

EDUCATION AND EXAMINATION REGULATIONS

MASTER'S DEGREE PROGRAMMES EEMCS

A. FACULTY SECTION

B. PROGRAMME-SPECIFIC SECTION

2021-2022 academic year

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

General

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

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

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

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

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SECTION A: FACULTY SECTION

A1. General provisions

Article A1.1 Applicability of the Regulations

1. These Regulations apply to education 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 education and examinations for all the Master's programmes at EEMCS. Section B contains programme-specific provisions. Together, Sections A and B form the Education 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 Education and Examination Regulations may include additional general provisions for the relevant programme.
6. For students who follow a study unit organised by another programme¹, the rules for testing apply that are laid down in the assessment plan of the study unit concerned, in the Education and Examination Regulations and in the Rules and Guidelines of the Examination Board of the programme that organises the study unit concerned. Special facilities according to article A7 can only be granted by the programme for which the student is enrolled.
7. The general provisions and the programme-specific provisions to the Education and Examination Regulations have been authorized by the Faculty Board.
8. 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.
9. The institutional part of the Students' Charter includes a definition of what the UT considers as fraud. The Rules and Guidelines of the Examination Board of the Master's programme concerned has additional regulations about fraud, for instance about what action the Examination Board is entitled to take when they have observed a case of fraud.
10. Requests for exemptions to provisions laid down in the education and examination regulations should be submitted to the examination board or the programme board, the guiding principle here is which body has the authority to make a decision on - or to make an exception to - a provision of these regulations.
11. References in these regulations to 'the student', 'the lecturer', 'he', 'him' or 'his' must also be read as 'the female student', 'the female lecturer', 'she', or 'her'.

¹ This does not apply, unless otherwise agreed, for units that are organised by a programme specifically for another programme.

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 Faculty Board, 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. **Assessment plan:** A plan indicating how the testing of a course is organised.
- d. **Combined Programme:** A programme of courses representing an amalgamation of two separate study programmes and covering the requirements and the programme intended learning outcomes of both individual Master's programmes, yielding two degrees;
- e. **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.
- f. **Course:** A study unit of the programme, as defined by the WHW.
- g. **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.;
- h. **EC:** A unit of 28 hours of study workload, in accordance with the European Credit Transfer System, a full academic year consisting of 60 EC or 1680 hours (Article 7.4 WHW).
- i. **Education period:** The period in which the study unit is offered. This period starts in the first week in which the study unit has any educational activity and ends in the last week in which the study unit has an educational activity and/or a test. Resits are not part of the education period. This period is not always the same as a quartile.
- j. **Exam:** An evaluation in a study unit of the knowledge, understanding and skills of the student, as well as the assessment of the results of this evaluation (Article 7.10 of the WHW); an exam may consist of a number of tests.
- k. **Examination programme:** All study units of a study programme counting towards the degree.
- l. **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 Education and Examination Regulations regarding the knowledge, insight and skills required in order to obtain a degree from the programme concerned.
- m. **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;
- n. **Executive Board:** Executive Board of the University of Twente.
- o. **Faculty Board:** Head of the faculty (Article 9.12 WHW).
- p. **Final Examination:** A programme concludes with a final examination. A final examination is deemed successfully completed if the study units belonging to a programme have been completed successfully.
- q. **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.
- r. **Functional impairment:** A functional impairment is a physical, sensory, or other impairment that might limit the student's academic progress.

- s. **Homologation:** Some study units that can be offered to students who are admitted to the Master's programme but who nevertheless have insufficient knowledge, understanding or skills, according to Article 7.30b. of the WHW.
- t. **Learning Management System (LMS):** System that supports online learning and teaching. In this case: Canvas.
- u. **Master's programme or programme:** The Master's degree programme, as referenced in Article 7.3a Paragraph 1 subparagraph b of the WHW: the entirety of the course components, teaching activities/methods, contact hours, testing and examination methods and recommended literature.
- v. **Master's thesis project / final project:** A study unit comprising literature research and a contribution to scientific research, which always results in a written report.
- w. **Practical exercise:** 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.
- x. **Pre-Master's programme or Bridging 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 7.30e. of the WHW.
- y. **Programme Board:** The committee charged by the Faculty Board with managing the programme.
- z. **Programme Committee (PC):** The Programme Committee as referred to in Article 9.18 WHW.
- aa. **Quarter or quartile:** A part of a semester as specified in the academic calendar of the university.
- bb. **Semester:** Half an academic year, as specified in the academic calendar of the university.
- cc. **Senior Examiner:** Specific examiners, appointed by the Examination Board to take on the role as chair of an assessment committee for the Final Project.
- dd. **Student Information System (SIS):** System designated by the institutional board for registration and for providing information on all relevant data related to students and the programme, as described in the WHW. In this case: Osiris.
- ee. **Student:** Any person enrolled for a programme in accordance with Articles 7.34 and 7.37 of the WHW.
- ff. **Study Adviser:** Person appointed by the faculty board who acts as contact between the student and the programme, and as such represents the interests of the students, as well as fulfilling an advisory role.
- gg. **Study load:** The amount of time an average student needs to capture the learning material. The study load comprises for instance project work, self-study, lectures and writing papers. The study load is expressed in credit points in accordance with the European Credit Transfer System.
- hh. **Study Programme:** All study units followed by the student as part of his/her Master's programme;
- ii. **Test:** An evaluation of the knowledge, understanding and skills of the student, as well as the assessment of the results of this evaluation. A test is a part of an exam. If a study unit has only one test, this coincides with the exam for the unit in question.
- jj. **University:** The University of Twente (UT).
- kk. **WHW:** The Dutch Higher Education and Research Act (*Wet op het hoger onderwijs en wetenschappelijk onderzoek*).

- II. **Working day:** Any day from Monday to Friday with the exception of official holidays and the prearranged compulsory holidays (compulsory days free of work) on which the staff is off.

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 Faculty Board. The Faculty Board 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 within six weeks.

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

1. Based on the provisions of Section 7.42a of the WHW, the Faculty Board or the Examination Board may, in exceptional cases, ask the Executive Board to terminate or refuse a prospective student's enrolment in a programme, if that student's actions or words show that the student is unsuitable either for practising one or more of the professions for which the programme in question would prepare the student or for practical preparations for professional practice.
2. If it is believed that a prospective student is unsuitable for the programme, as described in Paragraph 1, the Examination Board or the Faculty Board will initiate an inquiry, and the student will be informed of this promptly. The Examination Board or the Faculty Board 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. The courses in the pre-master are subject to the Bachelor Education and Examination Regulations.
3. The pre-Master's programme is assembled by the 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 twice the nominal study duration of the units to be completed unless otherwise specified.
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.
7. Deviations from these regulations are to be decided upon by the admission board.

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 WHW) 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. The examination board can grant students exemption from one or more complete study units at their request. To this end, students will demonstrate that they
 - a. have completed a component of a similar content, size and level of a university or higher professional education programme or
 - b. have, as a result of work and/or professional experience, sufficient knowledge and skills regarding the study unit concerned.
2. The examination board is authorised to make exceptions to the provisions as stated in paragraph 1 and grant an exemption to a student from parts of a study unit.
3. An exemption granted by the examination board will be registered in SIS with the concerning study unit or parts thereof with an EX (exemption).
4. Students cannot be forced to take extra study units or parts of study units in their curriculum instead of the granted exemption.
5. Exemptions may be granted to a maximum of 30EC.

6. 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 examination board.

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 7.3h. 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 must 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 combined programmes and their composition:

1. The student needs to be admitted and enrolled in both programmes in order to combine two programmes.
2. 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 four 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**.
 - d. In case there is a **Standard Programme** for a combined study programme **defined by two UT Master's programmes**, the requirements laid down in the Standard Programme will apply
3. The combined programme as described in paragraph 2 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.
4. If a single combined final project is included in and is relevant to both Master's programmes, as referred to in 2a and 2b, the study load of the final project must 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.

5. If a single combined internship is included that satisfies the requirements of both programmes as referred to in 2a, the study load of the internship must equal the load of the internship with the highest number of ECs.
6. Approval for the common courses is required from the Examination Boards of both Master's programmes.
7. Students who complete a study programme as described 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 combined 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

7. The committee contains at least two examiners, at least one of which is senior examiner; it is chaired by a senior examiner
8. The examiners must belong to (at least) two different research groups
9. All supervisors of the project are members of the assessment committee. Supervisors who are not examiners serve on the committee in an advisory capacity.
10. The examiners are collectively responsible for grading the thesis. In case of different opinions among the examiners, the chair of the assessment committee takes the ultimate decision on the grade
11. In the event that the assessment committee cannot meet the above specifications, a motivated request to the Examination Board may be made by the Programme Board. The approval for the particular assignment remains valid during the academic year in which the request was granted or the duration of the final project in question with the maximum of one year.

Article A3.9 Internship

1. The internship is a period of study-related professional practice amounting to 20 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. Students must contact the internship office for an intake at least three months before their preferred start date of the internship.
5. The daily supervisor for the internship is the company supervisor: a member of the organization where the internship is carried out. This supervisor must be named in the project description, mentioned in Paragraph 3.
6. The UT supervisor mentioned in Paragraph 3 supervises the student remotely during the internship. If, in the opinion of this UT supervisor, adequate supervision by the company supervisor is not – or no longer – possible, the UT supervisor may decide to take over as the student's 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 must submit the report to the UT supervisor within two months of finishing the internship.

Article A3.10 Duration of the internship

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

Article A3.11 Confidentiality

1. The final thesis report 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 must be made by the examiner preferably before the start of the final project or internship, but no later than four weeks before the end 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. The confidentiality period will by default be set at 2 years up to a maximum of 5 years.

4. 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.
5. Section B of these Education and Examination Regulations may include additional provisions for the relevant programme.

Article A3.12 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
 - Periodic course evaluations at the end of each course
 - Additional panel evaluations, on request from lecturer, students, or Programme Director
- External sources
 - National Student Survey (NSE)
 - National Alumni Survey
 - 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.

Article A4.2 Course Catalogue and Assessment Plan

1. The course catalogue in SIS stipulates how a study unit is to be assessed and the form of any examinations. Exams and tests can have the following various forms².
 - a. Tests or exams can be held online or offline.
 - b. A test or exam may be held online by means of online surveillance³ or online proctoring⁴, in the event where no alternative exam method is reasonably possible⁵.
 - i. Pursuant the DPIA⁶ the retention period of the data is 30 days unless the examination board decides that the data needs to be maintained longer for a fraud investigation.
 - c. The examination board may lay down further rules and conditions for online (proctored) testing.

² A test or exam can have the following forms: a written test, an assignment, an oral test, practical exercises, or a combination of these forms.

³ Camera-surveillance of student(s) during exams without recording via e.g. Canvas, Teams.

⁴ Surveillance of student(s) using special proctoring software e.g. Proctorio.

⁵ This means online proctoring can be used for a few students as well as for an entire test.

⁶ The DPIA is an instrument to point out privacy risks of a processing operation to be able to take measures to mitigate those risks.

- d. These further rules and conditions must comply with the General Data Protection Regulation (GDPR), the Data Protection Impact Assessment (DPIA) on proctoring and the EER.
 - e. Pursuant to Articles 12-14 of the GDPR, students must be informed before the use of online surveillance or online proctoring about the processing of their personal data.
2. At least two weeks prior to the start of the study unit an assessment plan, must be published in the Learning Management System (LMS)
3. The assessment plan includes at least all items as included in the course catalogue yet shall also include:
 - a. The learning objectives of the study unit;
 - 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;
4. The programme board may modify the assessment plan during the course of the study unit.
 - a. The assessment plan may only be changed in consultation with the examiners of the study unit or study units.
 - b. The programme board consults the examination board beforehand in case of changes in the form or the method of administering of a test or tests. If the change involves nothing more than moving tests or test components to a timeslot other than as shown in the schedule, the programme board must inform the examination board of the decision to make the change at the next meeting of the examination board.
 - c. Students are to be informed immediately of the change.
 - d. Changes to the assessment plan may, in reasonable expectation, not put students at a disadvantage. Examination boards may provide special facilities make in individual arrangements in these cases.
 - e. Changes to the assessment plan may, in reasonable expectation, not put students at a disadvantage. Examination boards may provide special facilities make in individual arrangements in these cases.

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.
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 A4.4 Examination results

1. Examination results, as determined by the examiner, are expressed with a 'pass'/'fail' or in half grades from 1.0 up to and including 5.0 and from 6.0 up to and including 10.0 whereby:
 - a. Grades will only be rounded in the last phase of the assessment of the study unit.

- b. The rounding is done in accordance with the following scheme:

In case $n \neq 5$	
Grade $\geq n.00$ and $< n.25$	$\Rightarrow n.0$
Grade $\geq n.25$ and $< n.75$	$\Rightarrow n.5$
Grade $\geq n.75$ and $< (n+1).00$	$\Rightarrow (n+1).0$
In case $n=5$:	
Grade ≥ 5.00 and < 5.50	$\Rightarrow 5.0$
Grade ≥ 5.50 and < 6.00	$\Rightarrow 6.0$

2. Test results are expressed in a grade from 1.0 to 10.0 with one decimal place, or as 'pass / fail'
3. Exam results of 6.0 or higher are a pass.
4. ECs will only be awarded for the study unit if an examination has been completed with a grade of 6.0 or higher or a pass. No ECs will be awarded for individual components of study units and/or individual tests.
5. Exam results with a pass grade obtained at foreign universities will be registered with a P (Pass). Exam results obtained at Dutch universities will be adopted one-to-one in compliance with the former paragraphs.
6. If a student receives more than one result for the exam in the same study unit, the highest grade will apply. This also applies for the results of tests and components of tests within the same academic year and for the results of tests and components of tests that remain valid after the academic year in which they were obtained.

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, they 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 who cannot be a teaching assistant, 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 examiner will inform the student of the result within at most 1 working day after conducting the oral test. If the oral test is part of a series of oral tests for the same study unit, which take place on more than one working day. In that case, the examiner determines the result within one working day after the conclusion of the series of oral tests.
3. In case 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. In case the examiner is unable to meet the terms described in Paragraphs 1 and 2 due to extraordinary circumstances, they must inform the Examination Board of this, providing reasons for this situation. The student is then informed of the delay by the Examination Board as soon as 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 Examination date

1. The examination date of a study unit, mentioned in the SIS, is the date upon which the student fulfilled the last obligation, necessary for an assessment of the unit.
2. If a student agrees with an examiner about an examination date for a certain unit, the submission of additional material by the student after this date will lead to a new examination date, being the date of the submission of this additional material.
3. With respect to possible prior knowledge requirements of subsequent study units a student is allowed to assume that the student has passed an examination at the examination date, as long as the result of the examination is pending.
4. If the result of an examination is a fail and if because of this fail a student violates prior knowledge requirements of a subsequent unit in which the student participates, the Examination Board can decide that a student must interrupt this subsequent unit pending a repair of this fail.

Article A4.8 Validity period for results

1. The period of validity for the results of an exam that has been passed is unlimited. The validity of an exam result can only be restricted if the tested knowledge, insight or skills are proven to be out of date.
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 A4.9 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 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 A4.10 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, they 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. In principle the maximum duration of the delay that may be granted is 12 months. In exceptional cases the student may have justifiable reasons to submit a request to delay the presentation of the certificate for more than 12 months.
5. 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 **weighted average**⁷ of the grades for all study units of the Master's examination programme, excluding the Master's thesis (final project) **and the internship (if applicable)**, is at least 8.0;
 - 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 9.0 or higher;
 - e. **If an internship is part of the examination programme, it is graded at 8.0 or higher.**
 - f. No more than one study unit of the examination programme has been graded lower than 7.0;
 - g. The 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 Faculty Board 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.

⁷ The weighted average is proportional to the number of credits.

A7. Studying with a functional impairment

1. A functional impairment is a physical, sensory, or other impairment that might limit the student's academic progress.
2. The Study Advisor and the student will discuss the most effective adjustments for the student as referred to in Article 2 of the Equal Treatment of Disabled and Chronically Ill People Act (WGB h/cz).
3. Adjustments are intended to remove specific obstructions when following the curriculum and/or sitting exams. Where necessary, these may concern facilities pertaining to the accessibility of infrastructure (buildings, classrooms and teaching facilities) and study material, changes to examination, alternative courses, or a custom study plan. Realising the programme intended learning outcomes must be guaranteed when implementing changes.
4. Based on the interview referred to in paragraph 2, the student is to submit a request for facilities to the Faculty Board, preferably three months before the student is to participate in classes, exams, and practical exercises for which the adjustments 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 Board 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. If the Faculty Board rejects the request in full or in part, the Faculty Board is to inform the student of the justification for the rejection and the possibilities for lodging an objection and an appeal. A written objection should 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. If extra facilities are granted, the period of validity will also be indicated. The applicant and the Study Advisor will evaluate the adjustments before the end of this period. During this evaluation, parties will discuss the effectiveness of the adjustments provided and whether they should be continued.
10. In the case of dyslexia, an additional period of 15 minutes for every hour is granted in the event additional time for a test is granted.

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 Education and Examination Regulations, the present document (Education 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 Education and Examination Regulations are determined by the Faculty Board 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 Education and Examination Regulations, the Faculty Board 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 Faculty Board 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 Assessment education and examination regulations

1. The Faculty Board is responsible for the regular assessment 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, parts of the Education and Examination Regulations need the consent of the Programme Committee. On other parts the Programme Committee can advise.
3. The Programme Committee annually assesses the way in which the Education and Examination Regulations are implemented.

Article A8.6 Appeal and objections

Any appeals against decisions made by the Examination Board or an examiner, and any objections to decisions made by the Faculty Board 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 A8.7 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 A8.8 Publication

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

Article A8.9 Commencement

These Regulations take effect on 1 September 2021 and supersede the Regulations dated 1 September 2020.

EDUCATION AND EXAMINATION REGULATIONS

MASTER OF SCIENCE COMPUTER SCIENCE

MASTER OF SCIENCE INTERNET SCIENCE AND TECHNOLOGY

A. FACULTY SECTION

B. PROGRAMME-SPECIFIC SECTION

2021-2022 academic year

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SECTION B PROGRAMME-SPECIFIC SECTION

MASTER COMPUTER SCIENCE (CS)

MASTER INTERNET SCIENCE AND TECHNOLOGY (IST)

About this Section

The Education and Examination Regulations (EER) are subdivided into two sections (Section A and Section B), which together form the EER. Section A, which can be seen as the faculty section, includes provisions that apply to all EEMCS Master's degree programmes. Section B contains the provisions that are specific to the particular degree programmes, in this case the Master's programme in Computer Science with the underlying specialisations 4TU Cyber Security (CybSec, organized within 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 specialisation 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. **SDS:** Sports Data Science, a sub-specialisation within Data Science and Technology
- e. **Graduation supervisor:** senior examiner of the research group chosen by the student to graduate with
- f. **IST:** Internet Science & Technology
- g. **Programme mentor:** individual appointed by the Examination Board to approve course programmes for their specific specialisation
- h. **ST:** Software Technology
- i. **TUD:** Delft University of Technology. Courses of the CybSec specialisation indicated with TUD are taught at the UT via tele-lecturing. The Delft EER 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, architectural design, detailed design, software construction, testing, and verification.
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, requirements engineering, software composition, software evolution, service-oriented architectures, model-driven engineering, logic, algorithms, and 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 programme

1. The general composition of the course programme is as follows¹:
 - a. Core courses: mandatory courses depending on the specialisation.
 - b. Advanced courses: courses depending on the specialisation.
 - c. Profiling space: around 30 EC in courses related to the specialisation.
 - 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 of their selected specialisation described in B6 specialisations.
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. To ensure basic knowledge in the field of study and the specialisation selected, the Admissions Board or Programme mentor may adjust the programme requirements on the basis of the student's prior education and training. Such an adjustment will never entail an intensification of the total study load, the programme will always have a study load of 120 credits.
5. Students take around 30 EC in courses related to the specialisation as part of their profiling space. Apart from additional requirements depending on the specialisation, this space should be used for:
 - a. an exchange programme
 - b. an internship (192199968, 20EC)
 - c. the study tour (10 EC)
 - d. a methodological course from the theme OOO (organize / research / design)
 - e. additional advanced specialisation courses
 - f. courses from another CS specialisation
 - g. courses from a different Master which are relevant to the specialisation

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 6.1.4, the one for EIT Data Science and Technology in Art. B6.2.4.

- 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 Admissions Board or Programme mentor as referred to in B4.1.4
6. When an 192199968 internship is included in an individual course programme, the 192199978 Final Project can only be carried out at the UT, at another university or at a research institute and not also at an external company.
7. Exceptions to the composition of the programme can be approved by the Examination Board.

Article B4.2 Course programme approval

1. Every student is required to obtain course programme approval from the Programme mentor of their selected specialisation
2. The programme approval is an agreement on the content of a student's individual course programme between the student and the Programme mentor. The Programme mentor approves a programme on behalf of the Examination Board.
3. Students are allowed to complete courses and sit examinations up to a maximum of 15 credits in a specialisation before contacting the Programme mentor for an approved course programme. After 15 credits permission from the Programme mentor is required for complete programme of 120 credits.
4. Until Research Topics and Final Project are started by the student, the approved course programme can still be altered by laying down a new revised course programme. At that time the Programme mentor should have approved the 120-credit course programme in its entirety.
5. 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 degree audit.
6. If the approved course programme 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.

Article B4.3 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 Guidelines of the Examination Board.

B5. RESEARCH TOPICS AND FINAL PROJECT

Article B5.1 Research Topics

1. All students must take Research Topics course as part of their course programme.
 - a. Students in the regular programme take 192199508 Research Topics (10EC)
 - b. Students in the EIT Digital Master School programme take 10 EC split into 201800524 Research Topics EIT (4EC) and 201800525 I&E Study EIT (6EC).

2. Research Topics serve as a preparation for the Final Project described in Article A3.7 and B5, and therefore has to immediately precede the graduation work. Students cannot start Research Topics before having obtained at least 60EC, but are recommended to start at 75 credits.
3. Students start Research Topics by registering in Osiris and subsequently Mobility Online.

Further information and procedures can be found on the programme website www.utwente.nl/csc. These procedures are considered part of this Regulation.

Article B5.2 Additional rules and procedures for the Final Project

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 research groups of the specialisation, 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 A3.11). Generally the Research Topics as described in Article B5.1 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. Students can start by registering in Osiris and subsequently Mobility Online
 - c. Faculty research groups take responsibility for supervision and assessment of the Final Project. Responsibility implies:
 - either the graduation committee contains a member of the group
 - or the Programme mentor has explicitly given permission for supervising the Final Project by a graduation committee containing no member of the group.

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 in Mobility Online), signed by both the student and the supervisor. The supervisor signs on behalf of the Examination Board.

Organizational procedures are found on Canvas, after registering in Osiris and on the programme website www.utwente.nl/csc. These procedures are considered part of this Regulation.

Article B5.3 Assessment and marking of the Final Project

1. 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 specialisation 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.
2. 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.
3. The composition of the assessment committee is described in A3.8 of the Faculty Section A.

4. In case the final grade of the Final Project is insufficient the student has to carry out a new Final Project.

B6. SPECIALISATIONS

Article B6.1 MSc Computer Science: Cyber Security

1. Core courses

The following 4 courses are mandatory:

- 201700074 Internet Security (InS, UT)
- 201500027 Security and Cryptography (Crp, TUD)
- 201600051 Software Security (SoS, UT)
- 201500026 Cyber Risk Management (CRM, TUD)

2. Advanced courses

At least 3 courses must be chosen out of the following:

- 192110940 Secure Data Management (SDM, UT)
- 201700083 Security Services for the Internet of Things (SSI, 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, UT)
- 201700079 Blockchain and Distributed ledger technology (BCT, UT)
- 201500040 Introduction to Biometrics (Bio, UT)
- 202000026 Secure Cloud Computing (SCC, UT)
- 202100073 Empirical Security Analysis & Engineering (ESA, UT)

3. Profiling space

Requirements:

- At least 3 socio-technical courses (see next item)

Socio-technical courses (at least 3)

- 201100022 Cyber Crime Science (CCS, TUD)
- 201500038 E-Law (UT)
- 201500041 Cyber Security Management (CSM, UT)
- 201500028 Economics of Security (EoS, TUD)
- 201900124 Capstone Cyber Security (Cap, TUD)
- 202001323 Governance of Cybersecurity (GoC, TUD)
- Other socio-technical courses (in consultation with the Programme mentor)

Additional 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)

Other elective courses

- 192620010 Mobile and Wireless Networking (MWN, UT)
- 201400177 Cloud Networking (CIN, UT)
- 201600070 Machine Learning 1 (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 specialisation 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; specialisation: Applied Security)
- Eötvös Loránd University, Hungary (both entry and exit year curriculum; specialisation: Advanced Cryptography)
- University of Turku, Finland (both entry and exit year curriculum; specialisation: Security of Networked Systems)
- University of Rennes 1, France (both entry and exit year curriculum; specialisation: Software Security)
- EURECOM, France (only exit year curriculum; specialisation: 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 (UT)

Core courses

The following 8 courses are mandatory:

- 201700074 Internet Security (InS, UT)
- 201500027 Security and Cryptography (Crp, TUD)
- 201600051 Software Security (SoS, UT)
- 201500026 Cyber Risk Management (CRM, TUD)
- 201700180 Innovation and Entrepreneurial Finance for EIT students (UT)
- 201700119 Business Development Lab I (UT)
- 201700120 Business Development Lab II (UT)
- 201400613 EIT Summer School (external) (4EC)

Advanced courses

At least 2 courses must 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, UT)
- 201700079 Blockchain and Distributed ledger technology (BCT, UT)
- 201500036 Software Testing and Reverse engineering (STR, TUD)
- 201100022 Cyber Crime Science (CCS, TUD)
- 201500038 E-Law (UT)
- 192620010 Mobile and Wireless Networking (MWN, UT)

Profiling space

Elective Innovation and Entrepreneurship (I&E) courses

- 201700019 Brand Management (UT)
- 201800077 Bioresource Business Development & Management (UT)
- 201800079 Bioresource Supply Chain Management (UT)
- 201600155 Global Strategy and Business Development (UT)
- 194105070 Information Systems for the Financial Services Industry (UT)
- 201500008 Empirical Methods for Designers (UT)
- 201600015 Strategic Technology Management and Innovation (UT)
- 201500080 Advanced Topics in Digital Marketing (UT)
- 201800205 Smart Industry (UT)
- 201800230 Advanced Project in Impact, Innovation & Entrepreneurship (UT)

Socio-technical courses

Please see the list of socio-technical courses in the Cyber Security specialisation (Art. B6.1.3).

Additional Cyber Security courses

- Additional advanced courses (see Art. B6.1.2)
- 201400177 Cloud Networking (CIN, UT)

Other suggested courses

- 201600070 Machine learning 1 (BML, UT)
- 201600071 Machine learning 2 (AML, UT)
- 201700075 Internet of Things (IoT, UT)
- 192130112 Distributed Systems (DiS, UT)

b. Exit year: specialisation “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, TUD)
- 202000026 Secure Cloud Computing (SCC, UT)
- 201500041 Cyber Security Management (CSM, UT)

- 192140122 System Validation (SyV, UT)
- 201500030 Fundamentals of Quantum Information (Q101, TUD, **4EC**)
- 201500026 Cyber Risk Management (CRM, TUD)
- 192110940 Secure Data Management (SDM, UT)
- 201500039 Security Verification (SeV, UT)
- 201500040 Introduction to Biometrics (Bio, UT)
- 202001323 Governance of Cybersecurity (GoC, TUD)
- 201600016 Quantum Cryptography (Q201, TUD)
- 201600070 Machine Learning 1 (MaL, UT)
- 201700075 Internet of Things (IoT, UT)
- 201400177 Cloud Networking (CIN, UT)
- 192130112 Distributed Systems (DiS, UT)
- 201600071 Machine Learning 2 (AML, UT)
- 201700079 Blockchain and Distributed Ledger Technology (BCT, UT)
- 201100022 Cyber Crime Science (CCS, TUD)
- 201500036 Software Testing and Reverse Engineering (STR, TUD)
- 201700074 Internet Security (InS, 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)
- 202100073 Empirical Security Analysis & Engineering (ESA, UT)

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

5. Grade rounding policy for Cybersecurity courses offered by TU Delft

Cybersecurity courses that are offered by TU Delft (marked with TUD in the courses listed above) follow the grade rounding policies as defined in Art. 17 of the [Delft Rules](#) and Regulations of the board of examiners EEMCS. Delft courses do NOT follow the Twente rounding rules as defined in Art. A4.4 of the Twente education and examination regulations for the computer science master (see above); only Twente courses follow the Twente rounding rules.

Important consequence: The teacher of each course is responsible to apply the respective grade rounding policy and as such decides on whether a student has passed or failed the course. The Delft rounding rules are slightly different from the Twente rules and for instance allow for a 5.5 (= fail in Delft) as final mark which does not exist in the Twente system. As a 5.5 is a failing mark in Delft. Any final grade for a Delft course > 5.0 and < 5.8 is transferred to a 5.0 in the Twente system to properly reflect the fact that the student has failed the course.

Article B6.2 MSc Computer Science: Data Science and Technology

1. Core courses

The following 4 courses are mandatory:

- 201200044 Managing Big Data
- 201400174 Data Science
- 201600070 Machine Learning 1

- 201700080 Information Theory and Statistics

2. Advanced courses

At least 4 courses must be chosen out of the following:

- 201600071 Machine Learning 2
- 191210910 Image Processing and Computer Vision
- 201800177 Deep Learning - From Theory to Practice
- 201600076 Foundations of Information Retrieval or 201600074 Natural Language Processing²
- 192320111 Architectures of Information Systems³
- 201700081 Probabilistic programming³
- 193810020 Advanced Techniques for Signal Analysis⁴
- 202001583 Sports Interaction Technology: Designing Interactive Systems for Sports⁴
- 191571090 Time Series Analysis⁴

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. Students opting for the sub-specialisation in Sports Data Science (SDS) need to complete at least 27 additional credits of mandatory profiling courses on Human Movement Science, to have it mentioned on their degree supplement.

Data Science profiles

- specialist in specific kinds of data*, such as natural language text, image data, geographic data, sensor data, networked data
- designer of smart services*
- designer of data science algorithms*
- multi-disciplinary researcher*
- specialist in sports and human movement data, devices and measurement techniques*

The following are suggested courses for the profiling space:

- (a,b) 201700075 Internet of Things
- (a,c) 201800222 Complex Networks
- (b) 201400277 Enterprise Architecture
- (b) 191820210 Simulation
- (c) 191506103 Statistics and Probability
- (c) 192135310 Modeling and Analysis of Concurrent Systems
- (c) 201900115 Statistical Learning
- (a) 201600083 Advanced Information Retrieval
- (a) 201600081 Advanced Natural Language Processing
- (a) 201600075 Speech Processing
- (a,d) 201800063 Traffic Forecasting and Analysis

² Students can do both, but only one will count as an advanced course and the other as an elective in the profiling space.

³ The courses 'Probabilistic programming' and 'Architectures of Information Systems' are considered advanced courses only for the DST study program. They can be electives for DST-SDS students.

⁴ The courses 'Advanced Techniques for Signal Analysis', 'Sports Interaction Technology' and 'Time Series Analysis' are considered advanced courses only for DST-SDS students. DST students can select them as electives.

- (a,c) 201500040 Introduction to Biometrics
- (b) 202000027 Enterprise Security
- (b) 192376500 Business Process Integration lab
- (b) 192320501 Electronic Commerce
- (b,d,e) 201600028 Telemedicine and Data Analysis for Monitoring
- (c) 201400353 Signals with Information
- (a,d) 201500363 Data Science Additional Topics
- (a) 201600082 Advanced Speech processing
- (a,b,c,d,e) 202000029 Empirical and Design Science Research in Information Systems
- (a,d,e) 193810020 Advanced Techniques for Signal Analysis
- (b) 201100051 Information Services
- (b) 192652150 Service-oriented Architecture Web Services
- (c) 191520751 Graph Theory
- (d) 201700196 Advanced Simulation for Health Economic Analysis
- (a,e) 201100254 Advanced Computer Vision and Pattern Recognition
- (a,b) 201500042 Privacy-Enhancing Technologies
- (a,b,c,d,e) 201300074 Research Experiments in Databases and Information Retrieval (REDI)
- (a,c) 201700364 Spatial Statistics
- (b,d) 202000028 Smart Industry
- (c,e) 191571090 Time Series Analysis
- (c) 192111092 Advanced Logic
- (d,e) 202001583 Sports Interaction Technology: Designing Interactive Systems for Sports
- (a,b,c,d,e) 201500527 Capita Selecta DST
- (c) other courses on fundamentals and algorithms of signal processing, stochastic processing, etc.
- (d) other courses on data analysis from fields like health/medicine, social sciences, business sciences, bio-informatics, engineering.

The following are mandatory profiling courses on Human Movement Sciences for the SDS sub-specialization. They are provided by teachers of the VU Amsterdam:

- 202100140 Anatomy (6EC)
- 202100141 Training and Performance (physiology part) (3EC)
- 202100142 Measurement of physical measures (6EC)
- 202100143 Applied Biomechanics (6EC)
- 202100144 Concepts in Human Movement Sciences (6EC)

The following is an optional profiling course on Human Movement Sciences for the SDS sub-specialization, provided by teachers of the VU Amsterdam:

- 202100145 Electromyography (3EC)

4. EIT Digital Master School: Data Science

A special way to fulfil the requirements of the Data Science & Technology specialisation is by successfully completing the course programme on Data Science 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 Data Science are:

- ⁵Eindhoven University of Technology, The Netherlands (both entry and exit year curricula; specialisation: Business Process Intelligence)
- KTH Royal Institute of Technology, Stockholm, Sweden (both entry and exit year curricula; specialisation: Distributed Systems & Data Mining for Big Data)
- Technical University of Madrid, Spain (both entry and exit year curricula; specialisation: Infrastructures for Large Scale Data Management and Analysis)
- Université Côte d'Azur, Nice, France (both entry and exit year curricula; specialisation: Multimedia and Web Science for Big Data)
- Politecnico di Milano, Italy (only entry year curriculum)
- University Paris-Saclay⁶, France (both entry and exit year curricula; specialisation: Natural Language Processing)
- Aalto University, Helsinki, Finland (both entry and exit year curricula; specialisation: Machine Learning, Big Data Management, and Business Analytics)
- Eötvös Loránd University, Budapest, Hungary (both entry and exit year curricula; specialisation: Real-time Data Analytics)
- University of Rennes 1, France (both entry and exit year curricula; specialisation: Artificial Intelligence & Data Mining for Business Intelligence)
- Technical University of Berlin, Germany (only exit year curriculum; specialisation: Design, Implementation, and Usage of Data Science Instruments)
- University of Trento, Italy (only exit year curriculum; specialisation: Big Data Variety and Veracity)

a. Entry year

The entry year of EIT Digital Data Science 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).

Mandatory for all Computer Science students

- 191612680 Computer Ethics

Core courses

The following 4 courses are mandatory:

- 201200044 Managing Big Data
- 201400174 Data Science
- 201600070 Machine Learning 1
- 201700080 Information Theory and Statistics

Advanced courses

At least 4 courses must be chosen out of the following:

- 201600071 Machine Learning 2
- 191210910 Image Processing and Computer Vision
- 201800177 Deep Learning - From Theory to Practice

⁵ This university cannot be chosen in combination with the University of Twente, because both are in The Netherlands

⁶ Formerly known as Université Paris-Sud.

- 201600076 Foundations of Information Retrieval or 201600074 Natural Language Processing⁷
- 192320111 Architectures of Information Systems
- 201700081 Probabilistic programming

NB: students are allowed to propose similar courses at the exit university to cover core or advanced courses. This has to be approved by the Programme mentor.

Profiling space

Requirements:

- All mandatory Innovation and Entrepreneurship (I&E) courses, see below
- No additional requirements apply, but the data science student is suggested to further specialize in one or more of the following data science profiles:
 - *specialist in specific kinds of data*, such as natural language text, image data, geographic data, sensor data, networked data
 - *designer of smart services*
 - *designer of data science algorithms*
 - *multi-disciplinary researcher*

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

The following are suggested courses for the profiling space:

- (a,b) 201700075 Internet of Things
- (a,c) 201800222 Complex Networks
- (b) 201400277 Enterprise Architecture
- (b) 191820210 Simulation
- (c) 191506103 Statistics and Probability
- (c) 192135310 Modeling and Analysis of Concurrent Systems
- (c) 201900115 Statistical Learning
- (a) 201600083 Advanced Information Retrieval
- (a) 201600081 Advanced Natural Language Processing
- (a) 201600075 Speech Processing
- (a,d) 201800063 Traffic Forecasting and Analysis
- (a,c) 201500040 Introduction to Biometrics

⁷ Students can do both, but only one will count as an advanced course and the other as an elective in the profiling space.

- (b) 202000027 Enterprise Security
- (b) 192376500 Business Process Integration lab
- (b) 192320501 Electronic Commerce
- (b,d,e) 201600028 Telemedicine and Data Analysis for Monitoring
- (c) 201400353 Signals with Information
- (a,d) 201500363 Data Science Additional Topics
- (a) 201600082 Advanced Speech processing
- (a,b,c,d,e) 202000029 Empirical and Design Science Research in Information Systems
- (a,d,e) 193810020 Advanced Techniques for Signal Analysis
- (b) 201100051 Information Services
- (b) 192652150 Service-oriented Architecture Web Services
- (c) 191520751 Graph Theory
- (d) 201700196 Advanced Simulation for Health Economic Analysis
- (a,e) 201100254 Advanced Computer Vision and Pattern Recognition
- (a,b) 201500042 Privacy-Enhancing Technologies
- (a,b,c,d,e) 201300074 Research Experiments in Databases and Information Retrieval (REDI)
- (a,c) 201700364 Spatial Statistics
- (b,d) 202000028 Smart Industry
- (c,e) 191571090 Time Series Analysis
- (c) 192111092 Advanced Logic
- (d,e) 202001583 Sports Interaction Technology: Designing Interactive Systems for Sports
- (a,b,c,d,e) 201500527 Capita Selecta DST
- (c) other courses on fundamentals and algorithms of signal processing, stochastic processing, etc.
- (d) other courses on data analysis from fields like health/medicine, social sciences, business sciences, bio-informatics, engineering.

b. Exit year: specialisation “Data Science for Persona Information”

Exit year students have completed a programme in the entry year at one of our partner universities. Nevertheless, students need to comply with our requirements for a core and advanced programme (see below). Students are expected to show how the courses in their programme at the entry university cover the all or at least most of the core and advanced courses. This has to be approved by the Programme mentor. The intention is that students minimize the number of core and advanced courses they still have to do in their exit year, so that sufficient room for electives remain.

The exit year counts at least 60 EC. It consists of the following parts

Mandatory for all Computer Science students

- 191612680 Computer Ethics
- 192199978 Final Project (30 EC)

Core courses

The following 4 courses are mandatory:

- 201200044 Managing Big Data
- 201400174 Data Science
- 201600070 Machine Learning 1
- 201700080 Information Theory and Statistics

Advanced courses

At least 4 courses must be chosen out of the following:

- 201600071 Machine Learning 2
- 191210910 Image Processing and Computer Vision
- 201800177 Deep Learning - From Theory to Practice
- 201600076 Foundations of Information Retrieval or 201600074 Natural Language Processing⁸
- 192320111 Architectures of Information Systems
- 201700081 Probabilistic programming

NB: students are expected to show how the courses in their programme at the entry university cover the all or at least most of the core and advanced courses. This has to be approved by the Programme mentor. The intention is that students minimize the number of core and advanced courses they still have to do in their exit year, so that sufficient room for electives remain.

Research Topics

Instead of the course “Research Topics”, EIT exit year students do:

- 201800524 Research Topics EIT (4EC)
- 201800525 I&E Study EIT (6EC)

Profiling space

For the remainder of the 60EC, the student needs to pick at least 15 EC from the following courses

- 201600028 Telemedicine and Data Analysis for Monitoring
- 201500222 Technology for Health
- 201400353 Signals with Information
- 201500040 Introduction to Biometrics
- 201100254 Advanced Computer Vision & Pattern Recognition
- 201700075 Internet of Things
- 201400408 Complex Networks
- The above courses are specifically suggested for the EIT specialisation “Data Science for Personal Information”. They are course related to topics such as health and sports, wellbeing, biometrics and privacy. Any other course suggested for the profiling space of the Data Science & Technology programme is also allowed.

Further details on the programme can be found on: <http://masterschool.eitdigital.eu/programmes/dsc>

Article B6.3 MSc Computer Science: Software Technology

1. Core course

The following 4 courses are mandatory:

- 202001472 Software Testing and Risk Assessment
- 192140122 System Validation
- 192111332 Design of Software Architecture
- 201700082 Principles of Programming, Processes and Patterns

2. Advanced courses

At least 4 courses must be chosen out of the following:

⁸ Students can do both, but only one will count as an advanced course and the other as an elective in the profiling space.

- 192111092 Advanced logic
- 192340041 Software Management
- 192135450 ADSA – Model-Driven Engineering
- 192652150 Service-oriented Architecture Web Services
- 192135310 Modeling and Analysis of Concurrent Systems
- 201900082 Graph Algorithms and Complexity
- 201400225 Software Evolution
- 202100126 Interactive Theorem Proving

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)⁹

Mandatory courses for the Research Orientation (10EC):

- One of the courses marked “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
- 201700081 Probabilistic Programming
- 201600070 Machine Learning 1
- 201400174 Data Science
- 201600040 Requirements Engineering Processes and Methods
- 202100113 Probabilistic Model Checking (Software Science)
- 202100114 Graph Transformations (Software Science)
- 202100115 Program Verification (Software Science)
- 202100116 Model Checking and Parity Games (Software Science)

Article B6.4 MSc Computer Science: Internet Science and Technology²

1. Core courses

The following 4 courses are mandatory:

- 192620010 Mobile and wireless networking
- 192620300 Performance evaluation
- 201700075 Internet of Things
- 201700074 Internet security

⁹ Students with a Design orientation are not allowed to also do an 192199968 internship due to the overlap with 201400172 ISEP

2. Advanced courses

At least 4 courses must be chosen out of the following:

- 201700077 Advanced Networking
- 192652150 Serv. Oriented Arch. with Web Serv.
- 201400177 Cloud Networking
- 201700073 Ad-Hoc Networks
- 202001579 Internet Measurements
- 192111301 Ubiquitous Computing
- 192130112 Distributed Systems
- 201700083 Security Services for the Internet of Things
- 202100073 Empirical Security Analysis and Engineering

3. Profiling space

Requirements: No additional requirements apply.

Suggested elective courses

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

Article B6.5 MSc Computer Science: specialisation Internet Science and Technology¹⁰

As of September 2020 the Master's programme in Internet Science and Technology will no longer be offered as a separate Master's programme to starting students. Instead the Master will continue on as a specialisation of Computer Science. Students studying in the MSc Internet Science and Technology can continue their programme until September 2023 or switch to the Computer Science IST specialisation. See also Article B6.4.

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. EVALUATION AND QUALITY ASSURANCE

In addition to the rules and procedures described in Article A3.12, the Programme Committee CS also plays an important role in the internal quality control cycle of the Computer Science programmes:

- For discussion of the reflection forms send in by lectures as part of the course evaluation cycle
- By organizing quality assurance interviews with lecturers based on these reflections

¹⁰ 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.

B9. TRANSITIONAL AND FINAL PROVISIONS

Article B9.1 Transitional provisions

The transitional arrangements can be found in appendix B.

Article B9.2 Publication

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

Article B9.3 Effective date

These Regulations enter into force with effect from 1 September 2021.

I. ADMISSIONS APPENDIX

This is the Admissions Appendix describing admission to the Master's programme in Computer Science. 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 Education 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 (UT), Computer Science and Engineering (TUD, TU/e), Business Information Technology (UT) or Informatica (RUG, UU, UvA, VU, UL, RU, OU) Bachelor's programme will be eligible for direct admission to the programmes.
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 specific 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 Education 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 modules as part of his or her Bachelor's course programme:
 - Computer Systems for CS (15EC)
 - Software Systems core (12EC)
 - Network Systems for EE (15EC)
 - Discrete Structures & Efficient Algorithms (15EC)

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. 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 enroll 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. 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 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 Education 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 must 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 Education 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 education 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 must contact their Programme mentor for an adjustment of their course programme.

3. Regulation 2017-2018 regarding Methods and Tools for Verification specialisation

Occasion: This regulation is necessary because the specialisation 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 specialisation.

4. Regulation 2017-2018 regarding Wireless and Sensor Systems specialisation

Occasion: This regulation is necessary because the specialisation 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 specialisation.

5. Regulation 2017-2018 regarding Data Science and Smart Services specialisation

Occasion: This regulation is necessary because the name of the specialisation 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 specialisation.

6. Regulation 2021-2022 regarding the discontinuation of the Internet Science and Technology Master's programme

Occasion: This regulation is necessary because Internet Science and Technology will be discontinued as a separate Master's programme per September 2023. Instead it will continue to exist as specialisation within the Computer Science Master's programme.

Term of validity: until September 1, 2023.

Contents of the regulation: Students who have their course programme approved will be allowed to finish their Master's programme up and until 31 August 2023. After this date students in the Master Internet Science and Technology will need to transfer to the IST specialization of the Computer Science Master programme to finish their degree.

