITIONAL ARRANGEMENTS

Students who have an approved course package in one of the previous specializations (e.g. Lab on a Chip and Robotics & Mechatronics) are entitled to finish in these specializations.