



Teaching and Examination Regulations

BACHELOR's study programme

B. Programme-specific section

Computer Science

Academic year 2017-2018

Section B: programme-specific section

1. General provisions

- Article 1.1 Definitions
- Article 1.2 Study programme information

2. Programme objectives and exit qualifications

- Article 2.1 Programme objective
- Article 2.2 Exit qualifications

3. Further admission requirements

- Article 3.1 Additional previous education requirements
- Article 3.2 Entrance examination
- Article 3.3 English language requirement for English-language Bachelor's programmes
- Article 3.4 Free curriculum

4. Curriculum structure

- Article 4.1 Composition of programme
- Article 4.2 Academic development
- Article 4.3 Units of study
- Article 4.4 The compulsory units of study
- Article 4.5 Electives
- Article 4.6 Practical exercise
- Article 4.7 Sequence of interim examinations
- Article 4.8 Signing up for interim examination
- Article 4.9 Participation in practical exercise and study group sessions
- Article 4.10 Maximum exemption
- Article 4.11 Validity period for results
- Article 4.12 Degree

5. Electives

- Article 5.1 Optional courses in Bachelor's programmes, first semester, third year
- Article 5.2 Electives
- Article 5.3 Other electives

6. Honours Programme

7. Academic student counselling and advice regarding continuation of studies

- Article 7.1 Academic student counselling
- Article 7.2 Binding (negative) advice regarding continuation of studies (BSA)

8. Transitional and final provisions

- Article 8.1 Amendments and periodic review
- Article 8.2 Transitional provisions
- Article 8.3 Publication
- Article 8.4 Effective date

Section B: programme-specific section**1. General provisions****Article 1.1 Definitions**

Not applicable

Article 1.2 Study programme information

1. The programme Computer Science CROHO number 50426 is offered on a full-time basis and the language of instruction is English.
2. A unit of study comprises 6 EC or a multiple thereof. The units of study listed below have a different size:

Course code	Course component	EC
L_ETBAALG006	Academic Writing (FEW)	3
X_400475	Computational Thinking	3
X_400318	History of Science	3
X_401087	Introduction Computer Science	3
X_400433	Philosophy	3

2. Programme objectives and exit qualifications**Article 2.1 Programme objective**

The programme aims to acquire theoretical and practical knowledge, understanding and skills in the field of computer science and related disciplines to enable them to progress to a Master's degree in Computer Science or related academic discipline, or potentially to enter the labour market.

The Bachelor's programme is meant as a preparation for the Master's programme in Computer Science at VU University Amsterdam, and students with a Bachelor's degree in Computer Science may also be admitted to relevant Master's programmes at other Dutch or European universities. By choosing an appropriate minor, graduates of the Bachelor's programme in Computer Science will also be able to continue their studies on various related Master's programmes, especially the university's own Master's programmes in Information Sciences, Artificial Intelligence and Bioinformatics.

The programme also aims to impress upon the students the importance of computer science in a broad scientific, philosophical and societal context.

Article 2.2 Exit qualifications

A graduate of the Bachelor programme Computer Science:

- Have thorough theoretical and practical fundamental knowledge of computer science which will enable the student to successfully complete a Master's programme in the field of computer science or to enter the labour market. This knowledge covers the areas of networked systems, formal methods, logic, and mathematics, programming and software engineering.
- Has become acquainted with research and development in the field of computer science at an academic level and with the associated scientific skills, and has practised these skills and demonstrated aptitude in applying them.
- Has gained experience in the practical skills that are relevant to the field of computer science, and is capable of applying them in specific and common professional situations. This includes using tools to model, assemble, deploy and evaluate (networked) computer-based systems.
- Is aware of the role of computer science in society, including the related ethical issues, as well as the development of the field of computer science and the nature of this academic discipline, and is able to use this awareness when reflecting on his or her own activities and thought processes.
- Is capable of taking a project-based approach, including participating in a multidisciplinary team, and can maintain an open attitude with regard to the exploratory development of complex systems.

- Is able to communicate professionally and at an academic level, including the formulation of objectives, the selection of appropriate resources (technology), and the definition of projects and research plans.
- Is familiar with empirical aspects of computer science, especially the evaluation of various types of systems, both in qualitative and quantitative terms.
- Is capable of presenting results clearly and succinctly, both orally and in writing (i.e. reports for professional use or of an academic nature).
- Possesses the requisite learning skills for completing a university Master's programme, and has demonstrated a clear analytical and problem-solving ability.

3. Further admission requirements

Article 3.1 – Additional previous education requirements

1. The following additional requirements apply to admission to the programme. A VWO (pre-university) diploma with one of the following profiles (from 2010):
 - Nature and Technology profile;
 - Science and Health profile, supplemented with Mathematics B;
 - Economics and Society profile, supplemented with Mathematics B;
 - Culture and Society profile, supplemented with Mathematics B;

Article 3.2 Entrance examination

1. The entrance examination referred to in Article 2.3 (Section A) concerns the following subjects at final pre-university examination level:
 - a. Mathematics B equivalent to final-examination university entry level (VWO) and
 - b. A command of English equivalent to pre-university final-exam level (VWO).
 - c. Evaluation with two members of staff.
2. The proof that the entrance examination has been passed provides entitlement to admission to the intended programme or programmes for the academic year after the examination was taken only.

Article 3.3 English language requirement for English-language Bachelor's programmes

1. The proficiency requirement in English as the language of instruction can be met by the successful completion of one of the following examinations or an equivalent:
 - IELTS: 6.5
 - TOEFL paper based test: 580
 - TOEFL internet based test: 92-93
 - Cambridge Advanced English: A, B or C.
2. Exemption is granted from the examination in English referred to in paragraph 1 to students who, no longer than two years before the start of the programme, have met the requirements of the VU test in English language proficiency TOEFL ITP, with at least the scores specified in paragraph 1, or
 - had previous education in secondary or tertiary education in an English-speaking country as listed on the VU website, or
 - have an English-language 'international baccalaureate' diploma.

Article 3.4 Free curriculum

1. Subject to certain conditions, the student has the option of compiling a curriculum of his/her own choice which deviates from the curricula prescribed by the programme.
2. The concrete details of such a curriculum must be approved beforehand by the most appropriate Examinations Board.
3. The free curriculum is put together by the student from the units of study offered by Vrije Universiteit Amsterdam or another institution of higher education and must at least have the size, breadth and depth of a regular Bachelor's programme. The student must ensure that the proposed curriculum enables admission to at least one Master's programme. In doing so, he/she makes no undertaking actually to take the Master's programme.

4. Curriculum structure

Article 4.1 Composition of programme

The programme consists of the following units:

1. 150 credits of educational units provided by the programme (major). This includes:
 - a. required educational units as specified in Article 4.4;
 - b. academic development as specified in Article 4.2;
2. A minor of 30 credits as specified in Article 4.5;

Article 4.2 Academic development

1. Academic development is part of the study programme. This includes:
 - (1) Philosophical training/Philosophy of Science/History of Science
 - (2) Methods & techniques
 - (3) Critical reasoning/academic skills

Course code	Course component	EC
L_ETBAALG006	Academic Writing (FEW)	3
X_400318	History of Science	3
X_400554	Programming	6
X_401020	Statistical Methods	6

Article 4.3 Units of study

The major comprises a package of compulsory and possibly optional units of study. In addition, units of study are categorized as introductory (100), in-depth (200) and advanced (300) level.

Article 4.4 The compulsory units of study are:

<u>Computer Science Year 1</u>				
Course Code	Course Name	EC	Period	Level
L_ETBAALG006	Academic Writing (FEW)	3	5	100
X_400318	History of Science	3	5	200
X_400475	Computational thinking	3	1	100
X_400487	Computer Networks	6	4	100
X_400488	Web Technology	6	3	100
X_400554	Programming	6	1	100
X_400556	Project Application Development	6	6	200
X_401010	Networks and Graphs	6	5	200
X_401087	Introduction Computer Science	3	1	100
X_401090	Logic and Sets	6	4	100
XB_40006	Excellence track	6	Academic Year	
XB_40008	Physical Computing	6	2	100
XB_40009	Systems Architecture	6	2	100
<u>Computer Science Year 2</u>				
Course Code	Course Name	EC	Period	Level
X_400432	Human-Computer Interaction	6	6	200

X_400561	Advanced Programming	6	1	200
X_400614	Data Structures and Algorithms	6	1	200
X_400633	Study and career	0	Academic Year	200
X_400649	Linear Algebra	6	4	200
X_401008	Databases	6	5	200
X_401015	Logic and modelling	6	5	200
X_401020	Statistical Methods	6	2	200
X_401086	Intelligent Systems	6	3	200
X_405067	Operating Systems	6	2	200
XB_40007	Software Design	6	4	200

Computer Science Year 3

Course Code	Course Name	EC	Period	Level
X_400154	Machine Learning	6	4	300
X_400433	Philosophy	3	5	200
X_401049	Automata and Complexity	6	4	300
XB_40001	Bachelor Project Computer Science	15	5+6	300

Article 4.5 Electives

The first semester of the third year of the curriculum comprises elective units of study. Of these units of study, at least two must be at level 300.

For the elective component, the student can take optional units of study designated as such, a minor offered by the faculty, a University minor designated as such or a minor designated as such by the Examinations Board and listed as such in Section B. A minor comprises units of study of which at least two are categorized at level 300 and no more than one at level 100.

Article 4.6 Practical exercise

Components with practical exercises are listed in Article 4.4 and Article 5.1 and 5.2 along with the practical teaching method.

Article 4.7 Sequence of interim examinations

Educational components may only be completed once the examinations of previous components have been passed. Components with specific requirements for prior knowledge are indicated in the study guide, accompanied by detailed information regarding these requirements.

In exceptional cases, the Examinations Board may, at the student's reasoned request, deviate from the sequence mentioned in paragraph 3 of this Article, with or without stipulating conditions.

Article 4.8 Signing up for interim examinations

As laid down in article 4.1 of TER part A.

Article 4.9 Participation in practical exercise and study group sessions

The study guide specifies the requirements for each degree component, as well as component attendance requirements.

Article 4.10 Maximum exemption

Not applicable

Article 4.11 Validity period for results

No further specific provisions to article 4.8 of TER part A.

Article 4.12 Degree

Students who have successfully completed the final examination and met all other requirements

stipulated in the WHW will be given the degree of Bachelor of Science, abbreviated to BSc. The degree awarded is stated on the diploma. If it is a joint degree, this will also be stated on the diploma.

5. Electives

5.1 Optional courses in Bachelor's programmes, first semester, third year

The credit requirement for the optional courses may be satisfied with:

1. a faculty minor sanctioned by the programme: 30 credits
2. a VU minor, also known as university minors. Examination Board approval is not required for these minors.
3. free choice subject to the following requirements:
 - a. 30 credits of courses that do not overlap with courses from the regular (major) programme with regard to content and level
 - b. 30 credits of courses with the following level requirements:
 - i. within the major field of study: all courses at 300 level or higher,
 - ii. outside of the major field of study: no more than 1 course at 100 level and at least two courses at 300 level
 - c. units of study at a university abroad, which are then subject to the same requirements as stated above. Additionally, no more than 1 Master's course (6 credits) at 400 level or higher may be included, subject to approval by the relevant programme. This course may not be part of the examination programme of the Master's programme.
 - d. In the case of a, b and c the optional courses must be submitted to the programme's Examination Board for approval.
4. The student does not need the prior approval of the Examination Board to take the following minor:

Minor Deep Programming

Course Code	Course Name	EC	Period	Level
X_400377	Systems Programming	6	Period 1	300
X_401011	Equational Programming	6	Period 2	300
X_401031	Concurrency & Multithreading	6	Period 2	400
XB_40005	Secure programming	6	Period 1	300
XB_0003	Compiler Construction	6	Period 3	300

Minor Bioinformatics and Systems Biology

HBO Bioinformatics / Biotechnologie

Course Code	Course Name	EC	Period	Level
AB_1022	Evolutionary Genetics	6	Period 3	300
X_400617	Calculus	6	Period 1+2	100
X_432806	Mathematics Premaster Course	6		400

Biomedische wetensch / Biologie / HLO

Course Code	Course Name	EC	Period	Level
X_400617	Calculus	6	Period 1+2	100
X_401096	Inleiding programmeren (Python)	6	Period 2	100
X_432806	Mathematics Premaster Course	6		400

Minor BSB keuze vakken				
Course Code	Course Name	EC	Period	Level
AB_1022	Evolutionary Genetics	6	Period 3	300
AB_1052	From Protein to Cell	6	Period 2	300
AB_1053	Molecular Cell Biology	6	Period 2	300
X_400083	Semantic Web	6	Period 1	300
X_400435	Information Retrieval	6	Period 2	300
X_400552	Pervasive Computing	6	Period 4	100
X_401012	Heuristics	6	Period 3	200
X_401047	Collective Intelligence	6	Period 2	300
X_422589	Mechanics and thermodynamics in the cell	6	Period 2	400

5.2. Electives

not applicable

5.3 Other electives

If the student wishes to take a different subject than that stipulated in Article 5.1 or 5.2, advance permission must be obtained in writing from the Examinations Board.

6. Honours Programme

The Honours programme comprises 30 EC and consists of the following components:

- a. Departmental courses 12-18 EC
- b. Interdepartmental courses 12-18 EC

The description of the components is available at

www.vu.nl/nl/opleidingen/bacheloropleidingen/vu-honours-programme

7. Academic student counselling and advice regarding continuation of studies

Article 7.1 Academic student counselling

1. The academic student counselling on this programme is provided by study advisors.

Article 7.2 Binding (negative) advice regarding continuation of studies (BSA)

1. At the end of the first year of registration at the latest, every student is issued with a recommendation from the Faculty Board with regard to the continuation of his or her studies.
2. If, at the end of the first year of registration, a student has earned fewer than 42 credits from the first-year curriculum of the degree programme, a negative recommendation on continuation of studies will be issued (i.e. expulsion), as stipulated in Article 7.8b, paragraphs 3 and 5 of the Act.
3. A negative recommendation on continuation of studies is binding and applies to the following Bachelor's degree programme offered by the faculty:
 - Computer Science.
4. A negative recommendation on continuation of studies also means that the student concerned may not register for the Bachelor's programme specified in the previous paragraph for a period of three academic years.
5. On request and in individual cases, the Dean may extend the period referred to in paragraphs 2 by a maximum period of one year, taking account of the student's personal circumstances. In this regard, the Dean may only weigh personal circumstances that have been reported to the study advisor or to one of the student counsellors, and in any case within two months of the onset of the personal circumstances.

6. Any student who terminates his or her enrolment during the first semester of the first year of registration and reports this to the Examination Board before 1 February will not be issued with a recommendation on continuation of studies. The termination of enrolment must take effect before 1 February.
7. The Dean draws up faculty regulations for recommendations on continuation of studies which detail all procedures.

8. Transitional and final provisions

Article 8.1 Amendments and periodic review

1. Any amendment to the Teaching and Examination Regulations will be adopted by the faculty board after taking advice, and if necessary approval by the Programme Committee concerned. A copy of the advice will be sent to the authorized representative advisory body.
2. An amendment to the Teaching and Examination Regulations requires the approval of the authorized representative advisory body if it concerns components not related to the subject of Section 7.13, paragraph 2 sub a to g and v of the WHW and as long as it does not involve the guidelines of the Executive Board.
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.

Article 8.2 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:

Article 8.3 Publication

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

Article 8.4 Effective date

These Regulations enter into force with effect from 1 September 2017.

Advice from Programme Committee, on 21 April 2017.

Advice from Examination Board of the Faculty of Science, on 10 November 2016

Approved by authorized representative advisory body, on 6 July 2017

Adopted by the Board of the Faculty of Science, on 21 July 2017.

Appendix I

List of articles that must be included in the OER pursuant to the WHW (articles in framed boxes):

Section A

Art. 1.1	7.13, para 1 WHW
Art. 2.3	7.29, para 2
Art. 3.2	7.13 para 2 sub e
Art. 4.2	7.13 para 2 sub h and l
Art. 4.3	7.13 para 2 sub n
Art. 4.4	7.13 para 2 sub o
Art. 4.5	7.13 para 2 sub j, h
Art. 4.7	7.13 para 2 sub r
Art. 4.8	7.13 para 2 sub k
Art. 4.9	7.13 para 2 sub p
Art. 4.10	7.13 para 2 sub q
Art. 4.11	7.13 para 2 sub a
Art. 5.1	7.13 para 2 sub v
Art. 6.1	7.13 para 2 sub u
Art. 6.2	7.13 para 2 sub f
Art. 6.3	7.13 para 2 sub f
Art. 6.4	7.13 para 2 sub f
Art. 6.5	7.13 para 2 sub m

Section B

Art. 1.2	7.13 para 2 sub i
Art. 2.1	7.13 para 1 sub b, c
Art. 2.2	7.13 para 2 sub c
Art. 3.1	7.25 para 4
Art. 3.2	7.29 para 2
Art. 4.1	7.13 para 2 sub a
Art. 4.4	7.13 para 2 sub e, h, j, l,
Art. 4.5	7.13 para 2 sub e, h, j, l,
Art. 4.6	7.13 para 2 sub t
Art. 4.7	7.13 para 2 sub s
Art. 4.9	7.13 para 2 sub d
Art. 4.11	7.13 para 2 sub k
Art. 7.2	7.13 para 2 sub f