TEACHING AND EXAMINATION REGULATIONS

MASTER OF SCIENCE COMPUTER SCIENCE

MASTER OF SCIENCE INTERNET SCIENCE AND TECHNOLOGY

A. FACULTY SECTION
B. PROGRAMME-SPECIFIC SECTION

2019-2020 academic year

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

General

The Dutch Higher Education and Research Act (*Wet op het hoger onderwijs en wetenschappelijk onderzoek*, WHW) of 1993 requires a broad outline of the teaching programme and examining for each degree programme to be recorded in the Teaching and Examination Regulations (TER (Dutch: OER)).

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

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

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SECTION A: FACULTY SECTION

A1. General provisions

Article A1.1 Applicability of the Regulations

1. These Regulations apply to teaching and examinations for the following Master's degree programmes: Applied Mathematics, Business Information Technology, Computer Science, Electrical Engineering, Embedded Systems, Interaction Technology, Internet Science and Technology, Systems & Control (hereinafter referred to as: the Master's programmes) 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 (Section A) and a programme-specific Section (Section B). Section A contains general provisions that apply to teaching and examinations for all the Master's programmes at EEMCS. Section B contains programme-specific provisions. Together, Sections A and B form the Teaching and Examination Regulations for the relevant programme.
3. The Regulations also apply *mutatis mutandis* to the joint Master's degree programmes and study units provided by the faculty, pursuant to Section 7.3c of the WHW.
4. These Regulations apply to anyone enrolled in the Master's programmes, irrespective of the academic year in which the student first enrolled in the programme.
5. Section B of these Teaching and Examination Regulations may include additional general provisions for the relevant programme.
6. The general provisions and the programme-specific provisions to the Teaching and Examination Regulations have been authorized by the Dean.
7. The Examination Board sets down rules with regard to the execution of its tasks and powers in accordance with Section 7.12b of the WHW. These regulations are specified in the Rules and Guidelines of the Examination Board.

Article A1.2 Definitions

The following definitions are used in these Regulations:

a. **Academic year:** the period beginning on 1 September and ending on 31 August of the following calendar year;
b. **Admissions Board:** the committee that assesses, on behalf of the Dean, whether a candidate meets the requirements for admission to the Master's programme of his/her choice. If no Admissions Board has been appointed for the programme, the Programme Board will function as the Admissions Board;
c. **Bridging programme or pre-Master's programme**: a programme that can be offered to students who cannot yet be admitted to the Master's programme due to insufficient knowledge, understanding or skills, in accordance with Article 7.30 of the WHW;
d. **Course catalogue:** the guide for the Master's programme concerned that provides further details of courses and other information specific to the programme. The course catalogue is available digitally at www.utwente.nl/coursecatalogue;
e. **Course:** a study unit of the programme, as defined by the WHW;

f. **Dean:** head of the faculty;

g. **Disability**: any condition which is (at least for the period in question) chronic or long-term in nature and which constitutes an on-going disadvantage for the affected student when receiving education, taking examinations or taking part in practical exercises;

h. **Double degree:** two degrees awarded by two institutions of higher education that offer a joint study programme; the joint programme covers the programme intended learning outcomes of both programmes;

i. **EC**: European Credit**.** A unit involving 28 hours of study, as used in relation to the European Credit Transfer System (ECTS), whereby a full academic year consists of 60 ECs or 1,680 hours (Article 7.4 WHW);

j. **Examination programme**: all study units of a study programme counting towards the degree;

k. **Examination Board:**. The Examination Board is the body that establishes, in an objective and expert manner, whether a student meets the criteria set out in the Teaching and Examination Regulations regarding the knowledge, insight and skills required in order to obtain a degree from the programme concerned;

l. **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 to determine their results;

m. **Executive Board:** Executive Board of the University of Twente;

n. **Final degree audit:** a Master's degree programme concludes with a final degree audit. A final degree audit is deemed to have been completed successfully if the study units associated with the relevant programme have been achieved. The final degree audit may also include an additional assessment by the Examination Board;

o. **Fraud and plagiarism:** fraud is an act or omission by a student designed to partly or wholly hinder the accurate assessment of his/her own knowledge, understanding and skills, or those of another person. Fraud includes plagiarism, which is the use of someone else's work without including a correct reference to the source. See the Student Charter of the UT for further details.

p. **Homologation:** a programme that can be offered to students who can be admitted to the Master's programme but who nevertheless have insufficient knowledge, understanding or skills, according to Article 7.30 of the WHW;

q. **Examination, also exam:** an assessment of the student's knowledge, understanding and skills relating to a course. The assessment is expressed in terms of a final grade. An examination may consist of one or more tests (*in Dutch: toetsen*);

r. **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;

s. **Learning Management System (LMS)** e.g. Canvas;

t. **Master's programme or programme:** the Master's degree programme, as referenced in Article 7.3a Paragraph 1 subparagraph b of the Act: the entirety of the course components, teaching activities/methods, contact hours, testing and examination methods and recommended literature;

u. **Master's thesis project / final project:** a study unit comprising literature research and a contribution to scientific research, which always results in a written report;

v. **Practical exercise:** 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.

w. **Premaster:** the combination of courses to be followed by a student in order to be eligible for enrolment in a Master's programme.

x. **Programme Board:** the committee charged by the Dean with managing the programme;

y. **Programme Committee:** the Programme Committee as referred to in Article 10.3c WHW;

z. **Quarter or quartile:** a part of a semester as specified in the academic calendar (*jaarcirkel*) of the university;

aa. **Semester:** half an academic year, as specified in the academic calendar (jaarcirkel) of the university

bb. **Student Information System (SIS)**: the system used by the institutional administration to register and record information relating to particular students and study data, as stipulated in the WHW, in this case Osiris;

cc. **Student:** any person enrolled for a programme in accordance with Articles 7.34 and 7.37 of the WHW;

dd. **Student's chair: Research chair of the student's supervisor for the final project**

ee. **Study Adviser:** staff member appointed by the Dean of the Faculty to act as an intermediary between the student and the programme and, in this capacity, to represent the interests of the students and provide advice to the students;

ff. **Study load:** the study load associated with a study unit to which an examination applies, expressed in terms of ECs (the study load for one academic year (1,680 hours) totals 60 ECs);

gg. **Study Programme:** all study units followed by the student as part of his/her Master's programme;

hh. **Test:** part of an examination (*toets*);

ii. **University:** the University of Twente (UT);

jj. **WHW:** the Dutch Higher Education and Research Act (*Wet op het hoger onderwijs en wetenschappelijk onderzoek*).

Any other terms used can be assumed to follow the definitions ascribed to them by the WHW.

A2. Previous education and admission

Article A2.1 Previous education

1. In order to qualify for enrolment in a Master's programme, either a Bachelor's degree obtained through academic higher education (WO) is required, or a Bachelor's degree from a university of applied sciences (HBO) in addition to the successful completion of an appropriate pre-Master's programme. The requirements that the Bachelor's degree must meet are specified in Section B.

2. In the event that a candidate does not have a Bachelor's degree as referred to in Paragraph 1, the Admissions Board of the Master's programme will assess the candidate's suitability for admission to the programme on the basis of the requirements stipulated in Section B.

3. The Admissions Board can admit students who lack some prior knowledge, provided they judge that this will not reduce the student's likelihood of successfully completing the programme.

4. The Bachelor's degrees that entitle students to automatic admission are listed in Section B.

5. Additional admission requirements are stipulated in Section B.

Article A2.2 Language requirements
1. To be admitted to the programme, students must be proficient in English.
2. Proof of proficiency in English is required by the successful completion of one of the following examinations or an equivalent:
   a. IELTS overall band score of at least 6.5 no older than two years
   b. TOEFL internet based test of at least 90 no older than two years
   c. Cambridge CAE or CPE (both with an A, B, or C grade)
3. The following students are exempt from the requirement to prove their proficiency in English; students who:
   a. have obtained a relevant Bachelor's degree from an accredited academic institution in the Netherlands;
   b. 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) .

Article A2.3 Application and enrolment
1. The deadline for application for admission to the Master's programme is stipulated on the website www.utwente.nl/master. Different application deadlines apply to different types of applicants.
2. After admission, the student must enrol before 1 September or 1 February thereafter.

Article A2.4 Admissions Board
Each programme has an Admissions Board, which is appointed by the Dean. The Dean will appoint this board after consulting with the Programme Directors and Examination Boards of the relevant Master's programmes.

Article A2.5 Admissions procedure
1. The Admissions Board is responsible for the admissions to the programme in relation to any students that cannot be admitted directly (see Paragraph A2.1.4).
2. With a view to admission to the programme, the Admissions Board assesses the candidate's knowledge, understanding and skills, including relevant language skills. The Board may request experts from inside or outside the University to test certain types of knowledge, understanding and skills, in order to supplement written evidence from the degree programmes the student has already completed.
3. In addition to the requirements , the Board will also assess requests for admission on the basis of the following documents:
   a. motivation letter;
   b. English proficiency scores according to Art. A2.2;
   c. Diploma;
   d. transcript of records;
   e. curriculum vitae;
   f. abstract of thesis;

    g.   course descriptions for programme-specific courses, research methodology courses, mathematics courses and a table of content for the course materials.

4. The Admissions Board may decide that particular units must be included in the student's study programme to compensate for lack of knowledge on the part of the student (homologation courses).
5. Candidates will receive either confirmation of their 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 Complaints Desk (*UT Klachtenloket)* within six weeks.

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

1. Based on the provisions of Section 7.42a of the WHW, the Dean or the Examination Board may, in exceptional cases, ask the Executive Board to terminate or refuse a prospective student's enrolment in a programme, if that student's actions or words show that he/she is unsuitable either for practising one or more of the professions for which the programme in question would prepare him/her or for practical preparations for professional practice.
2. If it is believed that a prospective student is unsuitable for the programme, as described in Paragraph 1, the Examination Board or the Dean will initiate an inquiry, and the student will be informed of this promptly. The Examination Board or the Dean will not issue any recommendation without carefully considering the interests involved and giving the prospective student the opportunity to be heard.

Article A2.7 Pre-Master's programme

1. The Admissions Board may decide to admit a candidate to the Master's programme on the condition that a pre-Master's programme is completed successfully before his/her admission.
2. A pre-Master's programme is a bridging programme with a study load of 15 or 30 ECs, to be decided by the Admissions Board.
3. The pre-Master's programme is assembled by the Programme Director together with the Admissions Board. A fixed programme may be defined for specific groups of students. However, a student may also be given a personalized programme.
4. Proof of the successful completion of the pre-Master's programme, together with the related Bachelor's degree, will serve as proof of admission to the relevant Master's programme, in the same and in the subsequent academic year.
5. Candidates are required to complete the pre-Master's programme within one academic year unless otherwise specified. There are two opportunities to take the examination for each part of the programme.
6. Students from Dutch Universities of Applied Sciences may be allowed to follow a pre-Master's programme during their Bachelor's programme. Paragraph 5 applies to these students. In this case, the relevant Bachelor's degree, together with the successfully completed pre-Master's programme, will serve as proof of admission to the relevant Master's programme.

A3. Programme content, structure and rules

Article A3.1 Aim of the programme

The aims and programme intended learning outcomes of the Master's programme (Article 7.13 Paragraph 2 (a) of the Higher Education and Research Act) are described in the Section B.

Article A3.2 Programme structure
1. The programme comprises the study units listed in Section B.
2. The scope of the Master's programme in ECs is 120. These 120 credits must not include any credits which have constituted part of a previously completed Bachelor's degree audit.
3. If students are required to sign up to participate in a particular study unit, this is only possible during the periods designated for that purpose.
4. Every Master's programme has a duration of two years, with each year divided into two semesters.
5. Every semester consists of two periods of ten weeks of education.
6. Master's programmes are taught on a full-time basis.

Article A3.3 Language of Instruction
1. The language of instruction for all Master's programmes is English.

Article A3.4 Exemptions
1. Upon receiving a written request from a student, the Examination Board may exempt the student from taking one or more examination components, if the student:
   a. has successfully completed a course component as part of a previous university or higher professional education programme that is equivalent in terms of 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.
2. Students may be exempted from the requirement to participate in practical exercises if they can demonstrate that they have reason to believe that doing so will give rise to a moral dilemma. In such cases, the Examination Board will decide whether the component can be carried out in another manner to be determined by the Board.
3. Exemptions may be granted to a maximum of 30 EC. The Examination Board may in extraordinary circumstances decide to grant exemptions in excess of 30 EC.
4. If an exemption is granted, the examination board can decide that the course in question must be substituted by another course so that the total number of credits achieved in the programme remains at least 120 ECs..

Article A3.5 Flexible degree programmes
1. The Examination Board for the Master's 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 relation to the programme intended learning outcomes.
2. The content of the flexible degree programme is determined and motivated by the student and must be equivalent to a regular Master's programme in terms of scope, breadth and depth.
3. The following requirements must be met in order to be eligible for the Master's degree:
   a. the deviation from the regular Master's programme should be at least 30 ECs while still ensuring coherence in terms of content;

      b.   the level of the programme must match the objectives and programme intended learning outcomes that apply to the programme for which the student is enrolled.

Article A3.6 Combined programmes

A student can obtain diplomas for two UT Master's programmes on the basis of a combined study programme that satisfies the requirements of each individual programme, including the programme intended learning outcomes.

The following requirements apply to the composition of combined programmes:

1. The student's programme of courses represents an amalgamation of two separate study programmes and satisfies the requirements relating to the programme intended learning outcomes of both corresponding Master's programmes. Depending on the requirements of the two Master's programmes, there are three possibilities:
   a. A **combined final project** and **combined internship**, whereby both study programmes also incorporate a **maximum of 20 ECs from common courses**.
   b. A **combined final project,** but with a **separate internship or no internship**, whereby both study programmes also incorporate a **maximum of 30 ECs from common courses**.
   c. **Two separate final projects**, with a **separate internship or no internship**, whereby both study programmes incorporate a **maximum of 30 ECs from common courses**.
2. The combined programme as described in paragraph 1 includes not only study units that are part of both Master's programmes, but also courses for which an exemption has been granted for one Master's programme on the basis of results achieved as part of the other programme.
3. If a single combined final project is included in and is relevant to both Master's programmes, as referred to in 1a and 1b, the study load of the final project should be at least 100% of the requirement in ECs for the final project of the programme that has the highest number of ECs plus at least 50% of the requirement in ECs for the final project of the other programme.
4. If a single combined internship is included that satisfies the requirements of both programmes as referred to in 1a, the study load of the internship should equal the load of the internship with the highest number of ECs.
5. Approval for the combined study programme is required from the Examination Boards of both Master's programmes.

Passing the final degree audit for a combined programme

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

Article A3.7 Master's final Project

1. Requirements for starting the final project:
   a. Students must have no more than 10 ECs still to complete, other than the final project;
   b. As an exception to the rule above, if the programme allows for a combined final project and internship, 10 ECs in unfinished courses other than the internship and final project are allowed.

2. The student and examiner(s) must agree on the start date and completion date for the Master's final project.
3. This agreement is to be documented in a plan that takes into account the nominal length of the final project, a reasonable holiday period and any uncompleted study units.
4. The timetable for completion must be approved by the supervisor and signed by the student.
5. The Final project is concluded with an oral presentation in public at the University of Twente, unless the project is carried out at another university as part of the exit year of a double degree programme.
6. Programme-specific regulations regarding the final project are stipulated in Section B.

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

1. The assessment committee is formed by a minimum of two examiners. The committee is chaired by an associate or full professor from the student's chair. The daily supervisor is a member of the assessment committee. One of the two examiners is a member of another chair. The examiners hold the PhD degree and have completed UTQ or equivalent. The committee may also have an advisory member, for instance a company supervisor.
2. In the event that the assessment committee cannot meet the above specifications, a motivated request to the Examination Board to assign a chairman who is not a full or associate professor but is sufficiently experienced may be made by the Programme Board. The approval for the particular assignment remains valid during the academic year in which the request was granted.

Article A3.9 Internship

1. The internship is a period of study-related professional practice amounting to 20 ECs and is carried out by the student at a company, university or organization outside the University of Twente.
2. Requirements for starting the internship:
    a. students must already have obtained at least 45 ECs of their examination programme;
    b. additional requirements may apply for each programme, which will be stipulated in Section B where applicable.
3. A description of the internship must be drawn up and approved by a member of UT staff appointed as examiner. This approval must be obtained before commencing the internship.
4. The student must register with the EEMCS Internship Office at least three months before starting his/her internship.
5. The daily supervisor for the internship is the company supervisor: a member of the organization where the internship is carried out. He/she must be named in the project description, mentioned in Paragraph 3.
6. The UT supervisor mentioned in Paragraph 3 supervises the student remotely during the internship. If, in the opinion of this UT supervisor, adequate supervision by the company supervisor is not – or no longer – possible, he/she may decide to take over as the student's daily supervisor.
7. During the internship, the student will write a report about his/her work. At the end of the internship period, this report will be submitted to the company supervisor. The company supervisor will assess the report using the relevant assessment form. The assessment will be based on the supervisor's observations of the student and on the report submitted by the student.
8. The UT supervisor acts as the examiner for this unit, and will base his/her grade on the assessment made by the company supervisor, the report written by the student and a discussion with the student.

The student should submit the report to the UT supervisor within two months of finishing the internship.

Article A3.10 Confidentiality
1. The final thesis report and internship report will be made public unless confidentiality has been deemed necessary (see following Paragraphs).
2. The Programme Board may declare an internship report and/or final thesis report to be confidential for a limited period upon receiving a motivated request to do so:
    a. A confidentiality request should be made by the examiner before the start of the final project or internship.
    b. A confidential report remains accessible for the supervisor, the Programme Board, and any members of bodies with the authority to assess the quality of the grading of the entire programme.
    c. All parties mentioned in 2b are required to respect the confidentiality of the report.
3. If confidentiality is deemed necessary as described in 2, the contents of the public final thesis presentation may be adapted to avoid making public those matters that are considered confidential.

Article A3.11 Evaluation
To monitor and to improve the quality of teaching, the EEMCS MSc programmes use information about the students' learning experiences. This information is obtained from:
- Internal evaluations
    o Periodic course evaluations at the end of each course
    o Additional panel evaluations, on request from lecturer, students, or Programme Director
- External sources
    o National Student Survey (NSE)
    o National Alumni Survey
    o International Student Barometer

A4. Examinations

Article A4.1 Signing up for courses and examinations
1. Every student must sign up in SIS in order to participate in a course. It is also mandatory to register before every examination opportunity.
2. Notwithstanding Paragraph 1, any student who has correctly signed up to participate in the instruction/classes for a particular course and has been admitted will also automatically be signed up for the subsequent examination, unless the course description specifies otherwise. For each examination after that, the student has to register in SIS manually.
3. The student has the right to inspect recent model test questions or model tests, or old tests and the associated answer keys, along with the standards for assessment.
4. The test schedule must be published in the Learning Management System (LMS) 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 A4.2 Type of examination

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

Article A4.3 Examination opportunities

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

Article A4.4 Examination results

1. Examination results are expressed with a numerical grade or as a 'pass'/'fail'.
2. Numerical grades are given on a scale from 1 to 10, with no decimal.
3. ECs will only be awarded for the study unit if an examination has been completed with a grade of 6 or higher or a pass. No ECs will be awarded for individual components of study units and/or individual tests.
4. If a student receives more than one authorized result for the same study unit, the highest grade will apply.

Article A4.5 Oral examinations

1. Oral examinations are conducted in public, unless the Examination Board has determined otherwise in relation to a particular case.
2. If a third party wishes to be present during an oral test, he/she must submit a request to the Examination Board at least ten working days prior to the oral examination. This does not apply for graduation colloquia.
3. 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 examination, it will notify the examiner and the student at least one working day prior to the test.
4. For an oral examination, proof is required that the student was treated appropriately and that the assessment was reliable. This can be shown by, for instance, the presence of a second expert or a video recording of the oral examination. The assessment is documented in a form that shows that the intended learning outcomes have been assessed appropriately.

Article A4.6 Determining and announcing results

1. The result of a written examination or practical exercise is published via SIS within 20 working days. This will be done by BOZ (Office of Educational Affairs).
   a. The examiner will determine the result of a written examination within 15 working days after the examination and notify BOZ of the result.
   b. No rights can be derived from examination results published on the LMS or communicated via any medium other than SIS.
2. The result of an oral examination is made known to the student within one working day in the form of authorized proof of the result by the examiner.
3. If the result for a study unit is based on multiple tests, the date of completion of the final test will count as the examination date.
4. Should the examiner be unable to meet the terms described in Paragraphs 1 and 2 due to extraordinary circumstances, he/she must inform the Examination Board of this, providing reasons for this situation. The student is then informed of the delay by the Examination Board as soon as possible, whereby a new deadline for the result will also be made known. 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 examination.
5. If a second examination is planned shortly after the first, the results of the first examination will be published at least five working days prior to the second examination.

Article A4.7 Validity period for results

1. The period of validity for the results of an examination that has been passed is indefinite, unless the knowledge or skills tested have been scientifically invalidated or are proven to have lost their relevance.
2. Test results are only valid in the academic year in which they were obtained, unless they are aggregated into an exam result.
3. The Examination Board may extend the validity of test results in individual cases at the request of the student.

Article A4.8 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 has been given. If no collective discussion of the results is held, the student may request an individual discussion of the results with the examiner within ten working days of the publication of the results. *The discussion must take place no later than five weeks after the publication of the test results, but at least five working days prior to the next test opportunity, in the presence of the examiner or a designated substitute*.
2. The student has the right to inspect his or her work for a period of two years after the assessment.

Article A4.9 Retention of examination results

1. Written examination questions, associated details and the assessed work from written tests will be retained for a period of two years.
2. The retention period for final thesis reports is seven years.

A5 Final Degree audit

Article A5.1 Master's final degree audit

1. The Examination Board determines the result of the Master's final degree audit after establishing that the student has passed all the study units associated with the programme. The date indicated on the degree certificate (i.e. the date of the final degree audit) is the day on which the student completed the final study unit of his/her degree programme.
2. A diploma can only be awarded after the student has received formal approval for his/her study programme as described in Section B.
3. If the student wishes, he/she may submit a substantiated request in writing to the Examination Board to postpone the final degree audit, and thus to delay the awarding of the degree certificate. The student must indicate the duration of the desired postponement in any such request.
4. If the student has requested postponement on the basis of Paragraph 3, the date of the final degree audit will be the date on which the Examination Board decides that the student has passed the final degree audit subsequent to the postponement.

Article A5.2 Diploma and transcript

1. The Examination Board grants a diploma as proof that the student has passed his/her final degree audit. The Executive Board will determine the model for the diploma and add a diploma supplement to the diploma providing information on the nature and content of the Master's programme completed. The diploma supplement will be in English and comply with the European format for such diplomas.
2. The International Diploma Supplement will be appended to the certificate for the successfully completed final degree audit (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, upon request, receive a statement issued by the relevant Examination Board stating which components have been successfully completed, as well as the study units involved, the number of ECs obtained and the method of examination for the examinations taken.

Article A5.3 Cum Laude

1. The Examination Board checks whether the student has fulfilled all requirements. If the judicium *Cum Laude* ('with distinction') applies, this will be stated on the diploma and the diploma supplement.
2. The *judicium Cum Laude* can be mentioned on the Master's certificate provided the following requirements are met:
   a. The arithmetic mean of the grades for all study units of the Master's examination programme, excluding the Master's thesis (final project), is at least 8.0;
   b. Those parts of the examination programme for which an exemption was granted or which were not graded with a number are not considered when calculating the average grade;
   c. Exemptions within the examination programme may be granted to a maximum of 15 ECs;

    d.   The Master's thesis (final project) is graded at 9 or higher;
    e.   No more than one study unit of the examination programme has been graded at 6;
    f.   The study programme has been completed within 125% of the nominal duration, starting from the start date recorded in SIS.

3.   In individual cases the Examination Board may grant the judicium Cum Laude even if not all requirements are met.

A6. Student counselling and study progress

Article A6.1 Study progress report

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

Article A6.2 Academic counselling for students

1.   The Dean is responsible for student counselling, which includes informing the student of study opportunities inside or outside the programme.
2.   Each student is allocated a study adviser.
3.   The study adviser will provide advice on study-related matters, as well as any personal problems that may affect the student's studies if the student so desires.
4.   If a student wishes to exercise his/her right to specific counselling or special facilities, the student is required to contact the study adviser. The study adviser will record any agreements made with the student, and this agreement is binding on both the student and the Programme Board.
5.   The following applies to the entitlement to special facilities:
    a.   there are demonstrable force majeure or personal circumstances; the student is expected to report these circumstances prior to or at the time they occur;
    b.   if necessary and possible, special dispensation for participation in examinations or tests and/or the provision of special facilities for examinations or tests will be provided. Such dispensation and additional testing opportunities can only be granted by the Examination Board.

A7. Studying with a functional impairment

1.   A functional impairment is a physical, sensory or other functional disorder that might limit the student's academic progress.
2.   The Study Advisor and the student will discuss the most effective facilities for the student as referred to in Article 2 of the Equal Treatment of Disabled and Chronically Ill People Act (WGB h/cz).
3.   Facilities are to be aimed at removing specific barriers in the teaching programme or when it comes to taking exams. Where necessary, these facilities may be related to access to infrastructure (buildings, classrooms and furnishings) and study materials, adjustments to the form of assessment, alternative learning pathways or a customized study plan. The facilities are to ensure the student's chances of achieving the programme intended learning outcomes.

4. Based on the interview referred to in paragraph 2, the student is to submit a request for facilities to the Dean, preferably three months before the student is to participate in classes, exams and practical exercises for which the facilities are required.
5. The request is to be submitted along with supporting documentation that is reasonably necessary for assessing the request (such as a letter from a doctor or psychologist registered in the BIG register, or in the case of dyslexia from a healthcare psychologist or special education needs expert, also registered in the BIG register).
6. The faculty Dean will decide on the admissibility of the request as referred to in paragraph 4 and will inform the student and the Study Advisor of the decision within 20 working days after receipt of the request, or sooner as the urgency of the request dictates.
7. The Study Advisor will ensure that the relevant parties are informed in good time about the facilities granted to a student with a functional impairment.
8. Should the faculty Dean reject the request in full or in part, the Dean is to inform the student of the justification for the rejection and the possibilities for lodging an objection and an appeal. A written objection must be submitted in writing within six weeks after the decision has been communicated to the student. The objection is to be submitted to the objections, appeals and complaints office via the Student Services desk.
9. Should extra facilities be granted, the period of validity will also be indicated. The applicant and the Study Advisor will evaluate the facilities before the end of this period. During this evaluation, parties will discuss the effectiveness of the facilities provided and whether they should be continued.
10. If a student is dyslexic, he/she will be granted a maximum of 15 extra minutes for each hour that a test or exam is officially scheduled..

A8. Amendments, transitional arrangements, appeals and objections.

Article A8.1 Conflicts with the regulations

If any additional regulations and/or provisions pertaining to teaching and/or examinations conflict with these Teaching and Examination Regulations, the present document (Teaching and Examination Regulations) will take precedence.

Article A8.2 Administrative errors

If, following the publication of an examination result, a list of grades, or an overview of a student's progress, an error is discovered, the party discovering the error – be it the university or the student – is required to make this known to the other party immediately and to cooperate in the rectification of the error.

Article A8.3 Amendments to the regulations

1. Substantive amendments to these Teaching and Examination Regulations are determined by the Dean in a separate decision.
2. Every effort will be made to ensure that substantive amendments to these Regulations do not apply to the current academic year. Substantive amendments to these Regulations may, however, be applied to the current academic year provided the interests of students are not prejudiced within reasonable bounds, or in situations of force majeure.
3. Amendments to these Regulations have no effect on earlier decisions taken by the Examination Board.

4. Transitional arrangements are arranged in accordance to Article A8.4.

Article A8.4 Transitional arrangements; examination opportunities

1. In the case of amendments to the Teaching and Examination Regulations, the Dean may decide to put a transitional arrangement in place.
2. Any such transitional arrangement will be published in Section B.
3. The following principles will be applicable to any transitional arrangement if a Master's programme is changed:
    a. Changes to a Master's programme will be published before the start of the academic year in which they take effect.
    b. No guarantee can be given that all the study units of a Master's programme, as they existed at the time of a student's enrolment in a programme, will continue to be part of the Master's programme concerned. The version of the Master's programme most recently approved by the Dean will serve as the basis for establishing the results of the Master's examination.
4. Transitional arrangements will always specify the following:
    a. which discontinued study units are equivalent to study units or components thereof in the revised Master's programme that is included in Section B;
    b. if a study unit without practical exercises is discontinued, there will be at least one opportunity in the subsequent academic year to take a written or oral examination or to ensure assessment by some other means;
    c. if a study unit that involves practical exercises is removed from the programme, and during the subsequent academic year no opportunities are provided to complete these practical exercises, at least one study unit will be designated as a suitable replacement for the discontinued study unit;
    d. 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 provided this works to the student's advantage, the Examination Board may allow a deviation from the number of times and the method by which examinations may be taken for a study unit that has been discontinued.

Article A8.5 Appeal and objections

Any appeals against decisions made by the Examination Board or an examiner, and any 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 no more than six weeks after the relevant decision has been communicated.

Article A8.6 Hardship clause

In the event of demonstrable and meaningful unreasonableness and unfairness, the Examination Board may allow exceptions to the provisions of these Regulations.

Article A8.7 Publication

The Teaching and Examination Regulations and the Rules and Regulations of the Examination Board are published on the website of the programme in question.

Article A8.8 Commencement

These Regulations take effect on 1 September 2019 and supersede the Regulations dated 1 September 2018.

SECTION B PROGRAMME-SPECIFIC SECTION

MASTER COMPUTER SCIENCE (CS)

MASTER INTERNET SCIENCE AND TECHNOLOGY (IST)

About this Section

The Teaching and Examination Regulations (TER) are subdivided into two sections (Section A and Section B), which together form the TER. Section A, which can be seen as the faculty section, includes provisions that apply to all EEMCS Master's degree programmes. Section B contains the provisions that are specific to the particular degree programmes, in this case the Master's programme in Computer Science with the underlying specializations 4TU Cyber Security (CybSec, organized within the the 4TU.Federatie as a cooperation of the University of Twente with the Technical University of Delft), Data Science and Technology (DST), and Software Technology (ST) and the Master's programme and specialization in Internet Science and Technology (IST).

B1. GENERAL PROVISIONS

Article B1.1 Definitions
In addition to the definitions in Section A the following definitions and abbreviations are used:

a. **Course programme:** examination programme
b. **CybSec:** Cyber Security
c. **DST:** Data Science and Technology
d. **Graduation supervisor**: chair holder of the chair chosen by the student to graduate from
e. **IST:** Internet Science & Technology
f. **Programme mentor**: individual appointed by the Examination Board to approve course programmes
g. **ST**: Software Technology
h. **TUD:** Delft University of Technology. Courses of the CybSec specialization indicated with TUD are taught at the UT via tele-lecturing. The Delft TER applies to these courses.

B2. PROGRAMME OBJECTIVES AND FINAL ATTAINMENT TARGETS

Article B2.1 Aim of the Computer Science Master's programme
The Master's programme in Computer Science 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 B2.2 Aim of the Internet Science and Technology Master's programme
The Master's programme in Internet Science and Technology aims to combine a scientific mindset with specialist technical knowledge, enabling graduates to design, analyze, validate and implement complex networked 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 B2.3 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. B2.4.
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 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 B2.4 Domain specific attainment targets

a. Cyber Security

1.   CybSec 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.

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

3.   CybSec graduates have understanding and skills of cyber security engineering methodologies in the small and in the large.

4.   CybSec 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.

5.   CybSec 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.

6.   CybSec 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.

7. CybSec 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. Data Science and Technology
   1. DST Graduates have thorough knowledge of, and are able to design solutions for, the management of large volumes of structured, semi-structured and unstructured data, such as sensor data, multimedia data, textual data, geographic data, and social data.
   2. DST Graduates are able to analyze large volumes of generated data and make scientific decisions based on such data sets.
   3. DST Graduates understand algorithms underlying data science techniques in terms of their fundamental basis in theory (probability theory, statistics, information theory, etc).
   4. DST 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) and subsystems that make up information systems.

c. Software Technology
   1. ST graduates have a thorough knowledge and understanding of the different phases of the software lifecycle (ranging from requirements engineering over architectural and detailed design to construction and quality assurance) as a scientific and design discipline.
   2. ST 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 and validation of large-scale systems.
   3. ST graduates know the trade-offs between alternative software engineering techniques and can make educated decisions throughout the software lifecycle.
   4. ST graduates have knowledge and understanding of various aspects of Software Engineering including its mathematical background, software management, quality assurance, requirements engineering, architectural design, detailed design, software construction, verification, and programming languages.
   5. ST 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, formal methods.
   6. ST graduates have practical experience conducting scientific research in the realm of software engineering methods and technologies, formal methods and/or programming or design paradigms, enabling them to contribute to such research, follow the trends and apply the results.

d. Internet Science and Technology
1. IST 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.
2. IST 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.
3. IST graduates can quantitatively evaluate the performance of networked systems, and judge their formal correctness, using both analytical methods and computer tools.
4. IST 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.

B3. FURTHER ADMISSION REQUIREMENTS

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

B4. CURRICULUM STRUCTURE

Article B4.1 Composition of the programmes

1. The general composition of the course programmes is as follows:
   a. Core courses: mandatory courses depending on the specialization.
   b. Advanced courses: courses depending on the specialization.
   c. Profiling space: around 30 EC in courses related to the specialization.
   d. 191612680 Computer Ethics, (5 EC)
   e. 192199508 Research Topics (10 EC)
   f. 192199978 Final Project (30 EC)
2. Each student has an individual course programme of at least 120 EC which meets the general programme guidelines of B4.1.1, and also the programme requirements in one of Articles B4.2-4.6.[1]
3. In addition to Article B4.1.1 and B4.1.2, students with a Bachelor's degree which includes "educatieve minor" may use the elective credits within the profiling space to form an alternate package of 30 EC with didactical/pedagogical subjects, including a traineeship in a high school, as part of a Science Education and Communication (SEC) Master's programme under the terms of Article A3.6.
4. Students take around 30 EC in courses related to the specialization as part of their profiling space. Apart from additional requirements depending on the specialization, this space might be used for:
   a. an exchange programme
   b. an internship (192199968, 20EC)

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[1] Students whose admission to the CS programme is derived from, or constitutes a part of, their admission to a programme within the EIT Digital Master school, may have a course programme which deviates from the requirements listed under Art. B 4.1.1. The programme for EIT CybSec students is described in Art. B 4.2.4

    c.   the study tour (10 EC)
    d.   a methodological course from the theme OOO (organize / research / design)
    e.   additional advanced specialization courses
    f.   courses from another CS specialization
    g.   courses from a different Master which are relevant to the specialization
    h.   courses at one of our 4TU partner programmes
    i.   courses from a different Master for a double / combined programme
    j.   homologation courses with a maximum of 15EC, as part of a bridging programme assigned by the Admission Board or Programme mentor

Article B4.2 MSc Computer Science: Specialization Cyber Security

1. Core courses

The following 3 courses are mandatory:
- 201700074 Internet Security (InS, UT)
- 201500027 Security and Cryptography (Crp, TUD)
- 201600051 Software Security (SoS, UT)

2. Advanced courses

At least 3 courses should be chosen out of the following:
- 192110940 Secure Data Management (SDM, UT)
- 201700083 Security Services for the Internet of Things (UT)
- 201500039 Security Verification (SeV, UT)
- 201700086 System Security (SyS, UT)
- 192140122 System Validation (SyV, UT)
- 201500037 Cyber Data Analytics (CDA, TUD)
- 201500042 Privacy Enhancing Technologies (PET, TUD)
- 201700079 Blockchain and Distributed ledger technology (BCT, UT)
- 201500040 Introduction to Biometrics (Bio, UT)

3. Profiling space

Requirements:
- 201500026 Cyber Risk Management and at least 3 additional socio-technical courses

Socio-technical courses
- 201500026 Cyber Risk Management (CRM, TUD)
- 201100022 Cyber Crime Science (CCS, UT)
- 201500038 E-Law (TUD)
- 201500041 Cyber Security Management (CSM, UT)
- 201500028 Economics of Security (EoS, TUD)
- 2019xxxxx Capstone Cyber Security (5EC)
- Other socio-technical courses (in consultation with the Programme mentor)

Additional dedicated Cyber Security Courses
- Additional advanced courses (mentioned above)
- 201500033 Applied Security Analysis (ASA, TUD)
- 201500030 Fundamentals of Quantum information (4EC, Q101, TUD)
- 201600016 Quantum comm. and Cryptography (Q201, TUD)
- 201500036 Software Testing and Reverse engineering (STR, TUD)

Suggested elective courses
- 192620010 Mobile and Wireless Networking (MWN, UT)
- 201400177 Cloud Networking (CIN, UT)
- 201600070 Basic Machine Learning (BML, UT)
- 192130112 Distributed Systems (DiS, UT)

4. EIT Digital Master School: Cyber Security

A special way to fulfil the requirements of the Cyber Security specialization is by successfully completing the course programme on Cyber Security in the EIT Digital Master School, set up as a double degree programme where one year is completed at the University of Twente and one year at a partner university. The partner universities in the EIT Digital Master programme on Cyber security are:
- University of Trento, Italy (both entry and exit year curricula; specialization: Applied Security)
- Eötvös Loránd University, Hungary (both entry and exit year curriculum; specialization: Advanced Cryptography)
- University of Turku, Finland (both entry and exit year curriculum; specialization: Security of Networked Systems)
- University of Rennes 1, France (both entry and exit year curriculum; specialization: Software Security)
- EURECOM, France (only exit year curriculum; specialization: Mobile and Cloud Security)

a. Entry year

The entry year of EIT Digital Cyber Security follows the rules for the Master's programme in Computer Science. The total amount of credits during the entry year must be at least 60 EC. The exit year is completed at a partner university and will consist of at least a graduation project and a minor in Innovation & Entrepreneurship (I&E).

The following course is mandatory for all Computer Science students.
- 191612680 Computer Ethics

Core courses
The following 3 courses are mandatory:
- 201700074 Internet Security (InS, UT)
- 201500027 Security and Cryptography (Crp, TUD)
- 201600051 Software Security (SoS, UT)

Advanced courses

At least 3 courses should be chosen out of the following:
- 201700083 Security Services for the Internet of Things (UT)
- 201500039 Security Verification (SeV, UT)
- 201700086 System Security (SyS, UT)
- 201500037 Cyber Data Analytics (CDA, TUD)
- 201500042 Privacy Enhancing Technologies (PET, TUD)
- 201700079 Blockchain and Distributed ledger technology (BCT, UT)
- 201500036 Software Testing and Reverse engineering (STR, UT)
- 201800127 Security in Embedded Hardware (SEH,UT)
- 201100022 Cyber Crime Science (CCS, UT)
- 201500038 E-Law (UT)
- 192620010 Mobile and Wireless Networking (MWN, UT)

Profiling space
Requirements:
- 201500026 Cyber Risk Management (CRM, TUD)
- All mandatory Innovation and Entrepreneurship (I&E) courses, see below

Innovation and Entrepreneurship (I&E) courses
Mandatory I&E courses
- 201700180 Innovation and Entrepreneurial Finance for EIT students
- 201700119 Business Development Lab I
- 201700120 Business Development Lab II
- 201400613 EIT Summer School (external) (4 EC)

Elective I&E courses:
- 201700019 Brand Management
- 201800077 Bioresource Business Development & Management
- 201800079 Bioresource Supply Chain Management
- 201600155 Global Strategy and Business Development
- 194105070 Information Systems for the Financial Services Industry
- 201500008 Empirical Methods for Designers

Socio-technical courses
Please see the list of socio-technical courses in the Cyber Security specialization (Art. B4.2.3).

Additional dedicated Cyber Security courses
- Additional advanced courses
- 201500040 Introduction to Biometrics (Bio, UT)
- 201400177 Cloud Networking (ClN, UT)

Other suggested courses
- 201600070 Basic Machine learning (BML, UT)
- 201600071 Advanced Machine learning (AML, UT)

- 201700075 Internet of Things (IoT, UT)
- 192130112 Distributed Systems (DiS, UT)

b. Exit year: specialization "Cyber Security: High Tech, Human Touch"

Exit year students have completed the equivalent of our core and advanced programme in the entry year at one of our partner universities.

The exit year counts at least 60 EC consisting of the following mandatory parts for all Computer Science students: 191612680 Computer Ethics (5 EC), and the 192199978 Final Project (30 EC).

Instead of the course "Research Topics", EIT exit year students do:
- 201800524 Research Topics EIT (4EC)
- 201800525 I&E Study EIT (6EC)

For the remainder of the 60EC, the student needs to pick at least 15 EC from the following courses:
- 201500028 Economics of Security (EoS, UT)
- 201500041 Cyber Security Management (CSM, UT)
- 192140122 System Validation (SyV, UT)
- 201500030 Fundamentals of Quantum Information (Q101, TUD, 4 EC)
- 201500026 Cyber Risk Management (CRM, TUD)
- 192110940 Secure Data Management (SDM, UT)
- 201500039 Security Verification (SeV, UT)
- 201500040 Introduction to Biometrics (Bio, UT)
- 201600016 Quantum Cryptography (Q201, TUD)
- 201600070 Basic Machine Learning (MaL, UT)
- 201700075 Internet of Things (IoT, UT)
- 201400177 Cloud Networking (ClN, UT)
- 192130112 Distributed Systems (DiS, UT)
- 201600071 Advanced Machine Learning (AML, UT)
- 201700079 Blockchain and Distributed Ledger Technology (BCT, UT)
- 201100022 Cyber Crime Science (CCS, UT)
- 201500036 Software Testing and Reverse Engineering (STR, TUD)
- 201700074 Internet Security (InS, UT)
- 201800127 Security in Embedded Hardware (SEH,UT)
- 192620010 Mobile and Wireless Networking (MWN, UT)
- 201500037 Cyber Data Analytics (CDA, TUD)
- 201500038 E-Law (UT)
- 201500042 Privacy Enhancing Technologies (PET, UT)
- 201700083 Security Services for the Internet of Things (SSI, UT)
- 201700086 System Security (SyS, UT)

Further details on the programme can be found on: masterschool.eitdigital.eu/programmes/cse

Article B4.3 MSc Computer Science: Specialization Data Science and Technology

1. Core courses

The following 4 courses are mandatory:
- 201200044 Managing Big Data
- 201400174 Data Science
- 201600070 Basic Machine Learning
- 201700080 Information Theory and Statistics

2. Advanced courses

At least 4 courses should be chosen out of the following:
- 201600071 Advanced Machine Learning
- 201600076 Foundations of Information Retrieval
- 192652150 Service-oriented Architecture with Web services
- 192320111 Architectures of Information Systems
- 201300074 Research Experiments in Databases and Information Retrieval
- 201700081 Probabilistic programming

3. Profiling space

Requirements: No additional requirements apply, but the data science student is suggested to further specialize in one or more of the following data science profiles:

Data Science profiles
a) *specialist in specific kinds of data*, such as natural language text, image data, geographic data, sensor data, networked data
b) *designer of smart services*
c) *designer of data science algorithms*
d) *multi-disciplinary researcher*

The following are suggested courses for the profiling space:
- (a) 201600074 Natural Language Processing
- (a) 201600075 Speech Processing
- (a) 191210910 Image Processing and Computer Vision
- (a) 201600083 Advanced Information Retrieval
- (a) 201600081 Advanced Natural Language Processing
- (a) 201600082 Advanced Speech processing
- (a) 201100254 Advanced Computer Vision and Pattern Recognition
- (a) 201500363 Data Science Additional Topics
- (a,b) 201700075 Internet of Things
- (a,b) 201500042 Privacy-Enhancing Technologies
- (a,c) 201800222 Complex Networks
- (a,c) 201700364 Spatial Statistics
- (a,d) 193810020 Advanced Techniques for Signal Analysis

- (a,d) 201800063 Traffic Forecasting and Analysis
- (
- (b) 192320501 Electronic Commerce
- (b) 192376500 Business Process Integration Lab
- (b,d) 201600028 Telemedicine and Data Analysis for Monitoring
- (c) 201800177 Deep Learning - From Theory to Practice
- (c) 192135310 Modeling and Analysis of Concurrent Systems
- (c) 191571090 Time Series Analysis
- (c) 201400353 Signals with Information
- (c) 191520751 Graph Theory
- (c) 192111092 Advanced Logic
- (a,c) other courses on fundamentals and algorithms of signal processing, stochastic processing, spatio/temporal data processing, etc.
- (d) other courses on data analysis from fields like health/medicine, social sciences, business sciences, bio-informatics, engineering and geo-informatics.

Article B4.4 MSc Computer Science: Specialization Software Technology

1. Core course
The following 4 courses are mandatory:
- 192170015 Testing Techniques
- 192140122 System Validation
- 192135450 ADSA – Model-Driven Engineering
- 201700082 Principles of Programming, Processes and Patterns

2. Advanced courses
At least 4 courses should be chosen out of the following:
- 192111092 Advanced logic
- 192340041 Software Management
- 201600040 Requirements Engineering Processes and Methods
- 192111332 Design of Software Architecture
- 192652150 Service-oriented Architecture Web Services
- 192135310 Modeling and Analysis of Concurrent Systems
- 201900082 Advanced Algorithms and Computational Complexity

3. Profiling space
Requirements: Choose at least one orientation: design or research (10 EC)

Orientation
Mandatory course for the Design Orientation (10EC):
- 201400172 Industrial Software Engineering Project (10 EC)

Mandatory courses for the Research Orientation (10EC):

- 201700084 Software Science
- 201400171 Capita Selecta Software Technology

Suggested elective courses
- Additional advanced courses
- 201600051 Software Security
- 201200006 Quantitative Evaluation of Embedded Systems
- 192620300 Performance Evaluation
- 201400225 Software Evolution
- 201700081 Probabilistic Programming
- 201600070 Basic Machine Learning
- 201400174 Data Science

Article B4.5 MSc Computer Science: specialization Internet Science and Technology[2]

See Article B4.6. As of September 2020 the Master's programme in Internet Science and Technology will no longer be offered as a separate Master's programme. Instead the Master will continue on as a specialization of Computer Science. Ahead of this plan, we will already offer students the opportunity to start their programme as a specialization of the Computer Science Master.

Article B4.6 MSc Internet Science and Technology[2]

1. Core courses
The following 4 courses are mandatory:
- 192620010 Mobile and wireless networking
- 192620300 Performance evaluation
- 201700075 Internet of Things
- 201700074 Internet security

2. Advanced courses
At least 4 courses should be chosen out of the following:
- 201700077 Advanced Networking
- 192652150 Serv. Oriented Arch. with Web Serv.
- 201400177 Cloud Networking
- 201700073 Ad-Hoc Networks
- 192699978 Internet Management and Measurement
- 192111301 Ubiquitous Computing
- 192130112 Distributed Systems

3. Profiling space
Requirements: No additional requirements apply.

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[2] It is not allowed to combine the MSc Internet Science and Technology and the CS specialization Internet Science and Technology with regards to Art. A3.6.

Suggested elective courses
- additional advanced courses
- Electrical Engineering courses (www.utwente.nl/ee)
- Embedded Systems courses (www.utwente.nl/emsys)
- CybSec courses
- Data Science & Technology courses
- Software Technology courses

Article B4.6 Internship

Students may take a 20 EC 192199968 internship as part of their profiling space (except for ST students who included 201400172 Industrial software engineering project, 10 EC, in their programme).
Further information and procedures can be found on the programme website www.utwente.nl/csc.

Article B4.7 Research Topics

All students must take the 10 EC 192199508 Research topics course as part of their course programme. Generally the Research Topics immediately precede the graduation work, and serve as a preparation for the Final Project described in Article B6.
Further information and procedures can be found on the programme website www.utwente.nl/csc. These procedures are considered part of this Regulation.

B5. COURSE PROGRAMME APPROVAL

Article B5.1 Approval procedures

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

1. <u>Contacting the Programme mentor and laying down the course programme.</u>
   Students may complete courses and sit 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.

2. <u>Alterations and renewed approval of entire course programme</u>
   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 Educational Affairs Office (BOZ). 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 authorized 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.

Article B5.2 Approval of a Flexible degree programme

The Examination Board shall decide on reasoned requests from students for a Flexible degree programmes as referred to in Article 7.3c of the Act and A3.5. Conditions related to this matter are to be specified in the Rules and Regulations of the Examination Board.

B6. FINAL PROJECT

Article B6.1 Additional rules and procedures

1. In addition to the rules in Article A3.7, 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. 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 at the University of Twente (even when some of the contents are confidential under Article A3.9). Generally the Research topics as described in Article B4 immediately precede the graduation work, and serve as a preparation for the Final Project.
   b. 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.
   c. 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:
         - Cyber security: SCS or DACS
         - Data science and Technology: SCS or DMB or FMT

- Software technology: FMT
- Internet science and technology: DACS or PS.

2. The Final Project description is written down as an agreement (by filling out the online Graduation registration form), signed by both the student and the supervisor. The supervisor signs on behalf of the Examination Board.

Organizational procedures are found on the programme website www.utwente.nl/csc.These procedures are considered part of this Regulation.

Article B6.2 Assessment and marking

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. The composition of the assessment committee is described in the Faculty section A.
5. In case the final grade of the Final Project is insufficient the student has to carry out a new Final Project.

B7. DEGREE

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

B8. TRANSITIONAL AND FINAL PROVISIONS

Article B8.1 Transitional provisions

The transitional arrangements can be found in appendix B.

Article B8.2 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 B8.3 Effective date

These Regulations enter into force with effect from 1 September 2019

I. ADMISSIONS APPENDIX

This is the Admissions Appendix to the Teaching and Examination Regulations of the Master's programmes Computer Science and Internet Science and Rechnology. Enrolment as a student is required to sit 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 I.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 degree audit for the Technical Computer Science (*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 degree audit 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 examinations and/or practicals of the programme before the student has passed the Bachelor's final degree audit. A limited period of validity may be set for such permission.

6. Admission of foreign students. In addition to the requirements in Chapter 2 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 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 I.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 I.1).

In addition to these provisions from the Teaching and Examination Regulation:
1.   Applicants who satisfy the following requirements are eligible for admission to the CS Master's programme.
      a.   The applicant is holder of a diploma from a University of Applied Science demonstrating that he or she has satisfied the requirements of the final assessment of the Computer Science (Informatica) Bachelor's programme,the Technical Computer Science (Technische informatica) Bachelor's programme or a HBO ICT Bachelor's programme
      b.   The applicant has successfully completed the transfer minor (*doorstroomminor*) as part of his or her Bachelor's course programme
2.   Applicants who satisfy the following requirements are eligible for admission to the CS 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, the Creative Technology Bachelor's Programme, or the Bachelor's programme from University College Twente (ATLAS)
      b.   The applicant has successfully completed two out of the following courses as part of his or her Bachelor's course programme:
            • Computer Systems for TCS
            • Software Systems, the 12 EC core part or Programming theory and project 8 EC together with Data structures, algorithms and complexity 5 EC
            • Network Systems for EE
            • 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, the Creative Technology Bachelor's Programme or the Bachelor's programme from University College Twente (ATLAS).
      b.   The applicant has successfully completed two out of the following courses as part of his or her Bachelor's course programme
            • Computer Systems for TCS
            • Software Systems, the 12 EC core part or Programming theory and project 8 EC together with Data structures, algorithms and complexity 5 EC
            • Network Systems for EE
            • Discrete Structures & Efficient Algorithms

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

In all other instances than those mentioned in Art. I.1 and I.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 A2.2.

Article I.4 Variations in admission decisions

1. <u>Issuing an unconditional certificate of admission</u>

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. <u>Issuing a conditional certificate of admission</u>

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. <u>Issuing a certificate of pre-master admission</u>

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 examinations or to have the final degree audit 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. The pre-master's programme is defined containing courses on the aspects that are lacking in the BSc programme taking into account the necessary knowledge to successfully complete 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. <u>Issuing a certificate of admission with additional requirements</u>

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 examinations or have the final degree audit 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 A3.4 of the Teaching and Examination Regulation stipulates that the Examination Board may not honor 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

II. TRANSITIONAL ARRANGEMENTS APPENDIX

This is the 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 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. In case the changes are not covered by any of the regulations in these transitional arrangements, students should contact their Programme mentor for an adjustment of their course programme.

3. Regulation 2017-2018 regarding Methods and Tools for Verification specialization
Occasion: This regulation is necessary because the specialization Methods and Tools for Verification is discontinued starting from September 1, 2017.
Term of validity: until September 1, 2022.
Contents of the regulation: Students who have their course programme approved before September 2017 can still finish this specialization.

4. Regulation 2017-2018 regarding Wireless and Sensor Systems specialization
Occasion: This regulation is necessary because the specialization Wireless and Sensor Systems is discontinued starting from September 1, 2017.
Term of validity: until September 1, 2022.
Contents of the regulation: Students who have their course programme approved before September 2017 can still finish this specialization.

5. Regulation 2017-2018 regarding Data Science and Smart Services specialization
Occasion: This regulation is necessary because the name of the specialization Data Science and Smart Services changed to Data Science and Technology starting September 1, 2017.
Term of validity: until September 1, 2022.
Contents of the regulation: Students who have their course programme approved before September 2017 can still finish this specialization.