

Teaching and Examination Regulations

Master programme in Parallel and Distributed Computer Systems

Faculty of Science

Academic year 2020-2021

- A. Faculty section
- B1. Programme specific section - general provisions
- B2. Programme specific section – content of programme

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Several articles for the 2020-2021 academic year will be temporarily suspended or amended as a result of the measures to stop the spread of COVID-19. These changes are included in Appendix V.

Section A: Faculty section

1. General provisions

Article 1.1 Applicability of the Regulations

1. These Regulations apply to anyone enrolled in the programme, irrespective of the academic year in which the student was first enrolled in the programme.	Advice OLC, approval FGV (9.38 sub b)
2. These Regulations enter into force on 1 September 2020	Advice OLC, approval FGV (9.38 sub b)
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.	Advice OLC, approval FGV (9.38 sub b)

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 Universiteit Amsterdam and the educational institution within and outside the Netherlands, 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:
- researching and writing a thesis or dissertation
 - 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;
- n. programme: the totality and cohesion of the course components, teaching activities/methods, contact hours, testing and examination methods and recommended literature;
- o. SAP/SLM: the student information system (*Student Lifecycle Management*);
- p. semester: the first (September - January) or second half (February - August) of an academic year;
- q. specialization: optional route of study within a degree programme indicating a deepening of the (inter/multi) disciplinary context of the programme;
- 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:
<https://www.vu.nl/en/study-guide/>;
- s. study monitor: dashboard for students and academic advisors with data of the student (*studiemonitor*);
- t. subject: see 'educational component';
- u. substituting course/ educational component: see under c (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'.
- v. Track: full route of study within a broad bachelor's or master's degree programme or a fully English-language route of study within a Dutch-language bachelor's or master's degree;
- w. Thesis/ internship work placement:: scientific research, always resulting in a written report;
- x. university: Vrije Universiteit Amsterdam;
- y. WHW: the Dutch Higher Education and Research Act (*Wet op het Hoger Onderwijs en Wetenschappelijk Onderzoek*);
- z. 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, the Executive Board may in special cases and on request of the Faculty Board, stipulate that a unit of study comprises 3 EC or a multiple thereof.	Ordinance CvB, see appendix 3

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, the student is obligated to take the whole component again. This rule does not apply to practical exercises and programmes that make use of partial 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 examiner's request, the Examination Board may permit a different form of interim examination than is stipulated in the study guide.	Advice OLC, Approval FGV (7.13 l)
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Article 3.3 Oral interim examinations

1. An oral assessment is public unless the Examination Board in special cases determines otherwise.	Advice OLC; approval FGV (7.13 l and n)
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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, but at the latest within one working day after the examination has finished and informs the student accordingly. The third sentence 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)

Article 3.5 Examination opportunities

1. a. Per academic year, two opportunities to take examinations per educational component will be offered.	Ordinance CvB, see appendix 3
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b. By way of exception to a., the options for retaking practical components, work placements and theses are detailed in the relevant work placement manual, teaching regulations or graduation regulations.	
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: <ul style="list-style-type: none"> a) is lacking only those credits to qualify for their degree, and; 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
5. If an educational component is no longer offered in the following academic year, one opportunity will be provided to sit the interim examination(s) or parts thereof during the current academic year and a transitional arrangement for the subsequent period will be included in the programme-specific section of the teaching and examination regulation (part B).	Advice OLC, approval FGV (7.13 j)

Article 3.6 Marks

1. Partial 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. In deviation from paragraph 2, final marks between 5 and 6 will be rounded off to whole marks: up to 5.50 rounded down; from 5.50 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" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>From</th> <th>To</th> <th>Grade</th> </tr> </thead> <tbody> <tr><td>1,00</td><td>1,24</td><td>1</td></tr> <tr><td>1,25</td><td>1,74</td><td>1,5</td></tr> <tr><td>1,75</td><td>2,24</td><td>2,0</td></tr> <tr><td>2,25</td><td>2,74</td><td>2,5</td></tr> <tr><td>2,75</td><td>3,24</td><td>3,0</td></tr> <tr><td>3,25</td><td>3,74</td><td>3,5</td></tr> <tr><td>3,75</td><td>4,24</td><td>4,0</td></tr> <tr><td>4,25</td><td>4,74</td><td>4,5</td></tr> <tr><td>4,75</td><td>5,49</td><td>5,0</td></tr> <tr><td>5,50</td><td>6,24</td><td>6,0</td></tr> <tr><td>6,25</td><td>6,74</td><td>6,5</td></tr> <tr><td>6,75</td><td>7,24</td><td>7,0</td></tr> <tr><td>7,25</td><td>7,74</td><td>7,5</td></tr> <tr><td>7,75</td><td>8,24</td><td>8,0</td></tr> </tbody> </table>		From	To	Grade	1,00	1,24	1	1,25	1,74	1,5	1,75	2,24	2,0	2,25	2,74	2,5	2,75	3,24	3,0	3,25	3,74	3,5	3,75	4,24	4,0	4,25	4,74	4,5	4,75	5,49	5,0	5,50	6,24	6,0	6,25	6,74	6,5	6,75	7,24	7,0	7,25	7,74	7,5	7,75	8,24	8,0
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	9,75	10,0	10	

4. The Examination Board can allow to use symbols rather than numbers, for example; v(oldaan), g(oed), n(iet)v(ol)d(aan), etc.). 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
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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"> has passed a course component of a university or higher professional education programme that is equivalent in terms of content and level; has demonstrated through their work and/or professional experience that the student has sufficient knowledge and skills with regard to the relevant course component. 	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-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. This regulation does not apply if a student is (simultaneously) enrolled in multiple programmes, which lead to multiple degrees, where courses may be part of both programmes. The Examination Board may decide to deviate from this regulation for a programme.	Advice OLC,

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.	Legal provision
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. Within twenty working days after the announcement of the results of a written interim examination, the student can, on request, inspect their assessed work, the questions and assignments set in it, as well as the standards applied for marking. The place and time will be announced at the time of the interim examination or 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 their own.	Advice OLC; approval FGV (7.13 q)
3. Students who meet the requirements stipulated in paragraph 2 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)

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 their 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"> The Student General Counselling Service Student psychologists Faculty academic advisors 	Advice OLC; approval FGV (7.13 u)

Article 4.2 Facilities 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 one or more special facilities with regard to teaching, practical training and interim examinations. These facilities 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 the responsible person on behalf of the faculty board, decides on teaching facilities and facilities regarding logistics. The Examination Board will rule on requests for facilities 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 can make an appointment with the academic advisor to discuss the details of the provisions.	Advice OLC; approval FGV (7.13 m)
6. A request for one or more facilities can 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 responsible person on behalf of the Examination Board will register in SAP 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. The student can consult the study monitor to check which facilities have been granted.	Advice OLC; approval FGV (7.13 m)
8. The decision as referred to in paragraph 5 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 Examination Board.	Advice OLC; approval FGV (9.38 sub b)
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Section B1: Programme specific – general provisions

6. General programme information and characteristics

Article 6.1 Study programme information

1. The programme Parallel and Distributed Computer Systems, CROHO number 60802, is offered on a full-time basis.	Advice OLC; approval FGV (7.13 i)
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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)

Article 6.3 Academic student counselling

1. The programme offers the following counselling in addition to the student counselling mentioned in Section A: - Student Advising.	Advice OLC; approval FGV (7.13 u)
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7. Further admission requirements

Article 7.1 Intake date(s)

1. The programme starts on September 1.	Advice OLC; approval FGV (9.38 sub b)
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Article 7.2 Admission requirements

1. Admission to the Master's programme is possible for an applicant who has obtained a Bachelor's degree obtained at an institution of academic higher education, which demonstrates the following knowledge, understanding and skills: a. knowledge: Computer Science / Engineering curriculum b. understanding: Systems thinking, Algorithmic thinking, Critical thinking c. skills: Programming, Software/Hardware practicals, Collaborative projects, Computer Science research, Writing and presenting technical material, Working independently	Partly legal provision & ordinance CvB, see appendix 3. Admission requirements excepted from participation in WHW
2. Applicants who wish to follow the track must, in addition to the provisions in paragraph 1, also meet the following requirements with regard to: Not applicable.	Partly legal provision & ordinance CvB, see appendix 3. Admission requirements excepted from participation in WHW
3. Applicants with a bachelor's degree obtained at an institution outside the Netherlands may be asked for additional methods to prove that they meet the admission requirements.	Advice OLC; approval FGV (9.38 sub b)

<p>4. An applicant should demonstrate sufficient level of proficiency in English by meeting at least one of the following standards, no more than two (2) years before the start of the programme at the VU:</p> <ul style="list-style-type: none"> - (academic) IELTS: 6.5 - TOEFL paper-based test: 580 - TOEFL internet-based test 92 	<p>Advice OLC; approval FGV (9.38 sub b)</p>
<p>5. Applicants who:</p> <ul style="list-style-type: none"> - completed an English-taught secondary or higher education degree in Canada, the United States, the United Kingdom, Ireland, New Zealand or Australia or - have earned a Bachelor's or Master's degree in an English-taught programme accredited by NVAO in the Netherlands, or - have earned a Bachelor's or Master's degree in an accredited English-taught programme in another member state of the European Union - have obtained a Cambridge Certificate of Proficiency in English (CPE) or a Cambridge Certificate of Advanced English (CAE) with at least a score of A, B or C. <p>are exempted from the requirements referred to in paragraph 4.</p>	<p>Advice OLC; approval FGV (9.38 sub b)</p>
<p>6. The Admission Board will decide whether the applicant meets the admission requirements.</p>	<p>Advice OLC; approval FGV (9.38 sub b)</p>

Article 7.3 Selection criteria

<p>1. In addition to the admission requirements referred to in Article 7.2, the Faculty board also sets (at least two of) the following selection criteria:</p> <ol style="list-style-type: none"> a. A high level of relevant knowledge and skills demonstrated by: <ul style="list-style-type: none"> - An average mark in the top-10 percentile of the student's cohort for relevant years or parts related to Computer Systems of the Bachelor's degree program, from a high-quality academic institution - At least a mark in the top-10 percentile of the student's cohort for the Bachelor's thesis or similar, from a high-quality academic institution b. Motivation for the programme, demonstrated by a letter stating the motivation for the programme / field of study / Computer Systems research c. A strong command of research methods from the relevant field, demonstrated by at least a mark in the top-10 percentile of the student's cohort for research subjects, or comparable, from a high-quality academic institution d. A high general academic level demonstrated by: <ul style="list-style-type: none"> - At least a mark in the top-10 percentile of the student's cohort for the Bachelor's thesis or similar from a high-quality academic institution - A scientific article / paper, and open-source software artifacts or FAIR data, not older than 2 years 	<p>Partly legal provision & ordinance CvB, see appendix 3. Admission requirements excepted from participation in WHW</p>
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Article 7.4 Pre-Master's programme

<p>1. Not applicable. There is no premaster for PDCS.</p>	<p>Advice OLC; approval FGV (9.38 sub b)</p>
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2. Further conditions and the procedure are set out in the relevant Pre-Master regulation of the faculty	Advice OLC; approval FGV (9.38 sub b)
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8. Interim examinations and results

Article 8.1 Sequence of interim examinations

<p>1. Students may participate in interim examinations and practical exercises of the components below only if they have passed the interim examination or examinations for the components mentioned hereinafter:</p> <ul style="list-style-type: none"> - Advanced Topics in Distributed Systems after passing Distributed Systems <p>See "Entry Requirements" in the study guide for more details.</p>	Advice OLC; approval FGV (7.13 h, s & t)
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Article 8.2 Validity period for results

<p>1. The validity period of the interim examinations and exemptions from interim examinations, is limited as follows:</p> <ol style="list-style-type: none"> a. the academic year in which it took place. <p>If necessary, the examiner may decide to extend the validity of the interim examinations and exemptions from interim examinations under extenuating circumstances.</p>	Advice OLC; approval FGV (7.13 k)
<p>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.</p>	Legal provision
<p>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.</p>	Legal provision

Section B2: Programme specific – content of programme

9. Programme objectives, tracks/specializations, exit qualifications and language

Article 9.1 Workload

1. The programme has a workload of 120 EC	Advice OLC; (7.13 a)
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Article 9.2 Tracks and/or specializations

The programme has the following tracks and/or specializations: - Not applicable	Approval OLC; (7.13 a)
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Article 9.3 Programme objective

The programme aims at: acquiring knowledge of the concepts, methods and skills that are relevant to the operation and implementation of computer systems, including topics such as programming, enterprise systems, computer networks, data structures, performance analysis, the theoretical foundations of communication systems and system security. Internet-based services, high-performance computing and peer-to-peer systems are at the very core of Parallel and Distributed Computer Systems.	Advice OLC; (7.13 a)
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Article 9.4 Exit qualifications

1. At all events, a graduate of the study programme will have: <ul style="list-style-type: none"> ▪ have solid scientific knowledge and understanding of Parallel and Distributed Computer Systems, including knowledge of computer systems, programming, operating systems, computer networks, data structures, the theoretical foundations of communication systems and security systems, all of which transcend Bachelor's level; ▪ be capable of acquiring knowledge, understanding and skills in other sub-areas of computer science within a reasonable period; ▪ have acquired practical skills in relevant areas of computer science at an academic level; ▪ be aware of the applications of computer science in general and of Parallel and Distributed Computer Systems in particular, and be capable of applying their knowledge and skills to new and unfamiliar problems; ▪ be capable of designing a research plan or project on the basis of a realistic problem description from the field of computer science; ▪ be capable of conducting scientific research, both independently and as a member of a small team; ▪ be capable of consulting international professional literature on relevant areas of computer science and of using the discussions and results found there; ▪ be capable of formulating, analysing and evaluating scientific results, and of using them to draw relevant conclusions; ▪ be capable of performing effectively in professional situations where scientific knowledge and skills in the field of computer science are required; ▪ have developed a critical scientific attitude and an awareness of the social aspects of information technology; 	Approval OLC (7.13 c)
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<ul style="list-style-type: none"> ▪ be capable of communicating at a professional level and of giving clear oral and written presentations of their own work or others' work; ▪ be thoroughly prepared for an academic programme at PhD level and/or other post-graduate programmes as a professional computer scientist. 	
2. Not applicable.	Approval OLC (7.13 b)
3. Language proficiency may be taken into account in the assessment of (interim) examinations	Approval OLC (7.13 c)

Article 9.5 Language of instruction

1. The language of instruction is English.	Approval OLC (9.18)
2. The 'Gedragcode vreemde taal' (code of conduct foreign languages) applies	Ordinance CvB, see appendix 3

10. 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 or academic internship.	Ordinance CvB, see appendix 3
2. Additionally, the programme can offer: <ul style="list-style-type: none"> • Practical exercises; • Electives. 	Advice OLC; (7.13 a)
3. Educational components are categorized as specialized (400), research-oriented (500) and highly specialized (600) level.	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	course code	nr of EC	level	Advice OLC; (7.13 a)
Year 1				
Computer and Network Security	X_400127	6	400	
Distributed Systems	X_400130	6	400	
Parallel Programming Practical	X_400162	6	400	
Programming Large-scale Parallel Systems	XM_40017	6	400	
Storage Systems	XM_0092	6	400	
Advanced Topics in Distributed Systems	X_405022	6	600	
Year 2				
Research Proposal Writing	X_405023	6	600	
Master Project PDCS	XM_0012	30	500	
Advanced Operating Systems	XM_40014	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; (7.13 a)
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Name of educational component	course code	nr of EC	level	
<i>Constrained choice FCC</i>				
Logical Verification	X_400115	6	500	
Protocol Validation	X_400117	6	500	
Distributed Algorithms	X_400211	6	500	
Advanced Logic	X_405048	6	500	
<i>Free Electives</i>				
Evolutionary Computing	X_400111	6	400	
Advanced Computer Networks	X_405082	6	400	
Binary and Malware Analysis	X_405100	6	500	
Performance of Networked Systems	X_405105	6	400	
Large Scale Data Engineering	X_405116	6	500	
Green Lab	X_418158	6	400	
Web Data Processing Systems	XM_40020	6	400	
Selected Topics in PDCS	XM_400379	6	500	
Industrial Internship	XM_405080	6	400	
Parallel System Architectures	XMU_40015	6	400	
Performance Engineering	XMU_40016	6	500	
Programming Multi-core and Many-core Sys	XMU_40018	6	400	
Service-oriented Design	X_405061	6	400	
Software Asset Management	X_400412	6	400	
Introduction to Computational Science	XMU_418111	6	400	
Concurrency Theory	XMU_0012	6	500	
Hardware Security	XM_40019	6	500	
Software Architecture	X_400170	6	400	
Knowledge Engineering	X_405099	6	400	
High Performance Computing and Big Data	XMU_40013	6	400	
Coding and Cryptography	X_405041	6	500	
Information Visualization	XMU_418143	6	400	
The Social Web	X_405086	6	400	
Experimental Design and Data Analysis	X_405078	6	400	
Software Testing	X_400439	6	400	
Web Services and Cloud-based Systems	XMU_418110	6	400	
Data Mining Techniques	X_400108	6	500	
Project Systems Testing	X_405124	6	400	
Machine Learning for the Quantified Self	XM_40012	6	400	
ICT4D in the field	XM_0008	6	400	
PDCS Programming Project	XM_405054	12	600	
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 Practical exercise

Not applicable

Article 10.5 Participation in practical training and tutorials

1. In the case of a practical training, the student must attend at least 100% of the practical sessions. Should the student attend less than 100%, the student must repeat the practical training, or the Examinations Board may have one or more supplementary assignments issued.	Approval OLC (7.13 d)
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2. Not applicable.	Approval OLC (7.13 d)
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11. Evaluation and transitional provisions

Article 11.1 Evaluation of the education

1. The education provided in this programme is evaluated in accordance with the document 'Kwaliteitszorg Onderwijs BETA'.	Approval OLC (7.13 a1)
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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: <ul style="list-style-type: none">- Not applicable	Advice OLC (7.13 a)
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Advice and approval by the Programme Committee, on June 23rd, 2020.

Approved by the Faculty Joint Assembly, on June 16th, 2020.

Adopted by the board of the Faculty of Science on July 17th, 2020.

Appendix I

Overview of articles that must be included in the OER

Based on Article 7.13, paragraph 2, of the WHW and other Articles of the Act.

Section A: Faculty section

2. Study programme structure	
Article 2.1 Structure of academic year and educational components	7.13 paragraph 2 sub e
3. Assessment and Examination	
Article 3.2 Type of examination	7.13 paragraph 2 sub h, l, j
Article 3.3 Oral interim examinations	7.13 paragraph 2 sub l, n
Article 3.4 Determining and announcing results	7.13 paragraph 2 sub o
Article 3.5 Examination opportunities	7.13 paragraph 2 sub h, j
Article 3.7 Exemption	7.13 paragraph 2 sub r
Article 3.8 Validity period for results	7.13 paragraph 2 sub k
Article 3.9 Right of inspection and post-examination discussion	7.13 paragraph 2 sub p, q
4. Academic student counselling and study progress	
Article 4.1 Administration of study progress and academic student counselling	7.13 paragraph 2 sub u
Article 4.2 Facilities for students with a disability	7.13 paragraph 2 sub m

Section B1: Programme specific – general provisions

6. General programme information and characteristics	
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
7. Further admission requirements	
Article 7.2 Admission requirements	7.30b paragraph 1
Article 7.3 Selection criteria	7.30b paragraph 2, 5
8. Interim examinations and results	
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

9. Programme objectives, tracks/specializations, exit qualifications and language	
Article 9.1 Workload	7.13 paragraph 2 sub g
Article 9.2 Tracks and/or 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
Article 9.5 Language of instruction	9.18 (<i>implementation expected in 2020</i>)
10. Curriculum structure	
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
11. Evaluation and transitional provisions	
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 advisory and approval rights of Programme Committees (OLC) and Faculty Joint Assembly (FGV)

(English underneath)

Onderwerpen Onderwijs – en Examenregeling (OER) 7.13 lid 2 WHW	FGV		OplC	
	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

Afkortingen:

FGV: Facultaire Gezamenlijke Vergadering

OplC: Opleidingscommissie

I: Instemmingsrecht

A: Adviesrecht

Appendix II (English)**Overview of advisory and approval rights of Programme Committees (OLC) and Faculty Joint Assembly (FGV)**

Disclaimer: this is a translation which only serves as an aid. No rights may be derived from it. The Dutch document prevails.

Article 7.13, paragraph 2, of the Higher Education and Research Act	FGV		OpIC	
	I	A	I	A
a. content of the programme and associated examinations				
a1. the manner in which teaching and education in the relevant programme are evaluated				
b. the content of the specializations offered as part of the programme				
c. the programme's final attainment levels with regard to the knowledge, understanding and skills				
d. where applicable, the design of practical exercises				
e. the study load of the programme and of each of its constituent educational units				
f. the detailed rules referred to in Article 7.8b, sixth paragraph, and Article 7.9, fifth paragraph (recommendation on continuation of studies)				
g. the Master's programmes to which Article 7.4a, eighth paragraph, applies (elevated study load)				
h. the number and sequence of examinations and the times at which these can be taken				
i. the full-time, part-time or work-study structure of the programme				
j. where necessary, the order, and the periods in which and the number of times per academic year that the opportunity to sit examinations and final degree assessments is given				
k. where necessary, the period of validity for pass grades awarded for examinations, notwithstanding the authority of the Examination Board to extend this period of validity				
l. whether examinations are administered in oral, written or another form, notwithstanding the authority of the Examination Board to decide otherwise				
m. the way in which students with a disability or chronic health condition are given a reasonable opportunity to take the examinations				
n. the public nature of oral examinations, subject to the right of the Examination Board to determine otherwise in special cases				
o. the period within which the results of an examination must be announced, together with details of whether this period can be altered and if so in what way				
p. the way in which and the period within which students who have taken an examination are given the opportunity to inspect their marked work				
q. the way in which and the period within which information can be provided about the questions asked and exercises given in the framework of a written examination and about the standards used for assessment				
r. the grounds on which the Examination Board could grant exemption from the taking of one or more examinations to students who have previously passed examinations in higher education or have acquired knowledge or skills outside higher education				
s. where necessary, the stipulation that students must pass certain examinations as a condition for admission to other examinations				
t. where necessary, the obligation to take part in certain practical exercises with a view to admission to the examination in question, subject to the authority of the Examination Board to grant exemption from this obligation, with or without the imposition of alternative requirements				
u. the monitoring of academic progress and individual student support and guidance;				
v. where applicable, the manner in which students are selected for a special track within a programme as referred to in Article 7.9b (excellence track within a programme)				
x. the actual design of the education provided.				
<i>All other matters that are regulated in the Academic and Examination Regulations but which are not mentioned as such in Article 7.13 of the Higher Education and Research Act under points a to x.</i>				

Abbreviations used:

- FGV: Faculty Joint Assembly
 OLC: Programme Committee
 I: right of approval
 A: right of advice

Appendix III

Ordinances VU CvB and Binding Guidelines (richtlijn)

Section A, article:	Concerns:	CvB ordinance / guideline
2.1.1, 2.1.2	Year planning two semesters 8-8-4 (uniforme jaarkalender VU-UvA)	29-9-2008 (period 2009-2015) 22-05-2014 (periode 2016-2025)
2.1.3, 2.1.4	Educational components	Richtlijn Bachelor en Masteronderwijs, revised on 6 June 2017
3.1	Signing up for education and interim examinations	CvB ordinance 30-09-2010, prior consent USR.
3.4.1	Determination and publication of the results (1) Grading deadline exams 10 workdays (2) Theses 20 workdays	(1) Richtlijn Bachelor en Masteronderwijs, revised on 6 June 2017 (2) Quality demand 11 from the VU assessment policy, CvB ordinance 15-05-2012
3.5.1	Two possibilities to take examinations per year	Richtlijn Bachelor en Masteronderwijs, revised on 6 June 2017
3.5.2	Retake: most recent grade is valid. A pass can be retaken	Taken from the UvA guidelines, as part of the harmonization, CvB ordinance 24-02-2014
3.5.4	Extra retake last year	Included in (prior) model OER 16-17 following a request from committee O&O and adopted by CvB op 27-10-2015
3.6	Grades	CvB ordinance 30-09-2010, with University council's consent. As a result of harmonization UvA, the guideline: 5.5 is a pass, has been added. CvB ordinance 24-02-2014.
Section B1, article:	Concerns:	CvB ordinance / guideline
7.2	Admission criteria; at least WO Bachelor's degree	Richtlijn Bachelor en Masteronderwijs, revised on 6 June 2017
7.3	Selection 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

Appendix IV**Article 2.1 of the Higher Education and Research (Implementation) Act (*Uitvoeringsbesluit*)**

Entered into force on 1 June 2018

(English underneath)

1 De persoonlijke omstandigheden bedoeld in de artikelen 7.8b, derde lid, en 7.9, derde lid, van de wet, zijn uitsluitend:

- a. ziekte van betrokkene,
- b. lichamelijke, zintuiglijke of andere functiestoornis van betrokkene,
- c. zwangerschap van betrokkene,
- d. bijzondere familie-omstandigheden,
- e. het lidmaatschap, daaronder begrepen het voorzitterschap, van:
 - 1. bij universiteiten: de universiteitsraad, faculteitsraad, het orgaan dat is ingesteld op grond van de medezeggenschapsregeling, bedoeld in artikel 9.30, derde lid, onderscheidenlijk artikel 9.51, tweede lid, van de wet, het bestuur van een opleiding of de opleidingscommissie, alsmede het lidmaatschap van het bestuur van een stichting die blijkens haar statuten tot doel heeft de exploitatie van voorzieningen, behorende tot de studentenvoorzieningen, dan wel van een daarmee naar het oordeel van het instellingsbestuur gelet op de taak gelijk te stellen orgaan,
 - 2. bij hogescholen: de medezeggenschapsraad, deelraad, studentencommissie of opleidingscommissie.

- f. andere in de regelingen, bedoeld in de artikelen 7.8b, zesde lid, en 7.9, vijfde lid, van de wet door het instellingsbestuur aan te geven omstandigheden waarin betrokkene activiteiten ontplooit in het kader van de organisatie en het bestuur van de zaken van de instelling,
- g. het lidmaatschap van het bestuur van een studentenorganisatie van enige omvang met volledige rechtsbevoegdheid, dan wel van een vergelijkbare organisatie van enige omvang, bij wie de behartiging van het algemeen maatschappelijk belang op de voorgrond staat en die daartoe daadwerkelijk activiteiten ontplooit.

2 Het instellingsbestuur kan voor de toepassing van het eerste lid, onderdeel g, nadere regels vaststellen omtrent het aantal bestuursleden dat ten hoogste per organisatie per studiejaar in aanmerking komt, zomede omtrent welke bestuursfuncties in aanmerking komen.

Appendix IV (English)

Article 2.1 of the Higher Education and Research (Implementation) Act

Entered into force on 1 June 2018

Disclaimer: This is a translation which only serves as an aid. No rights may be derived from it. The Dutch document prevails.

1. The extenuating personal circumstances referred to in Article 7.8b, paragraph 3 and 7.9, paragraph 3 of the Act (WHW) are limited to:

- a. illness of the person concerned,
- b. physical, sensory or other impairment of the person concerned,
- c. pregnancy of the woman concerned,
- d. extenuating family circumstances,
- e. membership, including the chairmanship of:

1. at universities: the university council, faculty council, the body established under the participation regulation referred to in Article 9.30, paragraph 3 or Article 9.51, paragraph 2 of the Act, the programme management or the Programme Committee, or membership on the board of a foundation whose bylaws allow for the exploitation of facilities belonging to the student services, or an equivalent body with regard to its activities in the opinion of the board of the institution,
2. at universities of applied science: the participation council, district council, student committee or Programme Committee.

- f. other circumstances to be designated by the board of the institution in the regulation as referred to in Article 7.8b, paragraph 6 and Article 7.9, paragraph 5 of the Act in which the person concerned engages in activities within the framework of the organization and the administration of the affairs of the institution,
- g. membership on the board of a student organization of any size with full legal capacity, or a similar organization of any size, whose primary task regards general societal interest and which actually develops activities for this purpose.

2. The institutional board may, for the purposes of the first paragraph, part g, establish specific rules regarding the maximum number of eligible board members per organization per academic year, as well as the eligible administrative offices.

Appendix V

Addendum to the 2020-2021 Academic and Examination Regulations Master's degree programmes

Several articles for the 2020-2021 academic year will be temporarily suspended or amended as a result of the consequences of the measures to stop the spread of COVID-19. These amendments apply exclusively to the 2020-2021 academic year, which ends 31 August 2021. In this regard, reference is also made to the addendum to the Application and Registration Regulations for the 2020-2021 academic year.

Part B1 Programme-specific section

Article 7.2 Admission requirements

Supplementary to Article 7.2.1, students* are also admissible for the 2020-2021 academic year (start date September 2020) if, at the latest by 31 August 2020

they have earned at least 150 EC of the Bachelor's programme (university in The Netherlands or EEA (European Economic Area)) that confers entitlement to admission, under the following conditions:

- The Bachelor's degree certificate must still be obtained before 1 September 2021 or before the Master's degree certificate is obtained, whichever comes first. If this condition is not met, the student will not be able to continue or complete the Master's programme.
- Additional admission requirements (not EC related) remain applicable.

they have earned at least 24 EC of the bridging or pre-Master's programme, under the following conditions:

- The bridging or pre-Master's programme must still be successfully completed before 1 September 2021 or before the Master's degree certificate is obtained, whichever comes first. If this condition is not met, the student will not be able to continue or complete the Master's programme.
- Additional admission requirements (not EC related) remain applicable.

*The above supplements do not apply to non-EEA students who must complete a Bachelor's programme outside of the Netherlands.

Article 7.4 Bridging or pre-Master's programme

Supplementary to Article 7.4.1, students* are also admissible for the 2020-2021 academic year (start date September 2020) if, at the latest by 31 August 2020 they have earned at least 210 EC of the designated HBO Bachelor's programme, under the following conditions:

- The HBO Bachelor's diploma must still be obtained before 1 September 2021 or before the bridging or pre-Master's programme is completed, whichever comes first. If this condition is not met, the student will not be able to complete or continue the programme.
- Additional admission requirements (not EC related) remain applicable.

*The above supplements do not apply to non-EEA students who must complete a Bachelor's programme outside of the Netherlands.