

TEACHING AND EXAMINATION REGULATIONS

MASTER'S DEGREE PROGRAMMES

A. FACULTY SECTION

B. PROGRAMME-SPECIFIC SECTION

Academic year 2016-2017

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

General

Since the introduction of the Dutch Higher Education and Research Act (*Wet op het hoger onderwijs en wetenschappelijk onderzoek*, WHW) in 1993, it has been compulsory for the broad outlines of the teaching programme and examining for each degree programme to be recorded in Teaching and Examination Regulations (OER).

In accordance with Section 7.13, paragraph 1, of the WHW, the OER must contain sufficient and clear information about the degree programme or group of programmes. Section 7.13, paragraph 2, of the WHW lists those issues that must, as a minimum, be regulated in the OER with respect to the procedures and rights and responsibilities relating to the teaching and examinations applicable for each degree programme or group of programmes. The WHW also includes a number of separate obligations relating to the inclusion of rules within the OER.

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

SECTION A: FACULTY SECTION

1. General provisions

Article 1.1 Applicability of the Regulations

1. These Regulations apply to the teaching and examinations for the Master's degree programmes: Applied Mathematics, Business Information Technology, Computer Science, Electrical Engineering, Embedded Systems, Human Media Interaction, Internet Science and Technology (formerly Telematics).
1. (Hereinafter referred to as: the Master's programme) 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. These Regulations consist of a faculty section (A) and a programme-specific section (B). Section A contains general provisions and applies to the teaching and examinations of the Master's programmes of EEMCS. Section B contains programme-specific provisions. Together, Sections A and B form the Teaching and Examination Regulations for the programme.
3. The Regulations can be declared to apply *mutatis mutandis* to the joint degree programmes and units of study, pursuant to Section 7.3c of the WHW, also provided by the faculty.
4. These Regulations apply to anyone enrolled in the programme, irrespective of the academic year in which the student was first enrolled in the programme.
5. Section B of these Teaching and Examination Regulations may contain additional general provisions for the relevant programme.
6. The general provisions and the programme-specific appendix of the Teaching and Examination Regulations are authorized by the dean.
7. The Examination Board set down the Examination Board Regulations for the execution of its tasks and powers in accordance with Section 7.12b of the WHW. These regulations are laid down in the Rules and Regulations of the Examination Board.

Article 1.2 Definitions

The following definitions are used in these Regulations:

- a. **EC:** European Credit. A unit of 28 hours of study load, in accordance with the European Credit Transfer System (ECTS), a full academic year consisting of 60 EC or 1680 hours (Article 7.4 WHW);
- b. **Final examination (examen):** A degree programme concludes with a final examination. A final examination is deemed successfully completed if the units of study belonging to a programme have been completed successfully. The examination may also include an additional assessment by the Examination Board;
- c. **Executive Board:** Executive Board of the University of Twente;
- a. **Dean:** Head of the faculty;
- b. **Fraud and plagiarism:** Fraud is an act or omission by a student designed to partly or wholly hinder the forming of a correct assessment of his own or someone else's knowledge, understanding and skills. Fraud also includes plagiarism, which is copying someone else's work without correct reference to the source;
- c. **Joint degree:** a degree awarded by an institution together with one or more institutions in the Netherlands or abroad, after the student has completed a degree programme (a degree programme, a major or a specific curriculum within a degree programme) for which the collaborating institutions are jointly responsible;

- d. **Double degree:** two degrees awarded by two higher education institutions offering a joint programme attesting the successful completion of this programme;
- e. **Course:** a unit of study of the programme within the meaning of the WHW;
- f. **Quarter or quartile:** a part of a semester as specified in the academic calendar (jaarcirkel) of the university;
- g. **Practical exercise:** the participation in a practical training or other educational learning activity, aimed at acquiring certain (academic) skills. Examples of practical exercises are:
 - researching and writing a thesis;
 - carrying out a research assignment;
 - taking part in fieldwork or an excursion;
 - taking part in another educational learning activity aimed at acquiring specific skills or participating in and completing a work placement.
- h. **Examination Board:** Sometimes referred to as Board of Examiners. The Examination Board is the body that establishes objectively and expertly whether a student meets the criteria set in the Education and Examination Regulations regarding knowledge, insight and skills needed for obtaining a degree;
- i. **Master's programme or programme:** the Master's degree programme as denoted in Article 7.3a paragraph 1 subparagraph b of the Act: the totality and cohesion of the course components, teaching activities/methods, contact hours, testing and examination methods and recommended literature;
- j. **Programme board:** The committee charged by the Dean with managing the programme;
- k. **Programme committee:** The Programme committee as referred to in article 10.3c WHW;
- l. **Master thesis project / final project:** a component comprising literature research and/or a contribution to scientific research, always resulting in a written report;
- m. **Student:** Anyone registered with a programme in accordance with Article 7.34 and 7.37 of the WHW;
- n. **Study adviser:** Person appointed by the Dean of the Faculty who acts as contact between the student and the programme, and in this role represents the interests of the students, as well as fulfilling an advisory role;
- o. **Disability:** all conditions which are (at least for the period in question) chronic or lasting in nature and which form a structural limitation for the student in receiving education, sitting (interim) examinations or taking part in practicals;
- p. **Student Information System (SIS):** The system designated by the institutional administration for the registration of and information relating to the relevant student and study data, as stipulated in the WHW, in this case Osiris;
- q. **Course catalogue:** the guide for the degree programme that provides further details of the provisions and other information specific to that programme. The course catalogue is available electronically at www.utwente.nl/coursecatalogue;
- r. **Study load:** the study load of the unit of study to which an interim examination applies, expressed in terms of EC (ECTS = European Credit and Transfer Accumulation System). (The study load for 1 year (1,680 hours) is 60 EC credits);
- s. **Academic year:** the period beginning on 1 September and ending on 31 August of the following calendar year;
- t. **Interim examination (tentamen)** an assessment of the student's knowledge, understanding and skills relating to a course component. The assessment is expressed in terms of a final mark. An interim examination may consist of one or more tests (*deeltentamens*);
- u. **Test:** part of an interim examination (*deeltentamen*);

- v. **Examiner:** The individual who has been appointed by the Examination Board in accordance with Article 7.12c of the WHW to hold examinations and tests and determine their results;
- w. **Admission Board** the committee that assesses, on behalf of the dean, whether a candidate meets the requirements for admission to the Master's degree programme of his/her choice. If there is no Admissions Board appointed for the degree programme, the programme board functions as Admissions Board;
- x. **Bridging programme or premaster:** a programme that can be offered to students with limited deficiencies and who are not yet admissible to the master programme according to Article 7.30 of the Act;
- y. **Homologation:** a programme that can be offered to students with limited deficiencies and who are already admissible to the master programme according to Article 7.30 of the Act;
- z. **University:** the University of Twente (UT);
- aa. **WHW:** the Dutch Higher Education and Research Act (*Wet op het hoger onderwijs en wetenschappelijk onderzoek*, WHW);

The other terms have the meanings ascribed to them by the WHW.

2. Previous education and admission

Article 2.1 Previous education

1. In order to qualify for enrolment in a Master's programme, a Bachelor's degree obtained in academic higher education (WO) or a bachelor degree from a university of applied sciences (HBO) complemented with an appropriate pre master programme is required. The requirements that the Bachelor's degree must meet are specified in Section B.
2. In the event that a candidate does not have a Bachelor's degree as referred to in paragraph 1, the Admissions Board of the degree programme will assess suitability for admission to the programme on the basis of the requirements stipulated in Section B.

Article 2.2 Registration and enrolment

1. The deadline for application for admission for the Master's programme is stipulated on the website www.utwente.nl/master. Different application deadlines apply to different types of applicants.
2. After registering on time, the student must enroll before 1 September or before 1 February.

Article 2.3 Admissions Board

Each programme has an Admissions Board established by the dean. The dean will appoint its members after consultation with the programme directors and Examination Boards of the relevant degree programmes.

Article 2.4 Admissions procedure

1. The Admissions Board is responsible for admission to the programme.
2. With a view to admission to the programme, the Admissions Board assesses the candidate's knowledge, understanding and skills. The Board may request experts within or outside the University to test certain types of knowledge, understanding and skills, in order to supplement written evidence of the programme/programmes the student has already completed. In its assessment, the Board includes knowledge of the language in which the programme will be taught.

3. Candidates receive either confirmation of admission to the master's programme, admission to a pre-master's programme or a negative decision. An appeal against a decision can be lodged with the *UT Klachtenloket* (or UT Complaints Desk) within six weeks.

Article 2.5 Refusal or termination of enrolment (unsuitability/judicium abeundi)

1. Based on the provisions of Section 7.42a of the WHW, the dean or the Examination Board may, in exceptional cases, ask the Executive Board to terminate or refuse a student's enrolment in a programme, if that student's actions or remarks show that he/she is unsuitable either for practicing one or more of the professions for which the programme in question is preparing the student or for the practical preparation for professional practice.
2. If a student is suspected of being unsuitable as described in paragraph 1, the Examination Board or the dean will institute an inquiry, of which the student will be informed immediately. The Examination Board or the dean will not issue any recommendation without carefully considering the interests involved and giving the student the opportunity to be heard.

Article 2.6 Admission requirements

1. Students with a Bachelor's degree in a field that corresponds to a sufficient extent with the subject area covered by the Master's programme can request admission to the programme.
2. The Admissions Board will investigate whether the interested person meets the admission requirements.
3. The Admissions Board can admit students that lack some prior knowledge, if it is estimated that the student's chances to finish the programme successfully will not be hampered by this.
4. The Admissions Board can determine that units they shall stipulate must be included in the master's study to compensate for lacking knowledge of the student (homologation courses).
5. In addition to the requirement referred to in the before mentioned sections, the Board will also assess requests for admission in terms of the following documents:
 - a. Motivation letter;
 - b. English proficiency test (art 2.8)
 - c. Diploma
 - d. Transcript of records
 - e. Curriculum vitae
 - f. Two references
 - g. Abstract of thesis
 - h. Course descriptions for programme-specific courses, research methodology courses, math courses and a table of content for the course materials.
6. The Bachelor's programme from which students are automatically admissible are mentioned in the programme-specific section B.
7. If the intended Master's programme includes different specializations, admission requirements may differ per specialization for applicants who are not directly admissible.
8. When the programme commences, the candidate must have a fully completed the Bachelor's programme allowing admission to this Master's programme.
9. Additional admission requirements are stipulated in Section B.

Article 2.7 Pre-Master's programme

1. A pre-Master's programme is a bridging programme containing a study load of 15 or 30 EC.
2. The pre-Master's is assembled by the programme director together with the Admissions Board.

3. The Admissions Board can decide to admit a candidate to the Master's programme on the condition that before the final admission a bridging programme is completed successfully.
4. Proof of a successfully completed pre-Master's programme, together with the related bachelor's programme degree serves as proof of admission to the Master's programme specified within it, in the same and the subsequent academic year.
5. From the start, candidates shall complete the pre-Master's programme within an academic year unless otherwise specified. For the interim examination of each part of the programme two occasions are given.

Article 2.8 English language requirement for English-language Master's programmes

1. The proficiency requirement in English as the language of instruction can be met by the successful completion of one of the following examinations or an equivalent:
 - IELTS: 6.5
 - TOEFL internet based test: 90
 - Cambridge CAE-C (CPE)
2. Exemption is granted from the examination in English referred to in the first paragraph to students who:
 - are native speakers of the countries specified on the relevant page on the web site of the UT, see www.utwente.nl/en/education/master/admission-requirements/international-degree/;
 - have obtained a relevant bachelor's degree from an accredited academic institution in the Netherlands;
 - have obtained a three-year bachelor's degree in one of the following countries: Australia, Canada, Ireland, New Zealand, the United Kingdom or the United States of America

3. Degree programme structure

Article 3.1 Structure of academic year

1. Every degree programme will be offered in two years, each of which divided into two semesters.
2. Every semester consists of two consecutive periods of ten weeks.
3. The programmes will be taught in full-time.
4. The language of instruction is English.

Article 3.2 Programme structure

1. The programme comprises the units of study included in Section B.
2. The size of the degree programme in EC is 120. These 120 credits must not include any credits which constituted part of a previously passed Bachelor's audit.
3. If students must sign up for participation in a unit of study, this will only be possible in the periods designated for that purpose.

Article 3.3 Master's final Project

1. Requirements to starting the Final project:
 - a. Outside of the Final project a maximum of 10 EC for unfinished courses is allowed
 - b. In case the programme allows a combined final project and internship, 10 EC unfinished courses outside the internship and final project are allowed.
2. The student and the (day-to-day) supervisor must make an appointment about the starting and finishing dates of the Master's project.

3. This will be documented in a plan that takes into account the nominal length of the final project, a reasonable holiday period and uncompleted study units.
4. The planning must be approved by the supervisor and signed by the student.
5. Programme-specific regulations regarding the Final Project are stipulated in the programme-specific section B.

Artikel 3.4 Internship

1. The internship is a period of study related work for the amount of 20 credits that is carried out by the student at a company, university or institute outside the University of Twente.
2. Requirements for starting the internship:
 - a. At least 45 EC should be obtained before starting the internship.
 - b. For each programme additional requirements can apply. If so, these will be stipulated in section B.
3. A description of internship must have been drawn up in accordance with and be approved by a member of the staff who has a permanent position at the University of Twente. The approval must be given before the start of the internship.
4. The student has to register with the Internship Office EEMCS at least three months before starting his internship.
5. The daily supervisor of the internship is a staff member appointed by the institute where the placement is being done. This person should be mentioned in the project description, mentioned in paragraph 2.
6. The staff member, mentioned in paragraph 3, supervises the student from a distance during the internship. If adequate supervision is not - or no longer - possible, in the opinion of this supervisor, the latter can decide to take over the daily supervisor.
7. During the internship the student should write a report about his work. At the end of the internship period the report should be handed over to the daily supervisor. The daily supervisor gives an assessment by filling in the assessment form, handed over by the student. The assessment will be based on the supervisor's observations of the student and on the report.
8. The UT supervisor shall act as examiner for this unit, and will base his mark on the assessment by the company supervisor, the report by the student and a discussion with the student. The student should hand in the report to the UT supervisor within two months after the end of the internship.

Article 3.5 Confidentiality

1. The final report and internship report are public unless confidentiality conditions have been imposed as follows.
2. The programme management can declare a (final) report confidential for a limited period upon receiving a motivated request:
 - a. A request regarding confidentiality should be done by the first supervisor before the start of the final project or internship.
 - b. The confidential report is accessible for the supervisor, the programme management, and members of bodies that have the authority to assess the quality of the grading of the entire programme
 - c. All parties mentioned in 2b are obliged to respect the confidentiality of the report.
3. In case confidentiality conditions are imposed according to 2, the final presentation may be adapted in a way to avoid making the issues that are considered confidential public

Article 3.6 Flexible Degree programme

1. The Examination Board of the programme decides whether a student may take part in a flexible degree programme as stipulated in Section 7.3d of the WHW. The Examination Board assesses whether the programme is appropriate and consistent within the domain of the programme and whether the level is high enough in the light of the final attainment targets of the programme.
2. The flexible degree programme is put together and motivated by the student and must at least have the size, breadth and depth of a regular Master's programme.
3. The following conditions must at least have been met in order to be eligible for the Master's degree:
 - a. A deviation from the regular Master's programme of at least 30 EC with a coherent content
 - b. the level of the programme must match the objectives and exit qualifications that apply for the programme for which the student is enrolled

Article 3.7 Double / combined programme

In some cases, a student can obtain diplomas for two Master's programmes on the basis of a combined course programme satisfying the requirements of each individual programme.

The following conditions for the composition of a combined programme are formulated.

1. The student's course programme can be described as the amalgamation of two (not necessarily) disjunctive course programmes satisfying the requirements of both programmes.
2. The two sub-course programmes referred to in 1. Have no more than 30 credits from courses in common outside of a possible combined final project. In case of a combined final project and combined internship of 20 EC, both programmes may not have more than 20 EC from course in common. This not only includes units of study included in both course programmes, but also courses for which an exemption was granted for one course programme on the basis of a result earned as part of the other course programme.
3. If a single final project is included in the intersection of both course programmes as referred to in 1, the study load of the assignment should be at least 100% of the requirement in EC for the final project of the course programme of the student plus at least 50% of the requirement in EC for the graduation project of the other course programme.
4. In individual cases the programme director may determine that not all conditions have to be met.
5. Approval for the combined course programme is needed from both Examination boards.

Passing the final assessment for a combined programme

Students who based in a course programme as described above sit a combined final assessment will successfully pass if the assessments included in the file would result in passing the final assessment of both programmes individually in accordance with the applicable regulations. The Examination Boards of the programmes involved must decide to allow a student to pass the final assessment. The programme management gives instructions on the date of a combined final colloquium.

4. Examinations

Article 4.1 Signing up for courses and examinations

1. Every student must sign up in SIS for participation in a course. It is also mandatory to register beforehand for every interim examination opportunity.
2. By way of exception to the provisions of paragraph 1, any student who has correctly signed up for participation in the instruction/classes for a particular course and has been admitted

will also be signed up for the subsequent interim examination, unless the degree programme stipulates a different approach.

3. The student has the right to inspect recent model test questions or model tests, or old tests and their keys, along with the norm for assessment.
4. The assessment schedule must be published in Blackboard at least two weeks prior to the start of the study unit.
5. The assessment schedule must include:
 - a. The learning objectives;
 - b. When and how tests will be administered;
 - c. the relative weighting of the tests;
 - d. any required minimum grade per test
 - e. the resit for each test (if applicable), the form of the resit, when it will take place, and any conditions for participating in the resit;

Article 4.2 Type of examination

1. In the course catalogue the way is stipulated in which a unit of study is concluded and the form any examination will take.

At the student's request, the Examination Board may permit a different form of examination than that stipulated in the course catalogue.

The examiner can request the Examination Board to permit a different form of examination on the condition that all participants agree.

2. In the case of a unit of study that is no longer offered, in the academic year following its termination, at least one opportunity will be provided to sit the interim examination(s) or parts thereof and a transitional arrangement will be included in the programme-specific section for the subsequent period.

Article 4.3 Oral examinations

1. The examiner may conduct oral examinations involving more than one student at a time, unless one of the students involved objects to this.
2. Oral tests will be conducted in public, unless the Examination Board has determined otherwise in a particular case, possibly at the request of the examiner or the student.
3. If a third party wishes to be present during an oral test must submit this request to the Examination Board at least ten working days prior to the oral test. This does not apply for graduation colloquia.
4. If the Examination Board has determined that members of the Examination Board (or an observer representing the Examination Board) are to be present during the oral test, it will notify the examiner and the student at least one working day prior to the test.
5. For an oral test, there must be proof that the student was treated properly and that the assessment is reliable. This can be shown by, e.g., the presence of a second expert or a video recording of the sitting of the oral test. The assessment is documented by means a form that shows that the intended learning outcomes are met.

Article 4.4 Determining and announcing results

1. The result of a written exam or practical exercise is published via the SIS within 20 working days. The publication will be done by BOZ (Office of Educational Affairs).

- a. The examiner will determine the result of a written exam within 15 working days after the exam and notify BOZ of the result.
 - b. No rights can be derived from exam results that have been published via Blackboard or any other medium not being the SIS.
2. The result of an oral exam is made known to the student within one working day in the form of an authorized proof of result provided by the examiner.
3. If the result for a unit of study is based on the completion of one or more assignments, or on writing a paper or thesis, then the date of submission of the final assignment, paper or thesis will count as the exam date.
4. Should the examiner not be able to meet the term as described in paragraphs 1 and 2 due to extraordinary circumstances, he/she reports this with reasons to the Examination Board. The student is informed of the delay as soon as possible by the Examination Board, whereby the new term within which the result will be made known is also communicated. If the Examination Board is of the opinion that the examiner has not met his/her obligations, it may appoint another examiner to ascertain the result of the exam.
5. If a second exam is planned shortly after the first, the results of the first exam will be published at least ten working days prior to the second exam.

Article 4.5 Examination opportunities

1. There will be an opportunity at least twice a year to sit written or oral exams. Practical exercises can be completed at least once per year.

Article 4.6 Examination results

1. Marks are given on a scale from 1 to 10, with no decimal after the point.
2. EC will only be awarded for the unit of study if an interim examination has been completed with a grade of 6 or higher. No EC's will be awarded for components of units of study and/or individual tests.
3. If a student receives more than one authorized result for one and the same unit of study, the highest result will apply.

Article 4.7 Exemption

1. At the written request of the student, the Examination Board may exempt the student from taking one or more examination components, if the student:
 - a. has passed a course component of a university or higher professional education programme that is equivalent in both content and level; or
 - b. has demonstrated through his/her work and/or professional experience that he/she has sufficient knowledge and skills with regard to the relevant course component.
 - c. Students may be exempted from the obligation to participate in practical exercises if they can demonstrate that they expect to be placed in a moral dilemma as a result of the need to meet one of the requirements for this component. In such cases, the Examination Board decides whether the component can be carried out in another manner to be determined by the Board.
2. Exemptions may be granted with a maximum of 30 credits. The Examination Board can grant an exception in extraordinary cases.
3. Exemptions cannot be granted on the basis of results from a Bachelor's programme, the course in question should be substituted by another course.

Article 4.8 Validity period for results

1. The period of validity for an exam result that has been successfully completed is six years. .
2. Test results are only valid in the academic year in which they were obtained.
3. The Examination Board can extend this period in individual cases at the request of the student.

Article 4.9 Post-examination discussion and right of inspection

1. The student is entitled to a justification of the results of a test from the examiner, whereby the examiner substantiates the assessment that was given. If no collective discussion of the results is held, the student may submit a request for an individual discussion of the results to the examiner within ten working days of publication of the test results. The discussion must take place at the latest five weeks after the publication of the test results, in the presence of the examiner or an authorized replacement.
2. The student has the right to inspect his or her work for a period of two years after the assessment.

Article 4.10 Retention of examination results

1. The questions, elaborations and the assessed work of written tests will be retained for a period of two years.
2. The retention period of final assignments of the programme is seven years.

Article 4.11 Master's final examination

1. The Examination Board determines the result of the Master's final examination after it has established that the student has passed all the units of study belonging to the programme. The date recorded on the diploma, i.e. the examination date, is the date on which the student successfully completed the last remaining unit of study.
2. A diploma can only be awarded after the student has received formal approval for his study programme as described in the programme-specific section B.
3. If so desired, the student has the right to submit a substantiated request in writing to the Examination Board to postpone declaring the examination as 'successfully completed' and consequently postpone the presentation of the certificate as well. The student must indicate at least the duration of the postponement he desires in his request
4. If the student has requested postponement on the basis of paragraph 3, the examination date will be the date following postponement on which the Examination Board has decided to declare the student to have successfully completed the final examination.

Article 4.12 Diploma and transcript

1. The Examination Board grants a diploma as proof that the student has passed his/her final examination. The Executive Board sets the model for the diploma. The Examination Board adds a diploma supplement to the diploma providing information on the nature and content of the degree programme completed. The diploma supplement is drawn up in Dutch or English and complies with the European format.
2. The International Diploma Supplement will be appended to the certificate for the successfully completed final examination (WHW, Article 7.11, paragraph 4).
3. Individuals who have successfully completed more than one component of the programme and who cannot be awarded a diploma as stipulated in paragraph 1 will, on request, receive a

statement to be issued by the relevant Examination Board stating at least the components that have been successfully completed together with the units of study they involved, the number of EC obtained and the way in which the interim examinations were taken.

Article 4.13 Cum Laude

1. The Examination Board checks whether the student has fulfilled all requirements. If the *judicium Cum Laude* applies, then this will be mentioned on the diploma and its supplement.
2. In exceptional cases the Examination Board may positively deviate from the requirements to obtain *Cum Laude*.
3. The *judicium Cum Laude* can be mentioned on the Master's certificate on the following conditions:
 - a. The average grade for all parts of the Master's examination programme has to be at least a mark 8.0;
 - b. Those parts of the study programme that were granted exemption or that were not marked with a number are not considered for determination of the average grade.
 - c. Exemptions within the programme may be granted with a maximum of 15 EC
 - d. The Master's thesis (final project) is marked with at least 8.0
 - e. The study programme is completed within 30 months. In the case of a combined programme, the maximum period to be eligible for *Cum Laude* is proportional to the total study load, that is, the number of months does not exceed the total study load in EC's divided by four.

Article 4.14 Fraud and plagiarism

1. The provisions of the Regulations governing Fraud and Plagiarism in the Rules and Regulations of the Examination Board EWI apply in full.
2. Electronic detection software programs may be used to detect plagiarism in texts. In submitting a text, the student implicitly consents to the text being entered into the database of the detection program concerned.

5. Student counselling and study progress

Article 5.1 Administration of study progress and academic student counselling

1. The Dean is responsible for student counselling, which includes informing the student of study opportunities in or outside the programme.
2. Each student is appointed a study adviser
3. The study adviser counsels the student and offers advice on study-related matters, as well as personal problems that may affect his studies if the student so desires.
4. If a student wishes to exercise his right to specific counselling or special facilities, he is required to contact the study adviser. The study adviser will record any agreements made with the student, of which the student and the programme board can derive rights.
5. The following applies to the entitlement to special facilities:
 - a. demonstrable force majeure or personal circumstances;
 - b. if necessary and possible, dispensation for participation of exams or tests and/or the availability of special facilities with regards to examination. Such dispensation and additional testing opportunities can only be granted by the Examination Board.
6. Every student has a list of the results achieved put at his/her disposal in SIS. The student can request a certified study progress overview from the Student Services Desk if required.

Article 5.2 Adaptations for students with a disability

1. A disability is a physical, sensory or other impairment that might limit the student's academic progress.
2. It is explored in consultation with the student and on the basis of an interview with the study adviser what adjustments as referred to in Article 2 of the Equal Treatment Act on the basis of a Handicap/Chronic Illness (WGB h/cz) are considered most effective for this student.
3. Adjustments are intended to remove specific obstructions when following the degree programme and/or sitting interim examinations. Where necessary, these may concern facilities pertaining to the accessibility of infrastructure (buildings, classrooms and teaching facilities) and study material, changes to examinations, alternative courses or a custom study plan. Realizing the attainment targets must be guaranteed when implementing changes.
4. On the basis of the interview described in paragraph 2, the student submits a written application for the facilities in consultation with the study adviser. The application is submitted to the Dean of the Faculty, preferably three months before the student is to participate in classes, exams and tests for which the facilities are required.
5. The application is supported by documents that can reasonably be requested to assess the application (such as a doctor's or psychologist's letter or, in case of dyslexia for example, a report by a testing bureau registered with BIF, NIB or NVO).
6. The Dean of the Faculty makes a decision, within twenty working days of receipt of the application or earlier if the urgency of the application necessitates it, on the validity of the application as described in paragraph 4, and informs the student and the study adviser of his decision.
7. The study adviser ensures that the relevant parties involved are informed in due time of the facilities granted to the student with a disability.
8. Should the Dean of the Faculty turn down the application in full or in part, the Dean will inform the student of the reason at the basis of this rejection and the possibilities for lodging an objection or an appeal. Objections must be submitted in writing within six weeks, of the decision being announced to the relevant party, at the Complaints Desk at Student Services.
9. Should extra facilities be granted, it will be stated for what term this grant will apply. The applicant and the study adviser will evaluate the facilities before the end of this term. During this evaluation, the parties will discuss the effectiveness of the facilities provided and whether they should be continued.
10. If additional time for a test is granted e.g. in case of dyslexia, an additional period of 15 minutes for every clock hour is allowed.

6. Amendments, transitional arrangements, appeals and objections.

Article 6.1 Conflicts with the regulations

If other additional regulations and/or provisions pertaining to teaching and/or examinations conflict with these Education and Examination Regulations, the present Education and Examination Regulations take precedence.

Article 6.2 Administrative errors

If, following the publication of an interim examination result, a list of marks, or an overview of a student's progress, an apparent 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 with rectification of the error.

Article 6.3 Amendments to the regulations

- 1) Substantive amendments to these Education and Examination Regulations are determined by the Dean in a separate decision.
- 2) In principle, substantive amendments to these Regulations do not apply to the current academic year. Substantive 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 of the Examination Board.
- 4) Transitional arrangements are made in accordance to Article 6.4.

Article 6.4 Transitional arrangement; examination opportunities

- 1) In the case of amendments to the Education and Examination Regulations, the Dean may decide on a transitional arrangement.
- 2) The transitional arrangement will be published in the programme-specific section B.
- 3) Points of departure for a transitional arrangement if a degree programme is changed:
 - a. Changes to a degree programme are published before the start of the academic year in which they are to apply.
 - b. No guarantee can be given that all the units of study of a degree programme, as they existed at the time of a student's enrolment in a programme, will continue to be part of his degree programme. The degree programme as most recently approved by the Dean serves as the basis for establishing the results of the Bachelor's examination.
- 4) The transitional arrangement will always include:
 - a. which lapsed units of study are equivalent to units of study or components thereof in the current degree programme included in the programme appendix; that if a unit of study without practical exercises is removed from the programme, there will be at least two opportunities in the subsequent academic year to take a written or oral exam or to obtain an assessment by some other means;
 - b. that if a unit of study that involves practical exercises is removed from the programme, and during the subsequent academic year no opportunities are offered to carry out these practical exercises, at least one unit of study is designated as a suitable replacement for the lapsed unit of study;
 - c. the term of validity of the transitional arrangement.
- 5) The transitional arrangement requires the approval of the Examination Board pursuant to the provisions of paragraph 4.
- 6) In exceptional cases, and if this is to the student's advantage, the Examination Board may allow a deviation from the number of times and the way in which interim examinations may be taken for a unit of study that is no longer included.

Article 6.5 Review of the education and examination regulations

- 1) The Dean is responsible for the regular review of the Education and Examination Regulations and takes into account the resultant study load for the students to enable this to be monitored and adjusted if necessary.
- 2) In accordance with Article 9.18 of the WHW, the Programme Committee is responsible for issuing advice on the Education and Examination Regulations as well as the annual assessment of the manner in which the Education and Examination Regulations are implemented.

Article 6.6 Appeal and objections

An appeal against a decision made by the Examination Board or an examiner, and objections to decisions made by the Dean on the basis of these Regulations, must be submitted in writing to the Complaints Desk at Student Services within six weeks after notification of the decision.

Article 6.7 Hardship clause

In the event of demonstrable, considerable unreasonableness and unfairness, the Examination Board can permit departures from the provisions of these Regulations.

Article 6.8 Publication

The Education and Examination Regulations and the Rules and Regulations of the Examination Board are published via the website of the programme in question.

Article 6.9 Commencement

These Regulations take effect on 1 September 2016 and supersede the Regulations of 1 September 2015.

SECTION B: PROGRAMME-SPECIFIC SECTION MASTER COMPUTER SCIENCE AND MASTER INTERNET SCIENCE AND TECHNOLOGY (TELEMATICS)

1. General provisions

Article 1.1 Definitions

- a. programme mentor: individual appointed by the Examination Board to approve course programmes
- b. graduation supervisor: chairholder of the chair chosen by the student to graduate from

2. Programme objectives and final attainment targets

Article 2.1 Aim of the Computer Science Master's programme

The common goals for the specializations in the master's programme in Computer Science are established in the course rules. Basically it comes to this: the master's programme aims to combine a scientific mindset with specialist technical knowledge, enabling graduates to analyze, design, validate and implement state-of-the-art ICT systems in their operational context. Graduates of the master's programme are trained to take a scientific, ethical and socially responsible approach to conducting and contributing to research in their specific area of study and to international trends in and related to their field of study.

Article 2.2 Aim of the Internet Science and Technology Master's programme

The goals for the master's programme in Internet Science and Technology are established in the course rules. Basically it comes to this: the master's programme aims to combine a scientific mindset with specialist technical knowledge, enabling graduates to design, analyze, validate and implement complex telematics systems. Graduates of the master's programme are trained to take a scientific, ethical and socially responsible approach to conducting and contributing to research in their specific area of study and to international trends in and related to their field of study.

Article 2.3 General attainment targets

The degree programmes have the following general scientific attainment targets

- a. Graduates have an extensive knowledge of and understand the issues relevant to their specific field of study (i.e. domain specific attainment targets) described in art. 2.4.
- b. Graduates can contribute to scientific research, and independently design, conduct and present the results of small-scale research.
- c. Graduates can provide an original contribution to the development and/or application of the field of study. 'Original' is understood to mean 'demonstrative of a creative contribution'.
- d. Graduates can analyze complex problems (change problems) relevant to the field of study and obtain the required knowledge and information.
- e. Graduates can design, validate and implement solutions/systems in their operational context; identify and apply relevant advanced knowledge, methods and techniques from their field of study.

- f. Graduates can assess solutions/systems and their applications according to their properties and potential to solve problems even if they are new to or unfamiliar with the situation or lack information and/or reliable information; they can use their assessment as a basis for (substantiation of) decisions.
- g. Graduates understand the ethical, social, cultural and public aspects of problems and solutions in their field of study; apply this insight in their international role as scholar.
- h. Graduates can work as part of and play a leading role in a team; manage and plan a development process; document development and research processes.
- i. Graduates can substantiate research results, designs and applications in writing and verbally; critically assess and participate in debates regarding the same.
- j. Graduates can independently acquire new knowledge and skills; reflect on trends in their field of study, responsibilities and roles and use this insight as a guide for and integrate it into their own personal development.
- k. Graduates can integrate information from other disciplines into their own work if necessary.
- l. Graduates take a critical approach to reading, incorporating information presented in and participating in debates regarding international scientific literature relevant to their field of study.

Article 2.4 Domain specific attainment targets

a. MSc Computer Science Specialization Cyber Security

Cybsec 1: Graduates have a profound understanding of security and privacy risks and mitigations in Cyber Space and are able to model and evaluate these risks and mitigations.

Cybsec 2: Graduates have understanding and skills of applying the relevant foundations of cyber security, such as cryptography, formal methods, statistics, machine learning, and data analytics.

Cybsec 3: Graduates have understanding and skills of cyber security engineering methodologies in the small and in the large.

Cybsec 4: Graduates have insight into cross-disciplinary aspects of cyber security such as law, psychology, economics, governance, and management, and are able to read and understand basic texts from those domains and communicate with experts from those domains on cyber security.

Cybsec 5: Graduates have understanding and skills of methods and approaches for practical security evaluation of ICT systems such as penetration testing, risk assessment, and monitoring & analytics.

Cybsec 6: Graduates have specialist knowledge and understanding of one or more sub-fields or aspects of cyber security, typically acquired via research in the final year project.

Cybsec 7: Graduates have practical experience conducting scientific research into cyber security, contributing to such research, applying the results, following the trends of this sub-field and contributing to its further development.

b. MSc Computer Science Specialization Data Science and Smart Services

DS3.1. Graduates have thorough knowledge of, and are able to design solutions for, the management of large volumes of structured and semi-structured data, including sensor data, multimedia data, geographic data, and social data.

DS3.2. Graduates are able to analyze large volumes of generated data and make scientific decisions based on such data sets.

DS3.3. Graduates have thorough knowledge of methods and techniques for the design and analysis of smart services, including those applicable to all stages of an information system's life cycle (requirement analysis, architecture design, realization and maintenance).

DS3.4. Graduates are able to reason about the functionality-cost-risk trade-off in smart services design, and to relate the trade-off to the data management and processes performed by information systems.

DS3.5. Graduates have thorough knowledge of the subsystems that make up information systems, such as workflow management systems, database management systems, transaction processing monitors, and web technology systems, and the distribution of these across organizational units and physical locations.

c. MSc Computer Science Specialization Methods and Tools Verification

MTV 1: graduates have a thorough knowledge of and understand the scope of formal methods as a scientific and design discipline.

MTV 2: graduates have a thorough knowledge of, understand and gain practical experience with the application of formal methods and tools in the development process of software, distributed and/or embedded systems.

MTV 3: graduates can apply formal methods and tools during system development on the basis of knowledge and insight, make an informed selection of these and contribute to their further development.

MTV 4: graduates have knowledge of and understand various aspects of theoretical computer science, including process algebra, proof systems and formal testing theory.

MTV 5: graduates have specialist knowledge and understanding of one or more sub-fields or aspects of the formal methods discipline, e.g. Process Algebra, Software Model Checking, Distributed Model Checking, Program Verification, Proof Systems, Testing, Quantitative Modelling and/or Analysis, Graph Transformations, Game Theory.

MTV 6: graduates have practical experience conducting scientific research into formal methods, contribute to such research, apply the results, follow the trends of this sub-field and contribute to its further development.

d. MSc Computer Science Specialization Software Technology

ST 1: graduates have a thorough knowledge and understanding of the different phases of the software lifecycle as a scientific and design discipline.

ST 2: graduates have a thorough knowledge and understanding of, as well as practical experience with, the application of software engineering methods and tools in the development large-scale systems.

ST 3: graduates know the trade-offs between alternative software engineering techniques and can make educated decisions throughout the software lifecycle.

ST 4: graduates have knowledge and understanding of various aspects of Software Engineering, such as its mathematical background, software management, quality assurance, requirements engineering, architectural design, detailed design, software construction and programming languages.

ST 5: graduates have specialist knowledge and understanding of one or more sub-fields or aspects of the software engineering discipline, e.g. Programming Languages, Software Composition, Service-Oriented Architectures, Model-Driven Engineering, Model Checking.

ST 6: ST graduates have specialist knowledge and understanding of the software requirements of one or more application areas, such as pervasive systems and network protocols, information systems, security.

ST 7: graduates have practical experience conducting scientific research in the realm of software engineering technologies, programming or design paradigms, or software engineering methods, enabling them to contribute to such research, follow the trends and apply the results.

e. MSc Computer Science Specialization Wireless and Sensor Systems

WISE 1: graduates have knowledge and understanding of flexible and efficient communication.

WISE 2: graduates have knowledge and understanding of distributed wireless systems.

WISE 3: graduates have knowledge and understanding of distributed data processing and reasoning.

WISE 4: graduates have the ability to demonstrate their comprehensive knowledge on principles of wireless and sensor systems.

WISE 5: graduates have the ability to understand, analyze, and reason about system-wide aspects and interaction between the key principles of wireless and sensor systems.

WISE 6: graduates have the ability to conduct scientific research in wireless and sensor systems and contributing to research in the field.

WISE 7: graduates have the ability to apply their knowledge in system-wide context.

f. Master of Science Internet Science and Technology

M-IST 1: graduates have thorough knowledge about and understanding of both wired and wireless communication devices, networks and systems, in terms of both key principles and contemporary technologies.

M-IST 2: graduates can design and evaluate wired and wireless communication devices, networks and systems; in doing so, they can take into account both detailed aspects of the individual components, and system-wide aspects such as security and management.

M-IST 3: graduates can quantitatively evaluate the performance of networked systems, and judge their formal correctness, using both analytical methods and computer tools.

M-IST 4: graduates have practical experience conducting research and/or doing design work in a sub-field of networked systems, can follow trends in the field and contribute to its further development.

3. Further admission requirements

Admission requirements additional to the ones in article 2 of section A can be found in Appendix A.

4. Curriculum structure

Article 4.1 Composition of programme

1. The composition of the course programmes is as follows:
 - a. Basic courses as described in article 4.3, these are the obligatory courses
 - b. Advanced courses, as described in article 4.3, these are to be chosen from a restricted list
 - c. Elective courses, as described in section article 4.3, these are freely chosen from other specializations
 - d. Computer Ethics, 5 credits, course unit 191612680
 - e. (Research) internship, not mandatory, as described in article 4.4
 - f. Research topics, at least 10 credits, as described in article 4.5
 - g. Final project, 30 credits, as described in article 6
2. Each student has an individual course programme which meets the programme requirements set in article 4.3, and also the general programme guidelines of 4.1.1.
3. In addition to article 4.1.1 students with a bachelor degree which includes “educatieve minor” may use the credits for electives to form an alternate packet of 30 EC with didactical/pedagogical subjects, including a traineeship in a highschool, as part of a SEC Master’s programme under the terms of article 3.7, section A.
4. For the composition of the course programmes this teaching and examination regulation distinguishes between the following specializations, which are:
 - a. Cyber Security: a Computer Science (M-CSc) specialization in Computer Security. (The course programme is organized within the the 3TU.Federatie as a cooperation of the University of Twente with the Technical University of Delft.)
 - b. Data Science and Smart Services: a Computer Science (M-CSc) specialization in analysis and design of information systems.
 - c. Methods and Tools for Verification (MTV) specialization: a Computer Science (M-CSc) specialization in methods and tools for verification.
 - d. Software Technology (ST) specialization: a Computer Science (M-CSc) specialization in software technology
 - e. Wireless and Sensor systems (WiSe): a Computer Science (M-CSc) specialization on wireless and sensor systems. The programme is the Master part of the WiSe graduate school programme, that can be followed as a specialization (so independent from the graduate school).
 - f. Internet Science and Technology (M-IST) Master: an independently accredited Master programme on Internet Science and Technology.
5. In addition to the programme referred to in paragraph 1, students who will be admitted to the programme on the basis of a Bachelor's degree awarded by a Dutch institute of professional education (HBO) must also complete a pre-Master’s programme. See the description in appendix A.

Article 4.2 Academic and organizational courses

All students have to take the following course in their course programme:

191612680 Computer Ethics (5EC)

Moreover, the student may choose *0 to 10 ECTS* courses from the following list, or any other appropriate course that will help to further develop academic and organizational skills, in agreement with the programme mentor.

Course code	Name	Credits
201000087	Entrepreneurial Finance	5
201200009	Managing Change & Human Resources	5
201000260	Advanced Science Communication	5
201200148	Study Tour	10

Article 4.3 Course programmes

a. MSc Computer Science Specialization Cyber Security

Core courses (5EC). At least 20 EC of:

- 192654000 Network security (UT)
- 201100022 Cyber Crime Science (UT)
- 201500027 Security and Cryptography (TUD)
- 201500026 Cyber Risk Management (TUD)
- 201500037 Cyber Data Analytics (TUD)
- 201600051 Software Security (UT)

Mandatory:

- 201500029 Integration week, ie. An Off-site summer school of one week at the beginning of year 2

Advanced courses (5 EC each):

- 201500040 Introduction to Biometrics (UT)
- 192110940 Secure Data Management (UT)
- 201500042 Privacy Enhancing Technologies (TUD)
- 201500028 Economics of Security (TUD)

- 201500036 Software Testing and Reverse engineering (TUD)
- 201500444 Digital Forensics (TUD)
- 201500041 Cyber Security Management (UT)
- 201500038 E-Law (TUD)
- 201500033 Applied Security Analysis "Hacking Lab" (only available in Delft)
- 201500030 Fundamentals of quantum information (4EC, TUD)
- 201600016 Quantum cryptography (TUD)

Electives:

- 201400177 cloud networking
- 192620010 mobile and wireless networking 1

Mandatory (45 EC, UT):

- 191612680 Computer Ethics (5 EC)
 192199508 Research Topics (10 EC)
 192199978 Final Project (30 EC)

Special requirement imposed: For every two technical cyber security courses, a student must select one socio-technical cyber security course (CCS, CRM, CSM, CoE, Ela, EoS).

A special way to fulfill the requirements of Cyber Security specialization is by successfully completing the course programme on SaP in the EITICT-Labs Masterschool, set up as a double degree programme where one year is done at University Twente. Details on the programme are found on:

<http://eitictlabs.masterschool.eu/programme/majors/sap/>

b. MSc Computer Science Specialization Data Science and Smart Services

Basic courses:

- 192320111 - Architecture of Information Systems
 192652150 - Service-oriented architecture with web services
 201200044 - Managing Big Data
 201400174 - Data Science

Advanced courses, 25-45 EC:

- 191520751 - Graph Theory (Grafentheorie)
 191800770 - Empirical Research & Data Analysis
 192110940 - Secure Data management

- 192135450 - Advanced Design of Software Architectures - Model Driven Engineering
- 192160400 - Information Retrieval
- 201600070 - Introduction to Machine Learning
- 201600071 - Advanced Machine Learning
- 192320220 - Advanced Architecture of Information Systems
- 192320501 - Electronic Commerce
- 192320820 - Design Science Methodology
- 192340041 - Software Management
- 201300074 - Research Experiments with Data and Information Retrieval
- 201500527 - Capita selecta DS3

Elective courses:

- 201200148 - International Study Tour
- 192199968 - Internship

Other courses chosen from any specialization to obtain the minimally required number of 120 credits

Mandatory (45 EC):

- 191612680 - Computer Ethics (5 EC)
- 192199508 - Research Topics (10 EC)
- 192199978 - Final Project (30 EC)

c. MSc Computer Science Specialization Methods and Tools Verification

Basic courses:

- 192111092 - Advanced Logic
- 192135310 - Modelling and Analysis of Concurrent Systems 1
- 192140122 - System Validation
- 192170015 - Testing Techniques

Basic electives (at least 20 EC):

- 192135450 - Advanced Design of Software Architectures - Model Driven Engineering
- 201400170 - Best Practices in Software Development
- 201400200 - Capita Selecta for MTV
- 201400173 - Concepts in Programming Languages
- 191210430 - Engineering Systems Dynamics (Dynamische systemen)
- 192130092 - Fault Tolerant Digital Systems

- 191520751 - Graph Theory (Grafentheorie)
- 201200006 - Quantitative Evaluation of Embedded Systems
- 192620300 - Performance Evaluation
- 201600051 - Software Security
- 201600040 - Requirements Engineering Processes and Methods

- 191561560 - Systems and Control

Advanced electives (at least 15 EC):

- 192114100 - Principles of Model Checking
- 201300042 - Limits to Computing
- 191581420 - Optimization Modelling
- 192135320 - Modelling and Analysis of Concurrent Systems 2
- 192114300 - Program Verification

Other electives:

- a 20 EC internship (192199968)
- other courses chosen from the courses offered by other specializations to obtain the minimally required number of 120 credits

Mandatory (45 EC):

- 191612680 - Computer Ethics (5 EC)
- 192199508 - Research Topics (10 EC)
- 192199978 - Final Project (30 EC)

d. MSc Computer Science Specialization Software Technology

General courses (mandatory):

- 192340041 - Software Management (UT)
- 192135450 - ADSA – Model-Driven Engineering (UT)
- 201400172 - Industrial Software Engineering project (UT)

Software Engineering phases (at least three):

- 201600040 - Requirements Engineering Processes and Methods (Requirements phase, UT)
- 192170015 - Testing Techniques (Quality Assurance phase; UT)

- 192111332 - Design of Software Architecture (Architecture phase; UT)
- 201400170 - Best Practices in Software Development (Detailed Design and Development phases; UT)

One of (Maintenance phase):

- 2IS55 - Software Evolution (TU/e)
- IN4189 - Software Reengineering (TUD)

Technologies (at least two):

- 192140122 - System Validation (UT)
- 192135310 - Modeling and Analysis of Concurrent Systems 1 (UT)
- 192135400 - ADSA – Product Line Engineering (UT)
- 201400173 - Concepts of Programming Languages
- 201400174 - Data Science (UT)
- IL45 - Advanced algorithms (TU/e)
- 2II45 - Architecture of Distributed Systems (TU/e)
- IN4150 - Distributed Algorithms (TUD)
- IN4026(-12) - Parallel Algorithms and Parallel Computers (TUD)

Application areas (at least two):

- 192654000 - Network Security (UT)
- 191211090 - Real-Time Software Development (UT)
- 201200044 - Managing Big Data (UT)
- 191158500 - Advanced Programming in Engineering (UT)
- 201400177 - Cloud networking (UT)
- 201000075 - Wireless Sensor Networks
- 2II70 - Constraint programming (TU/e)

Electives

- 192111092 - Advanced Logic (UT)
- 201400171 - Capita Selecta Software Technology (UT)

- 192652150 - Service-oriented Architecture Web Services (UT)
- 191520751 - Graph Theory (Grafentheorie) (UT)
- 192320820 - Design Science Methodology (UT)
- 192110940 - Secure Data Management (UT)
- 192653100 - Internet Management and Measurement (UT)
- 2IL75 - Algorithms for geographic data (TU/e)
- 2IL55 - Geometric algorithms (TU/e)
- IN4073 - Embedded Real-Time systems (TUD)

Note: a traineeship is not part of the ST specialization

Mandatory:

- 191612680 - Computer Ethics (5 EC)
- 192199508 - Research Topics (10 EC)
- 192199978 - Final Project (30 EC)

e. MSc Computer Science Specialization Wireless and Sensor Systems

Basic courses:

- 192620010 - Mobile and Wireless Networking I (5 EC)
- 201000075 - Wireless Sensor Networks (5 EC)
- 192111301 - Ubiquitous Computing (5 EC)
- 192130112 - Distributed Systems (5EC)
- 191211650 - Multi Disciplinary Design Project (10 EC)

Advanced courses:

At least 20 EC of the following:

- 191211590 - System-on-Chip for ES (5 EC)
- 191210720 - Biomedical Signal Acquisition (5EC)
- 192654000 - Network Security (5 EC)
- 192620300 - Performance Evaluation (5 EC)
- 192620020 - Mobile and Wireless Networking II (5 EC)
- 191211060 - Modern Robotics (5 EC)

Elective courses:

- 192199968 a 20 EC internship
- other courses chosen from the courses offered by other specializations in master programmes of Computer Science, Electrical Engineering, Internet Science and Technology and Embedded Systems to obtain the minimally required number of 120 credits

Mandatory (45 EC)

- 191612680 - Computer Ethics (5 EC)
- 192199508 - Research Topics (10 EC)
- 192199978 - Final Project (30 EC)

f. Master of Science Internet Science and Technology

Basic courses:

- 192620010 - Mobile and wireless networking 1
- 192620300 - Performance evaluation
- 192652150 - Service oriented architecture with web services
- 192654000 - Network security

Advanced courses:

at least 1 of the following advanced courses on modelling and validation:

- 201200006 - Quantitative Evaluation of Embedded Systems
- 192140122 - System validation
- 192170015 - Testing techniques

And at least 2 of the following advanced courses on networking technologies:

- 201400177 - Cloud Networking
- 192620020 - Mobile and wireless networking 2
- 192699978 - Internet Management and Measurement
- 201000075 - wireless sensor networks

And zero or more advanced courses chosen from the following list, such that the advanced courses in total (i.e., including the ones chosen from the above two lists) are at least 30 EC:

- 191210780 - Modern Communication Systems
- 191211030 - Mobile radio communications
- 192111301 - Ubiquitous computing

192135450	-	Advanced Design of Software Architectures Model Driven Engineering
201400176	-	Dependable Networking
192320111	-	Architecture of information services
201500132	-	Telemedicine: remote monitoring and coaching
201400175	-	Social Networks – Technology and Analysis
192130112		Distributed Systems
192110940		Secure Data management
192130240		Embedded Computer Architectures 1
201200044		Managing Big Data
201400174		Data Science
201600051		Software Security
191210790		Transmission Media
201200231		Smart Antennas & Propagation
201500042		Privacy-Enhancing Technologies

Elective courses:

- a 20 EC internship (192199968)
- other courses chosen from the courses offered by other specializations to obtain the minimally required number of 120 credits

Mandatory:

191612680	-	Computer Ethics (5 EC)
192199508	-	Research Topics (10 EC)
192199978	-	Final Project (30 EC)

g. Graduate Research Programmes

There are some course programmes leading to the diploma that are embedded in a graduate research programme. More detailed information on these research programmes is found in Appendix C.

General information is found on: www.utwente.nl/tgs/.

Article 4.4 Internship

Students may take a 20 EC internship in their course programme.

Organisational procedures are found on: www.utwente.nl/ewi/en/education/external_training/. These procedures are considered part of this Regulation.

Article 4.5 Research Topics

All students must take a 10 EC Research topics course in their course programme.

Organizational procedures are found on: www.utwente.nl/csc/programmeinformation/final%20project/

These procedures are considered part of this Regulation.

5. Course programme approval

Article 5.1 Approval procedures

The student must complete the following steps to obtain course programme approval:

1. Contacting the programme mentor and laying down the course programme.

Students may complete courses and sit interim examinations up to a maximum of 15 credits in a specialization before contacting the programme mentor (*). At this point, permission from the programme mentor is required for complete programme of 120 credits.

Criteria for approval of elective courses to be followed by the student are contained in the Rules and Regulations of the Examination Board. The programme is written down as an agreement on the content of the course programme, signed by both the student and the programme mentor. The programme mentor signs on behalf of the Examination Board.

**) It is strongly recommended for students to contact the programme mentor immediately at the start of the master's study.*

2. Alterations and renewed approval of entire course programme

The course programme laid down can be altered during executing the master's programme, by laying down revised course programmes. This can be done until research topics and final project are started by the student. At that time the programme mentor should have approved the 120-credit course programme in its entirety. At this point it is clear which chair/chairs will bear responsibility for the student's graduation supervision.

3. The completed and signed form listing the course programme must be included in the student's file at S&O (the Student & Education service centre). In principle, the student will earn the programme diploma if he/she completes the units of study listed in the course programme and earns results in line with the guidelines for passing the final assessment.
4. If the course programme listed on a signed form does not satisfy the regulations as described in these Regulations and/or does not satisfy the conditions imposed by the admissions board, the Examination Board is authorised to impose additional diploma eligibility requirements.
5. Requirements apply to each course programme to ensure basic knowledge in the field of study and the track selected. The admissions board may adjust these programme requirements on the basis of the student's prior education and training. Such an adjustment will never entail an intensification of the requirements, the programme will always have a study load of 120 credits. The Master's programme final assessment cannot be passed if the course programme does not satisfy the basic knowledge requirements.
6. The total number of credits completed **at** the UT or at another university or research institute approved by the programme mentor and study adviser, must be at least 90. The Examination Board may permit a student to deviate from this rule.

Forms to be found on: http://www.utwente.nl/csc/programmeinformation/rules_documents/

Article 5.2 Approval of Free programme choice

The Examination Board shall decide on reasoned requests from students for free programme choice as referred to in article 7.3c of the Act. Conditions related to this matter are to be specified in the Rules and Regulations of the Examination Board.

6. Final project

Article 6.1 Rules regarding the final project

1. In addition to the rules in article 3.3 of section A all students must carry out a Final Project under the graduation supervisor, a staff member from one of the responsible chairs of the specialization, with the following requirements:
 - a. Students complete the Final Project worth 30 credits.
 - b. The Final Project deals with carrying out a research project, delivering of a graduation report and a summary of the report, and finally an oral presentation in public. Generally the Research topics as described in article 4 immediately precede the graduation work, and serve as a preparation for the Final Project.
 - c. Students may start the Final Project with a maximum of 10 EC of unfinished courses, unless the graduation supervisor deems the content of the unfinished courses essential with regards to the chosen topic of the Final Project.
 - d. Faculty chairs take responsibility for supervision and assessment of the Final Project. Responsibility implies:
 - either the graduation committee contains a member of the chair
 - or the programme mentor has explicitly given permission for supervising the Final Project by a graduation committee containing no member of the chair.

The responsibilities are as follows:

- - Computer security: SCS
- - Data science and smart services: SCS or DB or FMT
- - Methods and tools for verification: FMT
- - Software technology: FMT
- - Wireless and sensor systems: PS, CAES or DACS
- - Internet science and technology: DACS

The Final Project is written down as an agreement (by filling in the form “description final project”), signed by both the student and the supervisor. The supervisor signs on behalf of the Examination Board.

Organizational procedures are found on:

<http://www.utwente.nl/csc/programmeinformation/final%20project/>

These procedures are considered part of this Regulation.

Forms to be found on:

http://www.utwente.nl/csc/programmeinformation/rules_documents/

These forms are considered part of this Regulation.

Article 6.2 Assessment and marking of the Final Project

1. The study load according to the Final Project plan may not exceed the nominal study load for the Final Project.

2. If student and supervisor agree on the necessity of an extension of the duration of the Final Project (e.g. because of illness or because of an unforeseen re-examination of a pending course) they may request the Programme Mentor (of the specialization in which the Final Project takes place) to give permission for such an extension. The Programme Mentor may give permission for an extension once, with a maximum duration of three months.
3. If an additional extension is needed, or if the desired extension period is longer than three months, or if the supervisor and the Programme Mentor are the same person, such a request has to be submitted to the Examination Board.
4. In case the final grade of the Final Project is insufficient the student has to carry out a new Final Project.
5. The Final Project with Honours is a 45 EC Honours variant of the 30 EC Final Project. Students always start with a Final Project. If during the execution of the Final Project both supervisors and student have the expectation that investing three more months might lead to a high quality of the results of the project (as might be witnessed by a publication), they may agree in transforming the project into a Final Project with Honours (this has to be decided at least four weeks before the end date of the Final Project). The extra 15 EC for this Honours variant will come on top of the (at least) 120 EC of the students course programme.
6. A Final Project with Honours has to be graded with at least an 8; grading it with a 7 or less means that it will have to be transformed into a “normal” 30 EC Final Project.

7. Degree

Students who have successfully completed their Master's final examination are awarded a Master of Science degree. The degree awarded is stated on the diploma.

8. Transitional and final provisions

Article 7.1 Transitional provisions

The transitional arrangements can be found in appendix B.

Article 7.2 Publication

1. The dean will ensure the appropriate publication of these Regulations and any amendments to them.
2. The Teaching and Examination Regulations will be posted on the faculty website.

Article 7.3 Effective date

These Regulations enter into force with effect from 1 September 2016

A. ADMISSIONS APPENDIX TO THE TEACHING AND EXAMINATION REGULATIONS OF THE MASTER'S PROGRAMMES COMPUTER SCIENCE AND INTERNET SCIENCE AND TECHNOLOGY

Enrolment as a student is required to sit interim examinations and to be eligible to earn the Master's diploma. In order to be enrolled, students must demonstrate that they have been admitted to one of the Master's programmes.

Article A.1 Admission to the programme

1. The admissions appendix forms an integral part of these regulations. The regulations in this appendix are part of the teaching and examination regulations of the Master's programmes Computer Science and Internet Science and Technology of the Faculty of Electrical Engineering, Mathematics and Computer Science of the University of Twente and are an addition to regulations stated in section A.
2. Admission to the programme can be granted only to students who meet the requirements regarding the level of their previously earned diploma's, in accordance with the provisions of Art.7.30b of the Act.
3. Students in possession of a diploma which shows that they have passed the final examination for the Technische Informatica (TU/e, TUD, UT), Telematica (UT), Bedrijfsinformatietechnologie (UT) or Informatica (RUG, UU, UvA, VU, UL, RU, OU) Bachelor's programme will be eligible for admission to the programmes.
In addition, students in possession of a diploma which shows that they have passed the final examination for the Electrical Engineering (*Elektrotechniek*) (TU/e, TUD, UT) Bachelor's programme are eligible for admission to the Internet Science and Technology programme.
4. Students who are not in possession of the diploma mentioned in paragraph 2 and 3 will require a certificate of admission issued by the Admissions Board. The Admissions Board is appointed by the Dean with the power to act in matters of admission to the programme. Admission involves an assessment of the student's eligibility for the Master's programme of his/her choice. If the admissions board positively assesses an application for admission, it issues a certificate of admission. Students with a certificate of admission are eligible for enrolment by the Central Student Administration. Enrolment will only take place if the other admission requirements maintained by the UT have also been satisfied.
5. Notwithstanding the provisions of paragraph 2, 3, and 4, the Dean may under special circumstances admit a student to one or more interim examinations and/or practicals of the programme before the student has passed the Bachelor's examination. A limited period of validity may be set for such permission.
6. Admission of foreign students. In addition to the requirements in article 2.6 and 2.8 of section A, the following criteria apply:
 - a. The level of education in the country in which the student has completed his/her pre-university education: this must be more or less comparable with that in the Netherlands.
 - b. Level of knowledge: the student must have accumulated sufficient knowledge on the basis of the courses he/she has studied abroad to be at a level comparable to that of Dutch students who are admitted to the Master's programme.

Article A.2 Admission to the programme pursuant to a regulation

The Dean has adopted the following provisions for certain students to be eligible for admission (next to the ones mentioned in article A.1).

In addition to these provisions from the Teaching and Examination Regulation:

1. Applicants who satisfy the following three requirements are eligible for admission to the CSc Master's programme.
 - a. The applicant is holder of a diploma from Saxion Hogeschool Enschede or Hogeschool Windesheim Zwolle) demonstrating that he or she has satisfied the requirements of the final assessment of the Computer Science (Informatica) Bachelor's programme or the Technical Computer Science (Technische informatica) Bachelor's programme
 - b. The applicant has successfully completed the DOORSTROOMMINOR as part of his or her bachelor's course programme
 - c. The applicant, according to UT records, has sat the interim examination of either the course 201500283/192140250 ADC plus or the course 192140200 ADC while completing the Advanced Algorithms elective module and received a mark of 6, 7, 8, 9 or 10 or, if no mark is awarded, 'pass' ('G' in Dutch)
2. Applicants who satisfy the following requirements are eligible for admission to the CSc Master's programme.
 - a. The applicant is holder of a diploma from the University of Twente demonstrating that he or she has satisfied the requirements of the final assessment of the Advanced Technology Bachelor's programme or the Creative Technology Bachelor's Programme.
 - b. The applicant has successfully completed two out of the following courses as part of his or her bachelor's course programme:
 - 201400210 Computer Systems
 - 201300071 or 201500111 Software Systems, the 12 EC core part
 - 201400431 Network Systems (EE)
 - 201400433 Discrete Structures & Efficient Algorithms
3. Applicants who satisfy the following requirements are eligible for admission to the IST Master's programme:
 - a. The applicant is holder of a diploma from the University of Twente demonstrating that he or she has satisfied the requirements of the final assessment of the Advanced Technology Bachelor's programme or the Creative Technology Bachelor's Programme.
 - b. The applicant has successfully completed two out of the following courses as part of his or her bachelor's course programme:
 - 201400210 Computer Systems
 - 201300071 or 201500111 Software Systems, the 12 EC core part
 - 201400431 Network Systems (EE)
 - 201400433 Discrete Structures & Efficient Algorithms
4. Applicants who satisfy the following requirements are eligible for admission to the Wireless and Sensor Systems specialization of the CSc Master's programme.
 - a. The applicant is holder of a diploma from the University of Twente demonstrating that he or she has satisfied the requirements of the final assessment of the Creative Technology Bachelor's programme.
 - b. The applicant has successfully completed the following courses as part of his or her bachelor's course programme:
 - 201400210 Module Computer Systems: Computer Architecture and Organisation 3 EC
 - 201400210 Module Computer Systems: Operating Systems 4 EC
 - 201400210 Module Computer Systems: Project 3 EC

- Elective 5 EC

Article A.3 Admission to the Master's programmes after individual assessment

In all other instances than those mentioned in Art. A.1 and A.2., the admissions board conducts a detailed assessment of the applicant's eligibility for admission. This assessment takes the following factors into account:

1. the highest diploma earned by the applicant: This must be at least a Bachelor's diploma from a recognized higher education institution. If such a diploma cannot be produced, the admissions board will ask for a statement attesting to the equivalency of the applicant's qualifications with the Bachelor's diploma required. The body issuing this statement must be authorized to do so.
2. the nature of the degree course and the content of the course programme completed by the applicant, the speed with which the course programme was completed and the marks earned: The nature of the degree course, content of the course programme and marks earned for the individual units of study must clearly demonstrate that the applicant has the fundamental academic skills and appropriate basic knowledge for the Master's programme or is able to compensate for any gaps in basic knowledge.
3. the student's motivation for applying for admission
4. the applicant's command of English: This only applies to international students. The threshold values for sufficient command of English are in article 2.8 of section A.

Article A.4 Variations in admission decisions

1. Issuing an unconditional certificate of admission

The admissions board may decide to admit applicants to the Master's programme after assessing their file. These applicants will be issued a (unconditional) certificate of admission.

2. Issuing a conditional certificate of admission

The admissions board may not reach a final decision about admission, because it finds insufficient or formally incorrect evidence of the applicant's status in the application file. In such a case the board can decide to admit the applicant conditionally. The student can enroll at the UT on the condition he or she submits the evidence lacking in the original application file to the satisfaction of the admissions board. (A typical case of conditional admission is when the applicant's file shows no formal proof of sufficient proficiency in English.)

3. Issuing a certificate of pre-Master admission

In some cases, the admissions board will issue applicants a certificate of pre-Master admission. While these individuals may enrol at the UT, they are not entitled to sit interim examinations or to have the final assessment conducted.

Pre-Master admission is associated with a pre-Master's programme, i.e. a list of units of study, the attainment targets and learning objectives of which are at the undergraduate level. Selecting this list of units is done as follows:

- checking the previous (BSc) programme on the presence of courses in programming, software engineering, computer architecture/organization, operating systems, information systems, databases and mathematics
- The pre-master's programme is defined containing courses on the aspects mentioned in previous item above that are lacking in the BSc programme with taking into account the specialization the student wants to choose in the master's programme.

Students in this category must first successfully complete this pre-Master's programme to be fully admitted to the Master's programme and become fully enrolled students with all the associated rights. Certificates of pre-Master admission are valid for a limited term (generally one year). Students who are not fully admitted during this term must re-apply for admission.

4. Issuing a certificate of admission with additional requirements

The admissions board may attach additional requirements to a certificate of admission (also to conditional and pre-Master admissions). These additional requirements do not impact the right to enroll, sit interim examinations or have the final assessment conducted. They do, however, impact the regulations governing successful conclusion of the Master's programme final assessment.

With this admission decision, the admissions board establishes additional requirements for the course programme to satisfy in order to successfully pass the Master's programme final assessment. Naturally, the additional requirements will be limited to the extent that the student will still be able to complete the programme with a study load of 120 credits. The additional requirements placed on the course programme are referred to as "homologation".

5. Issuing a certificate of admission with a requirements waiver

Article 4.7 of section A of the Teaching and Examination Regulation stipulates that the Examination Board may not honour requests for exemptions based on results earned as part of a Bachelor's programme. However, the Examination Board may waive a requirement placed on the course programme in recognition of the results earned as part of a Bachelor's programme and, consequently, permit the student to successfully pass the Master's programme final assessment with a course programme that does not satisfy all the formal requirements. Students who wish to have a waiver for requirements placed on the course programme based on their undergraduate education should submit a request to the admissions board. The admissions board will render a decision on the request on behalf of the Examination Board. If granted, it will issue a certificate of admission with a waiver for requirements, thereby granting the student the right to have the Master's programme final assessment conducted without meeting all the formal requirements. Such a waiver will never affect the Master's programme study load. A study load requirement of less than 120 credits is not permitted

B. TRANSITIONAL ARRANGEMENTS APPENDIX TO THE TEACHING AND EXAMINATION REGULATIONS OF THE MASTER'S PROGRAMMES COMPUTER SCIENCE AND INTERNET SCIENCE AND TECHNOLOGY

1. The transitional arrangements appendix forms an integral part of these regulations.

The regulations in this appendix are part of the teaching and examination regulations of the Master's programmes Computer Science and Internet Science and Technology of the Faculty of Electrical Engineering, Mathematics and Computer Science of the University of Twente.

2. Regulation 2016-2017 regarding approved course programmes

In general students who have their course programme approved are allowed to take the degree based on that approved programme unless this contradicts with another regulation or is no longer possible.

3. Regulation 2016-2017 regarding the course 192320850 Advanced Requirements Engineering

The course 192320850 Advanced Requirements Engineering will not be offered in 2016-2017. Students who have their course programme approved containing the course 192320850 Advanced Requirements Engineering will have to replace this course by 201400171 Capita Selecta Software Technology.

4. Regulation 2016-2017 regarding the course 192330301 Specification of Information Systems

This course will not be offered in 2016-2017. Students MTV who have their course programme approved containing this course will have to replace this course with 201600040 Requirements Engineering Processes and Methods, students from other specializations will have to replace this course in consultancy with the programme mentor.

5. Regulation 2016-2017 regarding the validity period of results

Occasion: Introduction of a validity period for interim examination results

Term of validity: unlimited, starting September 1, 2017

For all results obtained before 1 September 2016, the validity period will be six years starting 1 September 2016

6. Regulation 2015-2016 regarding Information and Software Engineering specialization

Occasion: This regulation is necessary because the specialization Software Engineering is discontinued starting from September 1, 2015.

Term of validity: until September 1, 2019.

Contents of the regulation Students who have their course programme approved before September 2015 can still finish this specialization.

7. Regulation 2015-2016 regarding Computer Security specialization

Occasion: This regulation is necessary because the specialization Computer Security is discontinued starting from September 1, 2015.

Term of validity: until September 1, 2019.

Contents of the regulation Students who have their course programme approved before September 2015 can still finish this specialization.

8. Regulation 2013-2014 regarding Software Engineering specialization

Occasion: This regulation is necessary because the specialization Software Engineering is discontinued starting from September 1, 2013.

Term of validity: until September 1, 2017.

Contents of the regulation Students who have their course programme approved before September 2013 can still finish this specialization.

9. *Regulation 2010-2011 regarding Embedded Computing Systems specialization*

Occasion: This regulation is necessary because the specialization Embedded Computing Systems is discontinued starting from September 1, 2010.

Term of validity: until September 1, 2014.

Contents of the regulation Students who have their course programme approved before September 2010 can still finish this specialization.

10. *Regulation 2011-2012 regarding DESC*

The requirements w.r.t. the programme of the specialization DESC are changed per 1 September 2012. Students who have their course programme approved before 1 September 2012 can take the degree based on that approved programme.

11. *Regulation 2013-2014 regarding the course 192111700 Computability and Computational Complexity*

The course 192111700 Computability and Computational Complexity will not be offered in 2013-2014. Students who have their course programme approved containing the course 192111700 Computability and Computational Complexity will have to replace this course by 201300042 Limits to Computing.

12. *Regulation 2013-2014 regarding the course 192110860 XML & Databases 2*

The course 192110860 XML & Databases 2 will not be offered in 2013-2014. Students who have their course programme approved containing the course 192110860 XML & Databases 2 will have to replace this course by 201300074 Research Experiments with Data and Information retrieval.

13. *Regulation 2014-2015 regarding the course 192110961 XML & Databases 1*

The course 192110961 XML & Databases 1 will not be offered in 2014-2015. Students who have their course programme approved containing the course 192110961 XML & Databases 1 will have to replace this course in consultancy with the programme mentor.

14. *Regulation 2014-2015 regarding the course 192320201 Data Warehousing and Data Mining.*

This course will not be offered in 2014-2015. Students who have their course programme approved containing this course will have to replace this course in consultancy with the programme mentor.

15. *Regulation 2014-2015 regarding the course 191211710 Core Networks.*

This course will not be offered in 2014-2015. Students who have their course programme approved containing this course will have to replace this course in consultancy with the programme mentor.

16. *Regulation 2014-2015 regarding the course 192620250 Selected topics P-2-P networks.*

This course will not be offered in 2014-2015. Students who have their course programme approved containing this course will have to replace this course in consultancy with the programme mentor.

17. *Regulation 2014-2015 regarding the course 192140700 Meten is weten.*

This course will not be offered in 2014-2015. Students who have their course programme approved containing this course will have to replace this course in consultancy with the programme mentor.

18. Regulation 2013-2014 regarding programme changes

Occasion: This regulation is necessary because of several small changes (shifting of courses, changes in EC) in some specialization programmes.

Term of validity: until September 1, 2016.

Contents of the regulation: Students who have their course programme approved before 1 September 2013 and whose course programme is affected by changes should contact their programme mentor for an appropriate solution.

19. *Finally*, the Dean draws up regulations (transitional arrangements) governing the admission of students to one of the Master's programmes who, prior to 1 September 2003, were enrolled in the single cycle *ingenieur* programme on which the Master's programme is based. These transitional arrangements are outlined in the course guide for single cycle academic programmes. (A single cycle *ingenieur* programme is a four or five year course in engineering, with a diploma at Master's level, in which a Bachelor's programme is included, but without a separate Bachelor's diploma.)

C. GRADUATE RESEARCH PROGRAMME APPENDIX TO THE TEACHING AND EXAMINATION REGULATIONS OF THE MASTER'S PROGRAMMES COMPUTER SCIENCE AND INTERNET SCIENCE AND TECHNOLOGY

Article C.1 graduate research programmes

The graduate research programme appendix forms an integral part of these regulations. The regulations in this appendix are part of the teaching and examination regulations of the Master's programmes Computer Science and Internet Science and Technology of the Faculty of Electrical Engineering, Mathematics and Computer Science of the University of Twente.

Article C.2 graduate research programmes intermediate leading to the diploma

The following course programmes embedded a graduate research programmes are leading to the diploma:

1. Graduate School Programme Dependable and Secure Computing

Basic courses:

- 192130092 - Faulttolerant Digital Systems
- 192140122 - System Validation
- 192194200 - Verification of Security Protocols (TU/e, 6EC)
- 192111332 - Design of Software Architectures
- 191210341 - Physical Systems Modelling of Embedded Systems

Advanced courses depending on choice of specialization:

Track Dependability Modeling and Evaluation (DME):

- 192135310 - Modeling and Analysis of Concurrent Systems 1
- 192135320 - Modeling and Analysis of Concurrent Systems 2
- 192135450 - Advanced Design of Software Architectures Model Driven Engineering
- 201200006 - Quantitative Evaluation of Embedded Systems

or

Track Secure Networks (SN):

- 192654000 - Network Security
- 192110940 - Secure Data Management
- 192620010 - Mobile and Wireless Networking 1
- 201100022 - Cyber-crime Science

or

Track Dependable Software Synthesis (DSS):

- 201400170 - Best Practices in Software Development
- 192111233 - Aspect Oriented Programming
- 192170015 - Testing Techniques
- 192135450 - Advanced Design of Software Architectures Model Driven Engineering
- 192114300 - Program Verification
- 192135310 - Modeling and Analysis of Concurrent Systems 1

Elective courses:

These consist of:

- courses in the other tracks of “Dependable and Secure Computing”
- courses from the following list
- other courses in consultation with the programme mentor

Listed courses:

- 192111092 - Advanced Logic (FMT)
- 201300042 - Limits to Computing (HMI)
- 192130112 - Distributed systems (PS)
- 191520751 - Graph Theory (DMMP)
- 192653100 - Internet Management and Measurement (DACS)
- 201500040 - Introduction to Biometrics (SAS)
- 201400176 - Dependable Networking
- 192620020 - Mobile and Wireless Networking 2 (DACS)
- 191211090 - Real-Time Software Development (EL)
- 191211080 - Systems Engineering (EL)

Mandatory (50 EC):

- 191612680 Computer Ethics
- 201100203 International Research Orientation/Internship (15 EC)
- 192199978 Master Thesis (including Research Proposal) (30 EC)

2. Graduate School Programme Service Sciences

Basic courses:

- 192320111 - Architecture of Information Systems
- 192320501 - Electronic Commerce
- 192111332 - Design of Software Architecture
- 192652150 - Service-Oriented Architecture with Web Services

Advanced courses:

Either four courses in Track A: Services technologies:

- 201600040 - Requirements Engineering Processes and Methods
- 192135450 - Advanced Design of Software Architectures - Model Driven Engineering
- 201400174 - Data Science
- 201200044 - Managing Big Data

Or four courses in Track B: Services in business:

- 192376500 - Business Process Integration Lab
- 201100051 - Information Services
- 194108040 - Business Development in Networks
- 192320820 - Design Science Methodology

Elective courses:

- a. Compulsory courses from the other tracks.
- b. Courses from the following list:

- 192320220 - Advanced Architecture of Information Systems

201500527		Capita Selecta Data Science and Smart Services	
201400171	-	Capita Selecta Software Technology192376000	- Business Case
Development for IT-projects			
192340070	-	Computer Supported Cooperative Work	
192350200	-	E-Strategizing	
192360021	-	ICT Management	
192340101	-	Implementation of IT in Organizations	
194105070	-	Information Systems for the Financial Services Industry	
193190000	-	Managing Service Organizations	
192631000	-	Mobile E-health Applications and Services	
201100022	-	Cyber-crime Science	
195810200	-	Supply Chain Management & ICT	
192140122	-	System Validation	
191506103		Statistics and Probability	
191820210		Simulation	
191863960		Foundations of Information Systems	
201400277		Enterprise Architecture	
201600070		Introduction to Machine Learning	
191800770		Empirical Research & Data Analysis	
192110940		Secure Data Management	

Mandatory (55 EC):

191612680	-	Computer Ethics (5 EC)
201100203	-	Research Orientation (15 EC)
192199978	-	Master thesis (including research proposal) (30 EC)
X	-	Individual specialization assignment for Track A or B (5 EC)

3. Graduate School Programme Wireless and Sensor Systems

Homologation courses for bachelor TI (5 EC):

191210001	-	Instrumentation for Embedded Systems (5 EC)
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Homologation courses for bachelor EE (5 EC):

201400210	-	Module Computer Systems: Operating Systems (4 EC)
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Homologation courses for bachelor CT (5 EC):

201400210	-	Module Computer Systems: Operating Systems (4 EC)
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And at least three of the following Basic courses:

192620010	-	Mobile and Wireless Networking I (5 EC)
201000075	-	Wireless Sensor Networks (5 EC)
191211590	-	System-on-Chip for ES (5 EC)
192111301	-	Ubiquitous Computing (5 EC)

Advanced courses:

192130112	-	Distributed Systems (5 EC)
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191211030	-	Mobile Radio Communications (5 EC)
192620300	-	Performance Evaluation (5 EC)
192620020	-	Mobile and Wireless Networking II (5 EC)
201300116	-	Embedded Signal Processing (7 EC)
191211650	-	MDDP (10 EC)

and:

Other courses to obtain the minimally required number of 120 credits may be chosen from the courses offered by other specializations in master programmes of Computer Science, Electrical Engineering, Telematics and Embedded Systems.

Mandatory (65 EC):

191211749	-	Individual Project (10 EC)
191612680	-	Computer Ethics (5 EC)
191211208	-	International research orientation or internship (20 EC), not for HBO students
192199978	-	Final Project (30 EC)

4. Graduate School Programme Human-centered interaction technologies, based on: 2. MSc Computer Science Specialization Information and Software Engineering

A special way to fulfill the requirements of HCID specialization is by successfully completing the course programme on HCID in the EITICT Masterschool, being a double degree programme where one year is done at University Twente. Details on the programme are found on:

eitictlabs.masterschool.eu/programme/majors/hcid/.