



UNIVERSITEIT VAN AMSTERDAM

# Teaching and Examination Regulations (TER)

Faculty of Science, Vrije Universiteit Amsterdam (VU)

Faculty of Science, University of Amsterdam (UvA)

Masterprogramme in Computer Science (Joint Degree)

Academic year: 2019-2020

A: Faculty section

B1: Programme specific section – general provisions

B2: Programme specific section – content of programme

## Index

<b>Section A: Faculty Section</b> .....	<b>3</b>
<b>1. General provisions</b> .....	<b>3</b>
Article 1.1 Applicability of the Regulations .....	3
Article 1.2 Definitions.....	3
<b>2. Study programme structure</b> .....	<b>4</b>
Article 2.1 Structure of academic year and educational components.....	4
Article 2.2 Refusal or termination of registration / (iudicium abeundi) .....	5
<b>3. Assessment and Examination</b> .....	<b>5</b>
Article 3.1 Signing up for education and interim examinations.....	5
Article 3.2 Type of examination .....	5
Article 3.3 Oral interim examinations.....	5
Article 3.4 Determining and announcing results.....	5
Article 3.5 Examination opportunities .....	6
Article 3.6 Marks .....	6
Article 3.7 Exemption .....	7
Article 3.8 Validity period for results .....	7
Article 3.9 Right of inspection and post-examination discussion .....	7
Article 3.10 Fraud and plagiarism.....	7
<b>4. Academic student counselling and study progress</b> .....	<b>8</b>
Article 4.1 Administration of study progress and academic student counselling.....	8
Article 4.2 Adaptations for students with a disability .....	8
<b>5. Hardship clause</b> .....	<b>8</b>
Article 5.1 Hardship clause.....	8
Article 5.2. Publication .....	9
<b>Section B1: Programme specific – general provisions</b> .....	<b>10</b>
<b>6. General programme information and characteristics</b> .....	<b>10</b>
Article 6.1 Study programme information .....	10
Article 6.2 Teaching formats used and modes of assessment .....	10
Article 7.1 Intake date(s).....	10
Article 7.2 Admission requirements.....	10
Article 7.3 Pre-Master’s programme.....	11
<b>7. Interim examinations and results</b> .....	<b>11</b>
Article 8.1 Sequence of interim examinations .....	11
Article 8.2 Validity period for results .....	11
Article 8.3 Maximum Exemption(s) .....	12
Article 8.4. Degree .....	12
<b>8. Programme objectives, specializations and exit qualifications</b> .....	<b>13</b>
Article 9.1 Workload.....	13
Article 9.2 Specializations .....	13
Article 9.3 Programme objective .....	13
Article 9.4 Exit qualifications .....	14
<b>9. Curriculum structure</b> .....	<b>16</b>
Article 10.1 Composition of the programme.....	16
Article 10.2 Compulsory educational components .....	16
Article 10.3 Elective educational components .....	22
Article 10.4 Participation in practical exercise.....	23
<b>10. Evaluation and transitional provisions</b> .....	<b>23</b>
Article 11.1 Evaluation of the education.....	23
Article 11.2 Transitional provisions.....	23
<b>Appendix I Overview of articles that must be included in the OER</b> .....	<b>25</b>
<b>Appendix II Overview of rights to prior consultation (advice) and rights to approve OLC and FGV</b> .....	<b>26</b>
<b>Appendix III Ordinances VU CvB and Binding Guidelines (richtlijn)</b> .....	<b>27</b>

## Section A: Faculty Section

### 1. General provisions

#### Article 1.1 Applicability of the Regulations

<p>1. These Regulations apply to anyone enrolled for the programme, irrespective of the academic year in which the student was first enrolled for the programme. These Regulations apply to the teaching and examinations for the following Master's degree programmes:</p> <ul style="list-style-type: none"> <li>▪ Artificial Intelligence</li> <li>▪ Bioinformatics and System Biology</li> <li>▪ Biomedical Sciences</li> <li>▪ Biomolecular Sciences</li> <li>▪ Business Analytics</li> <li>▪ Computer Science</li> <li>▪ Drug Discovery and Safety</li> <li>▪ Earth Sciences</li> <li>▪ Ecology</li> <li>▪ Environment and Resource Management</li> <li>▪ Global Health (research)</li> <li>▪ Health Sciences</li> <li>▪ Hydrology</li> <li>▪ Information Sciences</li> <li>▪ Management, Policy Analysis and Entrepreneurship in the Health and Life Sciences</li> <li>▪ Mathematics</li> <li>▪ Medical Natural Sciences</li> <li>▪ Neurosciences (research)</li> <li>▪ Parallel and Distributed Computer Systems</li> <li>▪ Science Business and Innovation</li> <li>▪ Stochastics and Financial Mathematics</li> </ul>	<p>Advice OLC, approval FGV (9.38 ub b)</p>
<p>2. These Regulations enter into force with effect from 1 September 2019.</p>	<p>Advice OLC, approval FGV (9.38 ub b)</p>
<p>3. An amendment to the Teaching and Examination Regulations is only permitted to concern an academic year already in progress if this does not demonstrably damage the interests of students.</p>	<p>Advice OLC, approval FGV (9.38 sub b)</p>

#### Article 1.2 Definitions

The following definitions are used in these Regulations (*in alphabetical order*):

- a. academic year: the period beginning on 1 September and ending on 31 August of the following calendar year;
- b. CvB: the Executive Board of Vrije Universiteit Amsterdam.
- c. Double degree programme: joint programme in the context of cooperation between Vrije Unviersiteit Amsterdam and the educational institution within and outside the EU, as to gain a double university degree; of the VU and the educational institution concerned; though not being the same as a 'joint degree programme' according to the art. 7.3c WHW';
- d. EC (European Credit): an EC credit with a workload of 28 hours of study;
- e. educational component: a unit of study of the programme within the meaning of the WHW;
- f. examination: the final examination of the Master's programme;
- g. exemption: Exemption from an examination/ practical/ fieldwork based on an earlier successfully completed examination, or knowledge / skills of a similar content, level and scope gained outside higher education;
- h. FGV: Faculty joint assembly – assembly of the faculty student council and faculty staff council;
- i. interim examination: an assessment of the student's knowledge, understanding and skills relating to a

	course component. The assessment is expressed in terms of a final mark. An interim examination may consist of one or more partial examinations. A resit always covers the same material as the original interim examination;
j. joint degree:	a degree awarded by an institution together with one or more institutions in the Netherlands or abroad, after the student has completed a study programme (a degree programme, a major or a specific curriculum within a degree programme) for which the collaborating institutions are jointly responsible;
k. OLC:	programme committee;
l. period:	a part of a semester;
m. practical exercise:	the participation in a practical training or other educational learning activity, aimed at acquiring certain (academic) skills. Examples of practical exercises are: <ul style="list-style-type: none"> <li>○ researching and writing a thesis or dissertation</li> <li>○ carrying out a research assignment</li> <li>○ taking part in fieldwork or an excursion</li> <li>○ taking part in another educational learning activity aimed at acquiring specific skills, or</li> <li>○ participating in and completing a work placement;</li> </ul>
n. premaster student	those who enroll in a premaster programme;
o. Programme:	the totality and cohesion of the course components, teaching activities/methods, contact hours, testing and examination methods and recommended literature;
p. SAP/SLM:	the student information system ( <i>Student Lifecycle Management</i> );
q. semester:	the first (September - January) or second half (February - August) of an academic year;
r. study guide:	the guide for the study programme that provides further details of the courses, provisions and other information specific to that programme. The Study Guide is available electronically at: <a href="https://www.vu.nl/studiegids">https://www.vu.nl/studiegids</a>
s. subject	see 'educational component';
t. substituting course/educational component	see under d (double degree programme). A course obtained at the educational institute, within the context of cooperation, that is mentioned in the diploma supplement as such; not being an 'exemption'.
u. thesis/ internship work placement	a component comprising research into the literature and/or contributing to scientific research, always resulting in a written report;
v. university:	Vrije Universiteit Amsterdam;
w. WHW:	the Dutch Higher Education and Research Act ( <i>Wet op het Hoger Onderwijs en Wetenschappelijk Onderzoek</i> );
x. workload:	the workload of the unit of study to which an interim examination applies, expressed in terms of credits = EC credits (ECTS = European Credit and Transfer Accumulation System). The workload for 1 year (1,680 hours) is 60 EC credits.

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

## 2. Study programme structure

### Article 2.1 Structure of academic year and educational components

1. The study programme will be offered in a year divided into two semesters.	Ordinance CvB, see appendix 3
2. Every semester consists of three consecutive periods of eight, eight and four weeks.	Ordinance CvB, see appendix 3
3. An educational component comprises 6 EC or a multiple thereof.	Ordinance CvB, see appendix 3
4. By way of exception to paragraph 3, Section B may stipulate that a unit of study comprises 3 EC or a multiple thereof. The Faculty Board requests permission from the Executive Board.	Ordinance CvB, see appendix 3

### Article 2.2 Refusal or termination of registration / (iudicium abeundi)

1. Pursuant to the provisions of Article 7.42a of the Act, the Faculty Board or the Examination Board may, in exceptional circumstances, request the Executive Board to terminate or refuse a student's registration on a programme. This may be the case if the student's conduct or statements demonstrate his or her unsuitability to work in the relevant field or discipline, or to take part in the programme's practical training component.	WHW
2. If a student is suspected of being unsuitable as described in paragraph 1, the Examination Board or the Faculty Board will examine the case, and the student will be informed of this immediately. The Examination Board or the Faculty Board will only issue a recommendation after careful consideration of the interests involved and following a hearing with the student concerned.	WHW

## 3. Assessment and Examination

### Article 3.1 Signing up for education and interim examinations

1. Every student must sign up to participate in the educational components of the programme, the examinations and resits. The procedure for signing up is described in an annex to the Student Charter.	Ordinance CvB, see appendix 3
2. Signing up may only take place in the designated periods.	Ordinance CvB, see appendix 3
3. If a student does not pass the examination and the resit of a component, he/ she is obliged to take the whole component again. This rule does not apply to practical exercises and programmes that make use of component marks that retain their validity. For further regulations see Section B of the programme involved.	Advice OLC, approval FGV (7.13 x)

### Article 3.2 Type of examination

1. At the student's request, the Examination Board may permit a different form of interim examination than that stipulated in the course catalogue. If applicable, more detailed regulations on this are included in the Rules and Guidelines for the Examination Board.	Advice OLC, Approval FGV (7.13 l)
2. In an educational component is no longer offered in the academic year following its termination, at least one opportunity will be provided to sit the interim examination(s) or parts thereof and a transitional arrangement will be included in the programme-specific section for the subsequent period.	Advice OLC, approval FGV (7.13 j)

### Article 3.3 Oral interim examinations

1. An oral assessment is public unless the Examinations Board on request determines otherwise.	Advice OLC; approval FGV (7.13 l and n)
2. An oral examination will be taken in the presence of a second examiner.	Advice OLC, approval FGV (art. 9.38 par. b)

### Article 3.4 Determining and announcing results

1. The examiner determines the result of a written interim examination as soon as possible, but at the latest within fifteen working days. By way of departure from that stipulated in the first clause, the marking deadline for theses, internships / work placements and final assignments is no longer than twenty working days. The examiner will then immediately ensure that the marks are registered and also ensures that the student is immediately notified of the mark, taking due account of the applicable confidentiality standards.	Ordinance CvB, see appendix 3
2. a. The examiner determines the result (i.e. mark) of an oral examination as soon as possible, though within one working day, after the examination has finished and informs the student accordingly. The third clause of the first paragraph applies. b. The examiner determines the result of an interim examination no later than five working days before the next (interim) examination will be held.	Advice OLC; approval FGV (7.13 o)

3. In the case of alternative forms of oral or written examinations, the Examination Board determines in advance how and by what deadline the student will be informed of the results.	Advice OLC; approval FGV (7.13 o)
4 A student can submit a request for reassessment to the examiner. A request for reassessment does not affect the time period for lodging an appeal.	Advice OLC; approval FGV (9.38 sub b)
5. Together with the result of an examination, the student's attention will also be drawn to their right to inspect the assessed work and have a post-examination discussion as stipulated in Art. 3.9, as well as his/her option to lodge a complaint before the Examination Board, and if necessary, to appeal to the Examinations Appeals Board (in Dutch: COBEX).	

### Article 3.5 Examination opportunities

1. a. Per academic year, two opportunities to take examinations per educational component will be offered. b. The options for retaking practical components, work placements and theses are detailed in the relevant work placement manual, teaching regulations or graduation regulations.	Ordinance CvB, see appendix 3
2. The most recent mark will apply in the event of a resit. A retake is allowed for both passed and failed units of study.	Ordinance CvB, see appendix 3
3. The resit for a (partial) interim examination must not take place within ten working days of the announcement of the result of the (partial) examination being resat.	Advice OLC; approval FGV (7.13 j)
4. The Examination Board may allow a student an extra opportunity to sit an examination if that student: a) is lacking only those credits to qualify for his or her degree; b) has failed the examination during all the previously offered attempts, unless participation in an examination was not possible for compelling reasons. The extra opportunity can only be offered if it concerns a written examination, a paper or a take home examination. This provision excludes the practical assignments and the Master's thesis. Requests for an additional examination opportunity must be submitted to the Examination Board no later than 15 July. If necessary, the method of examination may deviate from the provisions in the study guide.	Ordinance CvB, see appendix 3

### Article 3.6 Marks

1. Marks are given on a scale from 1 to 10 with no more than one decimal point.	Ordinance CvB, see appendix 3																														
2. The final marks are given in whole or half points.	Ordinance CvB, see appendix 3																														
3. Final marks between 5 and 6 will be rounded off to whole marks: up to 5.5 rounded down; from 5.5 rounded up. To pass a course, a 6 or higher is required. In case the examination of a component consists of two or more parts, each of which are graded separately, the (weighted) mean of these marks (meaning: the final mark) must be rounded off using the following table:	Ordinance CvB, see appendix 3																														
<table border="1"> <thead> <tr> <th>From</th> <th>Up to</th> <th>Grade</th> </tr> </thead> <tbody> <tr> <td>1,00</td> <td>1,25</td> <td>1</td> </tr> <tr> <td>1,25</td> <td>1,75</td> <td>1,5</td> </tr> <tr> <td>1,75</td> <td>2,25</td> <td>2,0</td> </tr> <tr> <td>2,25</td> <td>2,75</td> <td>2,5</td> </tr> <tr> <td>2,75</td> <td>3,25</td> <td>3,0</td> </tr> <tr> <td>3,25</td> <td>3,75</td> <td>3,5</td> </tr> <tr> <td>3,75</td> <td>4,25</td> <td>4,0</td> </tr> <tr> <td>4,25</td> <td>4,75</td> <td>4,5</td> </tr> <tr> <td>4,75</td> <td>5,50</td> <td>5,0</td> </tr> </tbody> </table>		From	Up to	Grade	1,00	1,25	1	1,25	1,75	1,5	1,75	2,25	2,0	2,25	2,75	2,5	2,75	3,25	3,0	3,25	3,75	3,5	3,75	4,25	4,0	4,25	4,75	4,5	4,75	5,50	5,0
From	Up to	Grade																													
1,00	1,25	1																													
1,25	1,75	1,5																													
1,75	2,25	2,0																													
2,25	2,75	2,5																													
2,75	3,25	3,0																													
3,25	3,75	3,5																													
3,75	4,25	4,0																													
4,25	4,75	4,5																													
4,75	5,50	5,0																													

	5,50	6,25	6,0		
	6,25	6,75	6,5		
	6,75	7,25	7,0		
	7,25	7,75	7,5		
	7,75	8,25	8,0		
	8,25	8,75	8,5		
	8,75	9,25	9,0		
	9,25	9,75	9,5		
	9,75	10,0	10		
4. The Examination Board can allow to use symbols rather than numbers, such as: pass, fail, (un)satisfactory, good, VRS (exemption). In case a student does not take part in any (interim) examination, the examiner will register the mark 'ns' (c.q. no show).					Ordinance CvB, see appendix 3

### Article 3.7 Exemption

1. At the written request of the student, the Examination Board may exempt the student from taking one or more examination components, if the student: <ol style="list-style-type: none"> <li>has passed a course component of a university or higher professional education programme that is equivalent in terms of content and level;</li> <li>has demonstrated through his/her work and/or professional experience that he/she has sufficient knowledge and skills with regard to the relevant course component.</li> </ol> The Examination Board will make a decision within six weeks after receiving the request.	Advice OLC; approval FGV (7.13 r)
2. The Master's thesis, the final work placement (c.q. internship) and the final project (c.q. final paper) are excluded from this exemption possibility.	Advice OLC; approval FGV (9.38 sub b)
3. A maximum of 18 EC for a one one-year master programme and 36 EC for a one two-year master programme can be accumulated through granted exemption. The substituting courses (educational components) are not included.	Advice OLC, approval FGV (art. 7.13 par. 2, under r WHW jo art. 9.38 par. b)

### Article 3.8 Validity period for results

1. The validity period of interim examinations passed and exemption from interim examinations is unlimited, unless otherwise specified in Section B.	WHW
2. The validity period of a partial examination is limited to the academic year in which it was sat or until the end of the unit of study concerned, as stipulated for the relevant unit of study in Section B.	Advice OLC; approval FGV (9.38 sub b)

### Article 3.9 Right of inspection and post-examination discussion

1. For twenty working days after the announcement of the results of a written interim examination, the student can, on request, inspect his or her assessed work, the questions and assignments set in it, as well as the standards applied for marking. The place and time referred to in the previous clause will be announced at the time of the interim examination on VUnet or Canvas.	Advice OLC; approval FGV (7.13 p en q)
2. If a collective post-examination discussion has been organized, individual post-examination discussions will be held only if the student has attended the collective discussion or if the student was unable to attend the collective discussion through no fault of his or her own.	Advice OLC; approval FGV (7.13 q)
3. Students who meet the requirements stipulated in paragraph 1 can submit a request for an individual post-examination discussion to the relevant examiner. The discussion shall take place at a time and location to be determined by the examiner.	Advice OLC; approval FGV (7.13 p en q)

### Article 3.10 Fraud and plagiarism

1. The provisions of the Rules and Guidelines for the Examination Board apply in full.	Ordinance CvB
--	---------------

2. Electronic detection software programmes may be used to detect plagiarism in texts. In submitting a text, the student implicitly consents to the text being saved in the database of the detection programme concerned.	Ordinance CvB
--	---------------

#### 4. Academic student counselling and study progress

##### Article 4.1 Administration of study progress and academic student counselling

1. The faculty board is responsible for the correct registration of the students' study results. After the assessment of an educational component has been registered, every student has the right to inspect the result for that component and also has a list of the results achieved at his or her disposal in VUnet.	Advice OLC; approval FGV (7.13 u)
2. Enrolled students are eligible for academic student counselling. Academic student counselling is in any case provided by: <ol style="list-style-type: none"> <li>a. The Student General Counselling Service</li> <li>b. Student psychologists</li> <li>c. Faculty academic advisors</li> </ol>	Advice OLC; approval FGV (7.13 u)

##### Article 4.2 Adaptations for students with a disability

1. A student with a disability can, at the moment of submission to VUnet, or at a later instance, submit a request to qualify for special adaptations with regard to teaching, practical training and interim examinations. These adaptations will accommodate the student's individual disability as much as possible, but may not alter the quality or degree of difficulty of a unit of study or an examination. In all cases, the student must fulfil the exit qualifications for the study programme.	Advice OLC; approval FGV (7.13 m)
2. The request referred to in the first paragraph must be accompanied by a statement from a doctor or psychologist. If possible, an estimate should be given of the potential impact on the student's study progress. In case of a chronic disability a single (one time) request suffices.	Advice OLC; approval FGV (7.13 m)
3. Students who have been diagnosed with dyslexia must provide a statement from a BIG, NIP or NVO registered professional who is qualified to conduct psychological evaluation.	Advice OLC; approval FGV (7.13 m)
4. The faculty board, or on behalf of the faculty board, the educational director, or the programme director, decides on the adaptations concerning the teaching facilities and logistics. The Examination Board will rule on requests for adaptations with regard to examinations.	Advice OLC; approval FGV (7.13 m)
5. In the event of a positive decision in response to a request as referred to in paragraph 1, the student will make an appointment with the study adviser to discuss the details of the provisions.	Advice OLC; approval FGV (7.13 m)
6. A request for adaptations will be refused if it would place a disproportionate burden on the organization or the resources of the faculty or university were it upheld.	Advice OLC; approval FGV (7.13 m)
7. If the disability justifies an extension of the interim examination time, the Examination Board will grant permission testifying to this entitlement to an extension. If a disability justifies other measures to be taken, the Examination Board will advise the Faculty Board on the necessary measures to be taken.	Advice OLC; approval FGV (7.13 m)
8. The decision as referred to in paragraph 7, is valid for a maximum period of one year with the exception for the chronic diseases and disabilities.	Advice OLC; approval FGV (7.13 m)

#### 5. Hardship clause

##### Article 5.1 Hardship clause

In instances not regulated by the Teaching and Examination Regulations or in the event of demonstrable extreme unreasonableness and unfairness, the faculty board responsible for the study programme will decide, unless the matter concerned is the responsibility of the Examinations Board.	Advice OLC; approval FGV (9.38 sub b)
---	---



**Article 5.2. Publication**

1. The faculty board will ensure the appropriate publication of these Regulations and any amendments to them.	WHW
2. The Teaching and Examination Regulations will be posted in the study guide or on VUnet.	WHW

Approved by authorized representative advisory body FGOV of the Faculty of Science on 3 September 2019.

Adopted by the Faculty Board on 30 August 2019.

## Section B1: Programme specific – general provisions

### 6. General programme information and characteristics

#### Article 6.1 Study programme information

1.	The programme MSc Computer Science CROHO number 65014 is offered on a full-time basis.	Advice OLC; approval FGV (7.13 i)
2.	The language of instruction is English	Advice OLC; approval FGV (9.38 b)
3.	The programme is offered in partnership with the University of Amsterdam and leads to a joint degree.	Advice OLC; approval FGV (9.38 b)

#### Article 6.2 Teaching formats used and modes of assessment

1.	The programme uses the teaching formats as specified in the Study Guide.	Advice OLC; approval FGV (7.13 x)
2.	The modes of assessment used per educational component are specified in the Study Guide.	Advice OLC; approval FGV (7.13 l)

### 6. Further admission requirements

#### Article 7.1 Intake date(s)

1.	The programme starts twice a year: on September 1 and on February 1.	Advice OLC; approval FGV (9.38 b)
----	--	--

#### Article 7.2 Admission requirements

1.	Students will be admitted to the degree programme if they hold a letter of acceptance, issued by or on behalf of the Faculty Board because they have demonstrated that they meet the knowledge, understanding and skills requirements reflecting the final level of attainment in an academic Bachelor's degree programme.	Partly legal provision & ordinance CvB, see appendix 3. Admission requirements excepted from participation in WHW
2.	The Examination Board will investigate whether the applicant meets the admission requirements.	Legal provision
3.	In addition to the requirements mentioned in the first paragraph, the Examination Board will also assess applications for admission based on the following criteria: a. talent and motivation; b. command of methods and techniques.	Partly legal provision & ordinance CvB, see appendix 3. Admission requirements excepted from participation in WHW
4.	Anyone with a Bachelor's degree in Computer Science from a Dutch university meets the requirements referred to in the first paragraph.	
5.	If the Master's programme consists of various programmes, then a prerequisite may be set for each programme consisting of a completed Bachelor's specialization or minor.	

6.	Those not yet in possession of a Bachelor's degree, but who meet the admission requirements as regards the knowledge, insight and skills specified in paragraph 1, may on request be granted conditional admission to the associated Master's programme, insofar as failure to grant admission would result in undue unfairness.	
7.	A Bachelor's degree obtained at an applied university or higher vocational education (HBO in Dutch) in a subject related to Computer Science may only grant access to a premaster to enter the programme in case of a GPA of at least 7.5.	

### Article 7.3 Pre-Master's programme

1. a)	Students with a Bachelor's degree of a university of applied science (HBO) in a field that corresponds to a sufficient extent with the subject area covered by the Master's programme can request admission to the pre-Master's programme.	advies OLC; instemming FGV (9.38 b)
b)	Students with a Bachelor's degree from an institution of academic higher education in a field that does not sufficiently corresponds with the subject area covered by the Master's programme can request admission to the pre-Master's programme.	
2.	The pre-Master's programme comprises 30 EC and is made up on individual basis.	Advice OLC; approval FGV (9.38 sub b)
3.	A successfully completed pre-Master's programme serves as proof of admission to the specified Master's programme in the subsequent academic year.	Legal provision
4.	A candidate can only participate in one pre-Master's programme at the Vrije Universiteit.	Ordinance CvB, see appendix 3

## 7. Interim examinations and results

### Article 8.1 Sequence of interim examinations

1.	Students may participate in interim examinations [or practical exercises] of the components below only if they have passed the interim examination or examinations for the components mentioned hereinafter: <i>this article is not applicable</i> .	Advice OLC; approval FGV (7.13 h, s & t)
----	--	---

### Article 8.2 Validity period for results

1.	See Article 3.8 of the Teaching and Examination Regulations, section A. No further specific provisions.	Advice OLC; approval FGV (7.13 k)
2.	A student may request the Examination Board to extend the validity of an exam. If the exam shows that a student's knowledge is insufficient or outdated, or if the student's skills and insights evaluated in the exam are demonstrably outdated, the Examination Board may impose a supplementary examination, impose a replacement examination or refuse to extend the period of validity.	Legal provision
3.	In situations where a limited period of validity applies, the period of validity of examinations may be extended in the event of extenuating circumstances as stipulated in WHW Article 7.51, paragraph 2, with at least the period of allocated financial assistance specified in WHW Article 7.15, paragraph 1.	Legal provision

### Article 8.3 Maximum Exemption(s)

A maximum of 36 EC of the curriculum can be accumulated through granted exemptions, based on previous results within other master's programmes.	Advice OLC, approval FGV (7.13 par. 2, under r jo art. 9.38 sub b)
---	--

### Article 8.4. Degree

Degree Students who have successfully completed their Master's final Examination are awarded a Master of Science degree. The degree awarded is stated on the diploma. If it is a joint degree, this will also be stated on the diploma. Track name will be stated on the diploma, either Big Data Engineering; Computer Systems Security; Foundations of Computing and Concurrency; Internet and Web Technology; Parallel Computing Systems or Software Engineering and Green IT if one has successfully completed all the compulsory courses of the specific track; otherwise no track name will be stated on the diploma.	Legal provision
---	-----------------

## Section B2: Programme specific – content of programme

### 8. Programme objectives, specializations and exit qualifications

#### Article 9.1 Workload

1. The programme has a workload of 120 EC.	Advice OLC; (7.13 a)
--	-------------------------

#### Article 9.2 Specializations

<p>The programme has the following specializations:</p> <ul style="list-style-type: none"> <li>▪ BDE: Big Data Engineering;</li> <li>▪ CSS: Computer Systems Security;</li> <li>▪ FCC: Foundations of Computing and Concurrency;</li> <li>▪ IWT: Internet and Web Technology;</li> <li>▪ PCS: Parallel Computing Systems;</li> <li>▪ SEG: Software Engineering and Green IT.</li> </ul>	Advice OLC; (7.13 a)
---	-------------------------

#### Article 9.3 Programme objective

<p>The programme aims to provide students with the knowledge, experience and insight they need to pursue a career as a computer science specialist or to engage in scientific research. Moreover, the programme seeks to provide students with a practical understanding of the field of Computer Science in a broad scientific, philosophical and social context.</p> <p>The goal of the programme is to expand on the knowledge and skills acquired at Bachelor's level. By choosing a specialization, the student engages with the cutting-edge of scientific endeavour or of application and design.</p>	Advice OLC; (7.13 a)
--	-------------------------

#### Article 9.4 Exit qualifications

<p>1. At all event, a graduate of the Master's programme in Computer Science:</p> <ol style="list-style-type: none"> <li>1) possesses solid academic knowledge and insight in the field of computer science, including the required background knowledge from other academic disciplines, which builds upon and goes beyond the level of a Bachelor's degree;</li> <li>2) has knowledge, insight and skills of a specialist nature in at least one area of computer science (additional final attainment levels to be given for each specialization separately);</li> <li>3) is able to acquire specialist knowledge, insights and skills in other areas of computer science within a reasonable period of time;</li> <li>4) has acquired practical skills in relevant sub-areas of the field of computer science at Master level;</li> <li>5) is aware of the applications of computer science in general and of the chosen specialization in particular, and is able to apply his/her knowledge and skills to new or otherwise unknown problems;</li> <li>6) is capable of designing a research or project plan on the basis of a realistic problem description in the field of computer science and can contribute to its progress with original solutions;</li> <li>7) able to carry out research independently, both individually and in small teams.</li> <li>8) is able to consult and use the international professional literature in the relevant sub-areas of the field of computer science;</li> <li>9) is able to formulate, analyse and evaluate scientific results, and to use them to draw conclusions;</li> <li>10) is able to function in professional situations in an international context where scientific knowledge and skills in computer science are required;</li> <li>11) has developed a critical, scientific attitude and a societal perspective on information technology;</li> <li>12) is able to communicate with others at a professional level and can give clear oral and written presentations of the results of his/her work;</li> <li>13) is thoroughly prepared for further education at doctorate level or for further postgraduate education as a professional computer scientist.</li> </ol>	<p>Approval OLC (7.13 c)</p>
<p>1.a. Beyond the general requirements of a Computer Science Master, the graduate of <b>Big Data Engineering</b> is expected to have acquired knowledge, competences, and insight on:</p> <ol style="list-style-type: none"> <li>1) BDE-1. Architecture and scalability of data processing platforms and their programming models;</li> <li>2) BDE-2. The world wide web as a global information source;</li> <li>3) BDE-3. Conducting experiments on data processing systems, and be able to properly interpret data that result from such experiments.</li> </ol>	<p>Approval OLC (7.13 b)</p>
<p>1.b. Beyond the general requirements of a Computer Science Master, the graduate of <b>Computer Systems Security</b> is expected to have acquired knowledge, competences, and insight on:</p> <ol style="list-style-type: none"> <li>1) CSS-1. Security issues in system-level software including weaknesses and defenses;</li> <li>2) CSS-2. Static and dynamic analysis techniques for software (benign and malicious);</li> <li>3) CSS-3. Security implications of modern hardware features (side channels, hardware bugs, and hardware-based protection).</li> </ol>	
<p>1.c. Beyond the general requirements of a Computer Science Master, the graduate of <b>Foundations of Computing and Concurrency</b> is expected to have acquired knowledge, competences, and insight on:</p> <ol style="list-style-type: none"> <li>1) FCC-1. Models of computation;</li> <li>2) FCC-2. Models of concurrency;</li> <li>3) FCC-3. Automated verification;</li> <li>4) IWT-3. Conducting experiments on networked applications and distributed systems, and be able to properly interpret data that result from such experiments.</li> </ol>	

<p>1.d. Beyond the general requirements of a Computer Science Master, the graduate of <b>Internet and Web Technology</b> is expected to have acquired knowledge, competences, and insight on:</p> <ol style="list-style-type: none"><li>1) IWT-1. Distributed computer systems, notably in the form of capabilities for designing networked systems and with emphasis on efficient information processing on the Internet;</li><li>2) IWT-2. Programming large and complex pieces of (possibly low-level) systems-oriented software.</li></ol>	
<p>1.e. Beyond the general requirements of a Computer Science Master, the graduate <b>Parallel Computing Systems</b> is expected to have acquired knowledge, competences, and insight on:</p> <ul style="list-style-type: none"><li>▪ PCS-1. Design and architecture of parallel and distributed computing systems;</li><li>▪ PCS-2. Performance and efficiency of application programs and the related runtime systems and middleware services;</li><li>▪ PCS-3. Conducting experiments as a means for the analysis of high-performance systems, and be able to properly interpret data that result from such experiments.</li></ul>	
<p>1.f. Beyond the general requirements of a Computer Science Master, the graduate of <b>Software Engineering and Green IT</b> is expected to have acquired knowledge, competences, and insight on:</p> <ol style="list-style-type: none"><li>1) SEG-1. Reconciling conflicting software project objectives, finding acceptable compromises within limitations of cost, time, knowledge, existing systems, organisations, and societal aspects of software technology;</li><li>2) SEG-2. Understanding and applying current theories, models and techniques that provide a basis for decision making on IT investment issues, problem identification and analysis, software architecture, software design, development, implementation, testing, documentation and reengineering;</li><li>3) SEG-3. Designing and conducting experiments (and empirical studies in general) to analyse and assess the relation between software systems, energy efficiency and sustainability issues.</li></ol>	

## 9. Curriculum structure

### Article 10.1 Composition of the programme

1. The programme comprises at least a package of compulsory components and an individual Master's thesis.	Ordinance CvB, see appendix 3
2. Additionally the programme offers: <ul style="list-style-type: none"> <li>▪ Practical exercises;</li> <li>▪ Electives</li> </ul>	Advice OLC; (7.13 a)
3. Educational components are categorized as specialized (level 400) and researchoriented (level 500).	Ordinance CvB, see appendix 3

### Article 10.2 Compulsory educational components

A detailed description per educational component can be found in the Study Guide

Educational component	Coursecode	Nr of EC	Level	Advice OLC, (art 7.13a)
<b>XM_CS_BDE</b>	<b>M CS track Big Data Engineering</b>			
<b>XM1_CS_BDE_V</b>	<b>M CS track BDE year 1 compulsory</b>			
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>	
X_405111	Seminar	6	400	
X_405116	Large Scale Data Engineering	6	500	
XM_40020	Web Data Processing Systems	6	400	
XMU_418143	Information Visualization	6	0	
X_400108	Data Mining Techniques	6	500	
XMU_418110	Web Services and Cloud-based Systems	6	400	
<b>XM2_CS_BDE_V</b>	<b>M CS track BDE year 2 compulsory</b>			
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>	
XM_0011	Master Project Computer Science	30	500	
<b>XM_CS_BDE_B</b>	<b>M CS track BDE constrained choice</b>			
<b>XM_CS_B2</b>	<b>Foundations of Computing &amp; Concurrency C</b>			
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>	
X_400117	Protocol Validation	6	500	
X_400115	Logical Verification	6	500	
X_400211	Distributed Algorithms	6	500	
X_405048	Advanced Logic	6	500	
<b>XM_CS_B3</b>	<b>Mathematics CC</b>			
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>	
X_400336	Stochastic Optimization	6	400	
X_405041	Coding and Cryptography	6	500	
X_405078	Experimental Design and Data Analysis	6	400	
<b>XM_CS_B5</b>	<b>Software Engineering CC</b>			
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>	



X_405061	Service Oriented Design	6	400
X_400412	Software Asset Management	6	400
X_400170	Software Architecture	6	400
X_400439	Software Testing	6	400
<b>XM_CS_B6</b>	<b>Societal Perspectives on Comp Science CC</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
XMU_418107	History of digital cultures	6	400
R_E.commerc	E-Commerce Law	6	500
XM_0009	Entrepreneurship for AI and CS	6	400
X_405101	ICT4D	6	400
XM_0008	ICT4D in the field	6	400
<b>XM_CS_CSS</b>	<b>M CS track Computer Systems Security</b>		
<b>XM1_CS_CSS_V</b>	<b>M CS track CSS year 1 compulsory</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
X_405111	Seminar	6	400
X_400127	Computer and Network Security	6	400
X_405100	Binary and Malware Analysis	6	500
X_400211	Distributed Algorithms	6	500
<b>XM2_CS_CSS_V</b>	<b>M CS track CSS year 2 compulsory</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
XM_0011	Master Project Computer Science	30	500
XM_40014	Advanced Operating Systems	6	400
XM_40019	Hardware Security	6	500
<b>XM_CS_CSS_B</b>	<b>M CS track CSS constrained choice</b>		
<b>XM_CS_B2</b>	<b>Foundations of Computing &amp; Concurrency C</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
X_400117	Protocol Validation	6	500
X_400115	Logical Verification	6	500
X_400211	Distributed Algorithms	6	500
X_405048	Advanced Logic	6	500
<b>XM_CS_B5</b>	<b>Software Engineering CC</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
X_405061	Service Oriented Design	6	400
X_400412	Software Asset Management	6	400
X_400170	Software Architecture	6	400
X_400439	Software Testing	6	400

<b>XM_CS_B6</b>	<b>Societal Perspectives on Comp Science CC</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
XMU_418107	History of digital cultures	6	400
R_E.commerc	E-Commerce Law	6	500
XM_0009	Entrepreneurship for AI and CS	6	400
X_405101	ICT4D	6	400
XM_0008	ICT4D in the field	6	400
<b>XM_CS_FCC</b>	<b>M CS track Foundations of Compu &amp; Concur</b>		
<b>XM1_CS_FCC_V</b>	<b>M CS track FCC year 1 compulsory</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
X_405111	Seminar	6	400
X_400117	Protocol Validation	6	500
X_400115	Logical Verification	6	500
X_405048	Advanced Logic	6	500
XM_400121	Term Rewriting Systems	6	400
X_400211	Distributed Algorithms	6	500
<b>XM2_CS_FCC_V</b>	<b>M CS track FCC year 2 compulsory</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
XM_0011	Master Project Computer Science	30	500
<b>XM_CS_FCC_B</b>	<b>M CS track FCC constrained choice</b>		
<b>XM_CS_B3</b>	<b>Mathematics CC</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
X_400336	Stochastic Optimization	6	400
X_405041	Coding and Cryptography	6	500
X_405078	Experimental Design and Data Analysis	6	400
<b>XM_CS_B4</b>	<b>Programming CC</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
XM_405088	Individual Systems Practical	6	500
XM_40014	Advanced Operating Systems	6	400
XM_40017	Programming Large-scale Parallel Systems	6	400
X_405082	Internet programming	6	400
X_400162	Parallel Programming Practical	6	500
XMU_40018	Programming Multi-core and Many-core Sys	6	400
X_405124	Project Systems Testing	6	400

<b>XM_CS_B5</b>	<b>Software Engineering CC</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
X_405061	Service Oriented Design	6	400
X_400412	Software Asset Management	6	400
X_400170	Software Architecture	6	400
X_400439	Software Testing	6	400
<b>XM_CS_B6</b>	<b>Societal Perspectives on Comp Science CC</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
XMU_418107	History of digital cultures	6	400
R_E.commerc	E-Commerce Law	6	500
XM_0009	Entrepreneurship for AI and CS	6	400
X_405101	ICT4D	6	400
XM_0008	ICT4D in the field	6	400
<b>XM_CS_IWT</b>	<b>M CS track Internet &amp; Web Technology</b>		
<b>XM1_CS_IWT_V</b>	<b>M CS track IWT year 1 compulsory</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
X_405111	Seminar	6	400
X_400130	Distributed Systems	6	400
X_405082	Internet programming	6	400
X_405105	Performance of Networked Systems	6	400
X_400211	Distributed Algorithms	6	500
XMU_418110	Web Services and Cloud-based Systems	6	400
<b>XM2_CS_IWT_V</b>	<b>M CS track IWT year 2 compulsory</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
XM_0011	Master Project Computer Science	30	500
<b>XM_CS_IWT_B</b>	<b>M CS track IWT constrained choice</b>		
<b>XM_CS_B2</b>	<b>Foundations of Computing &amp; Concurrency C</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
<b>X_400117</b>	<b>Protocol Validation</b>	<b>6</b>	<b>500</b>
X_400115	Logical Verification	6	500
X_400211	Distributed Algorithms	6	500
X_405048	Advanced Logic	6	500
<b>XM_CS_B5</b>	<b>Software Engineering CC</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
X_405061	Service Oriented Design	6	400
X_400412	Software Asset Management	6	400
X_400170	Software Architecture	6	400
X_400439	Software Testing	6	400

<b>XM_CS_B6</b>	<b>Societal Perspectives on Comp Science CC</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
XMU_418107	History of digital cultures	6	400
R_E.commerc	E-Commerce Law	6	500
XM_0009	Entrepreneurship for AI and CS	6	400
X_405101	ICT4D	6	400
XM_0008	ICT4D in the field	6	400
<b>XM_CS_PCS</b>	<b>M CS track Parallel Computing Systems</b>		
<b>XM1_CS_PCS_V</b>	<b>M CS track PCS year 1 compulsory</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
X_405111	Seminar	6	400
XM_40017	Programming Large-scale Parallel Systems	6	400
X_400162	Parallel Programming Practical	6	500
XMU_40015	Parallel System Architectures	6	400
XMU_40018	Programming Multi-core and Many-core Sys	6	400
XMU_40016	Performance Engineering	6	500
<b>XM2_CS_PCS_V</b>	<b>M CS track PCS year 2 compulsory</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
XM_0011	Master Project Computer Science	30	500
<b>XM_CS_PCS_B</b>	<b>M CS track PCS constrained choice</b>		
<b>XM_CS_B2</b>	<b>Foundations of Computing &amp; Concurrency C</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
<b>X_400117</b>	<b>Protocol Validation</b>	<b>6</b>	<b>500</b>
X_400115	Logical Verification	6	500
X_400211	Distributed Algorithms	6	500
X_405048	Advanced Logic	6	500
<b>XM_CS_B3</b>	<b>Mathematics CC</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
X_400336	Stochastic Optimization	6	400
X_405041	Coding and Cryptography	6	500
X_405078	Experimental Design and Data Analysis	6	400
<b>XM_CS_B5</b>	<b>Software Engineering CC</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
X_405061	Service Oriented Design	6	400
X_400412	Software Asset Management	6	400
X_400170	Software Architecture	6	400
X_400439	Software Testing	6	400

<b>XM_CS_B6</b>	<b>Societal Perspectives on Comp Science CC</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
XMU_418107	History of digital cultures	6	400
R_E.commerc	E-Commerce Law	6	500
XM_0009	Entrepreneurship for AI and CS	6	400
X_405101	ICT4D	6	400
XM_0008	ICT4D in the field	6	400
<b>XM_CS_SEG</b>	<b>M CS track Software Engineeri &amp; Green IT</b>		
<b>XM1_CS_SEG_V</b>	<b>M CS track SEG year 1 compulsory</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
X_405111	Seminar	6	400
X_405061	Service Oriented Design	6	400
X_400412	Software Asset Management	6	400
X_400170	Software Architecture	6	400
X_400439	Software Testing	6	400
<b>XM2_CS_SEG_V</b>	<b>M CS track SEG year 2 compulsory</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
XM_0011	Master Project Computer Science	30	500
X_418158	Green Lab	6	400
<b>XM_CS_seg_B</b>	<b>M CS track seg constrained choice</b>		
<b>XM_CS_B2</b>	<b>Foundations of Computing &amp; Concurrency C</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
<b>X_400117</b>	<b>Protocol Validation</b>	<b>6</b>	<b>500</b>
X_400115	Logical Verification	6	500
X_400211	Distributed Algorithms	6	500
X_405048	Advanced Logic	6	500
<b>XM_CS_B3</b>	<b>Mathematics CC</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
X_400336	Stochastic Optimization	6	400
X_405041	Coding and Cryptography	6	500
X_405078	Experimental Design and Data Analysis	6	400
<b>XM_CS_B4</b>	<b>Programming CC</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
XM_405088	Individual Systems Practical	6	500
XM_40014	Advanced Operating Systems	6	400
XM_40017	Programming Large-scale Parallel Systems	6	400
X_405082	Internet programming	6	400
X_400162	Parallel Programming Practical	6	500

XMU_40018	Programming Multi-core and Many-core Syg	6	400
X_405124	Project Systems Testing	6	400
<b>XM_CS_B6</b>	<b>Societal Perspectives on Comp Science CC</b>		
<b>Code</b>	<b>Name (EN)</b>	<b>Credits</b>	<b>Level</b>
XMU_418107	History of digital cultures	6	400
R_E.commerc	E-Commerce Law	6	500
XM_0009	Entrepreneurship for AI and CS	6	400
X_405101	ICT4D	6	400
XM_0008	ICT4D in the field	6	400

### Article 10.3 Elective educational components

1. The student can take one or more of the following electives without prior consent from the Examination Board:				Advice OLC, (art 7.13a)
<b>Code</b>	<b>Name of educational component</b>	<b>Credits</b>	<b>Level</b>	
M CS pre-approved electives (for all tracks)				
XM_405088	Individual Systems Practical	6	500	
XM_405080	Industrial Internship	6	400	
XM_40014	Advanced Operating Systems	6	400	
X_400127	Computer and Network Security	6	400	
X_400111	Evolutionary Computing	6	400	
X_418158	Green Lab	6	400	
XMU_418111	Introduction to Computational Science	6	400	
X_405065	Knowledge and Media	6	500	
X_405116	Large Scale Data Engineering	6	500	
XM_40017	Programming Large-scale Parallel Systems	6	400	
X_400117	Protocol Validation	6	500	
X_405061	Service Oriented Design	6	400	
X_400412	Software Asset Management	6	400	
XMU_418108	Lambda Calculus	6	0	
X_400336	Stochastic Optimization	6	400	
XMU_0012	Concurrency Theory	6	500	
X_400130	Distributed Systems	6	400	
XM_40019	Hardware Security	6	500	
X_405082	Internet programming	6	400	
X_405099	Knowledge Engineering	6	400	
X_400115	Logical Verification	6	500	
X_400170	Software Architecture	6	400	
XM_40020	Web Data Processing Systems	6	400	
X_400162	Parallel Programming Practical	6	500	
XMU_40013	High Performance Computing and Big Data	6	400	
XMU_40015	Parallel System Architectures	6	400	
X_405048	Advanced Logic	6	500	
X_400650	Business Process Analytics	6	400	
X_405041	Coding and Cryptography	6	500	
X_405078	Experimental Design and Data Analysis	6	400	
XMU_418143	Information Visualization	6	0	
X_405105	Performance of Networked Systems	6	400	
XMU_40018	Programming Multi-core and Many-core Syg	6	400	
XM_400121	Term Rewriting Systems	6	400	

X_405086	The Social Web	6	400
X_405100	Binary and Malware Analysis	6	500
X_400108	Data Mining Techniques	6	500
X_400211	Distributed Algorithms	6	500
X_405101	ICT4D	6	400
XMU_40016	Performance Engineering	6	500
X_400439	Software Testing	6	400
XMU_418110	Web Services and Cloud-based Systems	6	400
XM_0008	ICT4D in the field	6	400
XM_40012	Machine Learning for the Quantified Self	6	400
X_405124	Project Systems Testing	6	400
2. If the student wishes to take a different educational component than listed, advance permission must be obtained in writing from the Examinations Board.			Advice OLC; (7.13 a)

#### Article 10.4 Participation in practical exercise

1. Student are expected to participate actively in all degree components for which they are registered.	Approval OLC (7.13 d)
2. In addition to the general requirement regarding active participation, the study guide details additional requirements for each degree component, including attendance requirements.	
3. At the start of each degree component, a specification will be made available which details: <ul style="list-style-type: none"> <li>- The final attainment levels of the degree component;</li> <li>- The study guidelines for passing the degree component;</li> <li>- The way in which the final attainment levels are assessed;</li> <li>- The regulations for examinations and resits;</li> <li>- The guidance provided by lecturers during scheduled hours and otherwise;</li> <li>- Component attendance requirements;</li> <li>- The provision of feedback to the student on assignments and reports submitted, and presentations given during the degree component.</li> </ul>	
4. If a student is prevented by force majeure from attending a required degree component, then the student must send written notification of his or her absence to the examiner and the study advisor as soon as possible. The examiner may, after consultation with the study advisor, give the student an alternative assignment.	
5. Absence from degree components with required attendance is only allowed in the case of force majeure.	
6. In the event of inadequate participation, either qualitative or quantitative, the examiner may exclude the student from further participation in the degree component or a part of the degree component. The details of the student's inadequate participation must be recorded in advance and approved by the Director of Studies.	

## 10. Evaluation and transitional provisions

### Article 11.1 Evaluation of the education

1. The education provided in this programme is evaluated in accordance with the (attached) evaluation plan. The faculty evaluation plan offers the framework.	Approval OLC (7.13 a1)
---	---------------------------

### Article 11.2 Transitional provisions

By way of departure from the Teaching and Examination Regulations currently in force, the following transitional provisions apply for students who started the programme under a previous set of Teaching and Examination Regulations: <i>this article is not applicable.</i>	Advice OLC (7.13 a)
---	------------------------

Advice and approval by the Programme Committee of M Computer Science (JD), on 6 June 2019

Approved by the Faculty Joint Assembly, on 3 September 2019.

Adopted by the board of the Faculty of Science on 30 August 2019.



## Appendix I Overview of articles that must be included in the OER

Based on Section 7.13, paragraph 2, of the WHW and other Sections of the Act.

### Section B1: Programme specific – general provisions

<b>6. General programme information and characteristics</b>	
Article 6.1 Study programme information	7.13 paragraph 2 sub i, r
Article 6.2 Teaching formats used and modes of assessment	7.13 paragraph 2 sub l, x
[option:] Article 6.3 Academic student counselling	7.13 paragraph 2 sub u
<b>7. Further admission requirements</b>	
Article 7.2 Admission requirements	7.30b paragraph 2
<b>8. Interim examinations and results</b>	
Article 8.1 Sequence of interim examinations	7.13 paragraph 2 sub h, s, t
[option 1:] Article 8.2 Validity period for results	7.13 paragraph 2 sub k
[option 2:] Article 8.2 Validity period for results	7.13 paragraph 2 sub k

### Section B2: Programme specific – content of programme

<b>9. Programme objectives, specializations and exit qualifications</b>	
Article 9.1 Workload	7.13 paragraph 2 sub g
Article 9.2 Specializations	7.13 paragraph 2 sub a
Article 9.3 Programme objective	7.13 paragraph 2 sub a
Article 9.4 Exit qualifications	7.13 paragraph 2 sub b, c
<b>10. Curriculum structure</b>	
Article 10.1 Composition of the programme	7.13 paragraph 2 sub a
Article 10.2 Compulsory educational components	7.13 paragraph 2 sub a
[Optional] Article 10.3 Elective educational components	7.13 paragraph 2 sub a
[Optional] Article 10.4 Practical exercise	7.13 paragraph 2 sub d
Article 10.5 Participation in practical training and tutorials	7.13 paragraph 2 sub d
<b>11. Evaluation and transitional provisions</b>	
Article 11.1 Evaluation of the education	7.13 paragraph 2 sub a1
Article 11.2 Transitional provisions	7.13 paragraph 2 sub a

## Appendix II Overview of rights to prior consultation (advice) and rights to approve OLC and FGV

(Dutch only)

Onderwerpen Onderwijs – en Examenregeling (OER) 7.13 paragraph 2 WHW	FGV		OpIC	
	I	A	I	A
a. de inhoud van de opleiding en van de daaraan verbonden examens				
a1. de wijze waarop het onderwijs in de desbetreffende opleiding wordt geëvalueerd				
b. de inhoud van de afstudeerrichtingen binnen een opleiding				
c. de kwaliteiten op het gebied van kennis, inzicht en vaardigheden die een student zich bij beëindiging van de opleiding moet hebben verworven				
d. waar nodig, de inrichting van praktische oefeningen				
e. de studielast van de opleiding en van elk van de daarvan deel uitmakende onderwijseenheden				
f. de nadere regels, bedoeld in de artikelen 7.8b, zesde lid, en 7.9, vijfde lid (BSA)				
g. ten aanzien van welke masteropleidingen toepassing is gegeven aan artikel 7.4a, achtste lid (verhoogde studielast)				
h. het aantal en de volgtijdelijkheid van de tentamens alsmede de momenten waarop deze afgelegd kunnen worden				
i. de voltijdse, deeltijdse of duale inrichting van de opleiding				
j. waar nodig, de volgorde waarin, de tijdvakken waarbinnen en het aantal malen per studiejaar dat de gelegenheid wordt geboden tot het afleggen van de tentamens en examens				
k. waar nodig, de geldigheidsduur van met goed gevolg afgelegde tentamens, behoudens de bevoegdheid van de examencommissie die geldigheidsduur te verlengen				
l. of de tentamens mondeling, schriftelijk of op een andere wijze worden afgelegd, behoudens de bevoegdheid van de examencommissie in bijzondere gevallen anders te bepalen				
m. de wijze waarop studenten met een handicap of chronische ziekte redelijkerwijs in de gelegenheid worden gesteld de tentamens af te leggen				
n. de openbaarheid van mondeling af te nemen tentamens, behoudens de bevoegdheid van de examencommissie in bijzondere gevallen anders te bepalen				
o. de termijn waarbinnen de uitslag van een tentamen bekend wordt gemaakt alsmede of en op welke wijze van deze termijn kan worden afgeweken				
p. de wijze waarop en de termijn gedurende welke degene die een schriftelijk tentamen heeft afgelegd, inzage verkrijgt in zijn beoordeelde werk				
q. de wijze waarop en de termijn gedurende welke kennis genomen kan worden van vragen en opdrachten, gesteld of gegeven in het kader van een schriftelijk afgenomen tentamen en van de normen aan de hand waarvan de beoordeling heeft plaatsgevonden				
r. de gronden waarop de examencommissie voor eerder met goed gevolg afgelegde tentamens of examens in het hoger onderwijs, dan wel voor buiten het hoger onderwijs opgedane kennis of vaardigheden, vrijstelling kan verlenen van het afleggen van een of meer tentamens				
s. waar nodig, dat het met goed gevolg afgelegd hebben van tentamens voorwaarde is voor de toelating tot het afleggen van andere tentamens				
t. waar nodig, de verplichting tot het deelnemen aan praktische oefeningen met het oog op de toelating tot het afleggen van het desbetreffende tentamen, behoudens de bevoegdheid van de examencommissie vrijstelling van die verplichting te verlenen, al dan niet onder oplegging van vervangende eisen				
u. de bewaking van studievoortgang en de individuele studiebegeleiding				
v. indien van toepassing: de wijze waarop de selectie van studenten voor een speciaal traject binnen een opleiding, bedoeld in artikel 7.9b, plaatsvindt (excellentietraject binnen een opleiding)				
x. de feitelijke vormgeving van het onderwijs				
alle overige onderwerpen die in de OER zijn geregeld maar die niet als zodanig zijn genoemd in art. 7.13 WHW onder a t/m x.				

De lettering komt overeen met de lettering van artikel 7.13 lid 2 WHW

### Appendix III Ordinances VU CvB and Binding Guidelines (richtlijn)

Section B1, article:	Concerns:	CvB ordinance / guideline
7.2.1	Admission criteria; at least WO Bachelor's degree	Richtlijn Bachelor en Masteronderwijs, revised on 6 June 2017
7.2.3	Additional admission criteria; type of criteria	Richtlijn Bachelor en Masteronderwijs, revised on 6 June 2017
Section B1, article:	Concerns:	CvB ordinance / guideline
10.1	Composition programme	Richtlijn Bachelor en Masteronderwijs, revised on 6 June 2017
10.2	Categorization of components	Richtlijn Bachelor en Masteronderwijs, revised on 6 June 2017