

Teaching and Examination Regulations (TER)

Faculty of Science

Masterprogramme in Parallel and Distributed Computer Systems

Academic year: 2019-2020

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

Index

Section A: Faculty Section	4
1. General provisions.....	4
Article 1.1 Applicability of the Regulations	4
Article 1.2 Definitions	4
2. Study programme structure	5
Article 2.1 Structure of academic year and educational components	5
Article 2.2 Refusal or termination of registration / (iudicium abeundi).....	6
3. Assessment and Examination	6
Article 3.1 Signing up for education and interim examinations	6
Article 3.2 Type of examination	6
Article 3.3 Oral interim examinations	6
Article 3.4 Determining and announcing results	6
Article 3.5 Examination opportunities.....	7
Article 3.6 Marks	7
Article 3.7 Exemption.....	8
Article 3.8 Validity period for results	8
Article 3.9 Right of inspection and post-examination discussion	8
Article 3.10 Fraud and plagiarism	9
4. Academic student counselling and study progress.....	9
Article 4.1 Administration of study progress and academic student counselling	9
Article 4.2 Adaptations for students with a disability.....	9
5. Hardship clause.....	10
Article 5.1 Hardship clause.....	10
Article 5.2. Publication	10
Section B1: Programme specific – general provisions	11
6. General programme information and characteristics.....	11
Article 6.1 Study programme information.....	11
Article 6.2 Teaching formats used and modes of assessment.....	11
7. Further admission requirements	11
Article 7.1 Intake date(s)	11
Article 7.2 Admission requirements	11
Article 7.3 Pre-Master's programme	12
8. Interim examinations and results	12
Article 8.1 Sequence of interim examinations.....	12
Article 8.2 Validity period for results	12
Article 8.3 Maximum Exemption(s).....	13
Article 8.4. Degree.....	13
Section B2: Programme specific – content of programme	14
9. Programme objectives, specializations and exit qualifications.....	14
Article 9.1 Workload	14
Article 9.2 Specializations	14
Article 9.3 Programme objective	14
Article 9.4 Exit qualifications	14
10. Curriculum structure.....	15
Article 10.1 Composition of the programme	15
Article 10.2 Compulsory educational components.....	15
Article 10.3 Elective educational components.....	15
Article 10.4 Participation in practical training and tutorials.....	16
11. Evaluation and transitional provisions	17
Article 11.1 Evaluation of the education	17
Article 11.2 Transitional provisions	17
Appendix I Overview of articles that must be included in the OER	18

Appendix II	Overview of rights to prior consultation (advice) and rights to approve OLC and FGV	19
Appendix III	Ordinances VU CvB and Binding Guidelines (richtlijn)	20

Section A: Faculty Section

1. General provisions

Article 1.1 Applicability of the Regulations

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:	Advice OLC, approval FGV (9.38 ub b)
<ul style="list-style-type: none"> ▪ Artificial Intelligence ▪ Bioinformatics and System Biology ▪ Biomedical Sciences ▪ Biomolecular Sciences ▪ Business Analytics ▪ Computer Science ▪ Drug Discovery and Safety ▪ Earth Sciences ▪ Ecology ▪ Environment and Resource Management ▪ Global Health (research) ▪ Health Sciences ▪ Hydrology ▪ Information Sciences ▪ Management, Policy Analysis and Entrepreneurship in the Health and Life Sciences ▪ Mathematics ▪ Medical Natural Sciences ▪ Neurosciences (research) ▪ Parallel and Distributed Computer Systems ▪ Science Business and Innovation ▪ Stochastics and Financial Mathematics 	
2. These Regulations enter into force with effect from 1 September 2019.	Advice OLC, approval FGV (9.38 ub 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 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:
- o researching and writing a thesis or dissertation
 - o carrying out a research assignment
 - o taking part in fieldwork or an excursion
 - o taking part in another educational learning activity aimed at acquiring specific skills, or
 - o participating in and completing a work placement;
- 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 (*Student Lifecycle Management*);
- 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:
<https://www.vu.nl/studiegids>
- 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 (*Wet op het Hoger Onderwijs en Wetenschappelijk Onderzoek*);
- 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
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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

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"> 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 his/her work and/or professional experience that he/she has sufficient knowledge and skills with regard to the relevant course component. 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	Advice OLC; approval FGV (7.13 q)

discussion or if the student was unable to attend the collective discussion through no fault of his or her own.	
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: <ul style="list-style-type: none"> a. The Student General Counselling Service b. Student psychologists c. Faculty academic advisors 	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	Advice OLC; approval FGV

the exception for the chronic diseases and disabilities.	(7.13 m)
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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)
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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 Parallel and Distributed Computer Systems CROHO number 60802 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)

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)

7. Further admission requirements

Article 7.1 Intake date(s)

1. The programme starts on September 1.	Advice OLC; approval FGV (9.38 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: <ul style="list-style-type: none"> ▪ Knowledge ▪ Understanding ▪ Skills 	Partly legal provision & ordinance CvB, see appendix 3. Admission requirements excepted from participation in WHW
2. The Admissions Board will investigate whether the applicant meets the admission requirements.	Legal provision
3. In addition to the requirements referred to in the first paragraph, the Admissions Board can also assess requests for admission in terms of (at least two of) the following criteria: <ul style="list-style-type: none"> a. talent and motivation; b. level of relevant knowledge and understanding; c. proficiency in methods and techniques; d. academic attitude and critical thinking; e. proficiency in the language(s) of instruction 	Partly legal provision & ordinance CvB, see appendix 3. Admission requirements excepted from participation in WHW
4. Students who wish to take the Master's programme in Parallel and Distributed Computer Systems should have a solid foundation in the field of computer science at Bachelor's level, particularly in the area of computer systems.	

5. 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.	
6. 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.	

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. 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.	Advice OLC; approval FGV (9.38 sub b)
2. The pre-Master's programme comprises 30 EC and is made up on individual basis.	Advice OLC; approval FGV (9.38 sub b)
4. 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
5. A candidate can only participate in one pre-Master's programme at the Vrije Universiteit.	Ordinance CvB, see appendix 3

8. 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>article is not applicable</i> .	Advice OLC; approval FGV (7.13 h, s & t)
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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)
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Article 8.4. Degree

Degree Students who have successfully completed their Master's final Examination are awarded a Master of Science degree (MSc). The degree awarded is stated on the diploma.	Legal provision
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Section B2: Programme specific – content of programme

9. Programme objectives, specializations and exit qualifications

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 Specializations

The programme has the following specializations: <i>article is not applicable</i> .	Advice OLC; (7.13 a)
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Article 9.3 Programme objective

<p>The Master's programme in Parallel and Distributed Computer Systems focuses on 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.</p> <p>Internet-based services, high-performance computing and peer-to-peer systems are at the very core of Parallel and Distributed Computer Systems.</p>	Advice OLC; (7.13 a)
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Article 9.4 Exit qualifications

<p>1. At all events a graduates of the study programme will:</p> <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. 	
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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	500	
Programming Large-scale Parallel Systems	XM_40017	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)
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	
Internet programming	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 Participation in practical training and tutorials

1. In the case of a practical training, the student must attend at 100% of the practical sessions. Should the student attend less than 100% , he or she must repeat the practical training, or the Examinations Board may have one or more supplementary assignments issued.	Approval OLC (7.13 d)
2. Student are expected to participate actively in all degree components for which they are registered.	
3. In addition to the general requirement regarding active participation, the study guide details additional requirements for each degree component, including attendance requirements.	
4. At the start of each degree component, a specification will be made available which details: <ul style="list-style-type: none"> ▪ The final attainment levels of the degree component; ▪ The study guidelines for passing the degree component; ▪ The way in which the final attainment levels are assessed; ▪ The regulations for examinations and resits; ▪ The guidance provided by lecturers during scheduled hours and otherwise; ▪ Component attendance requirements; ▪ -The provision of feedback to the student on assignments and reports submitted, and presentations given during the degree component. 	
5. 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.	
6. Absence from degree components with required attendance is only allowed in the case of force majeure.	
7. 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.	

11. Evaluation and transitional provisions

Article 11.1 Evaluation of the education

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)
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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: <i>this article is not applicable</i> .	Advice OLC (7.13 a)
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Advice and approval by the Programme Committee of M PDCS, on 25 March 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

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 2
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, specializations and exit qualifications	
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
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 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		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 (excellentietaject 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