

Teaching and Examination Regulations

MASTER's Degree Programme

B. programme-specific section

M Biomolecular Sciences

Academic year 2015-2016

Section B: Programme-specific section

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Section B: Programme-specific section

1. General provisions

Article 1.1 Definitions

See part A.

Article 1.2 Degree programme information

1. The programme Biomolecular Sciences CROHO number 60616 is offered on a full-time basis and the language of instruction is English.
2. The programme has a workload of 120 EC.
3. A unit of study comprises 3 EC or a multiple thereof.

Article 1.3 Intake dates

The programme is offered starting in the first semester of the academic year (1 September).

The intake date(s) mentioned in this paragraph ensure(s) that a programme can be completed within the nominal study duration set for the programme.

2. Programme objectives and exit qualifications

Article 2.1 Programme objective

The programme aims to prepare students for a scientific career within the international Life Sciences research community. The graduate is expected to be able to successfully commence PhD training. To this end, a graduate of the MSc programme Biomolecular Sciences possesses an academic attitude and academic as well as practical skills. The programme aims to strengthen and deepen domain specific knowledge acquired in BSc programmes. Graduates should thoroughly understand the scientific process at large and in particular dispose of the necessary research specific skills. The goal is to provide students with a broad and interdisciplinary knowledge of various approaches and techniques. In addition we aim to teach them the skills and attitudes necessary for gaining insights into the societal impact of this kind of research within a society that is facing an ever-increasing threat by multifactorial as well as infectious diseases, invoking an ever-increasing demand for the unravelling of processes in healthy and malfunctioning cells.

Article 2.2 Exit qualifications

In all events, a graduate of the degree programme:

- has knowledge about terminology, state-of-the-art of theory and research topics in the biomolecular sciences disciplines (such as biophysics, biochemistry, and cell biology);
- possesses familiarity with general and specific scientific literature and knows how to analyse, summarize and critically evaluate this information;
- has the ability to use the principles from the different disciplines in the design of research plans, the execution of research, and the analysis of the results;
- has command of the relevant research techniques and laboratory procedures, including safety procedures and the ability to solve emerging problems;
- has command of the use of computer software relevant for the field;
- is able to communicate experimental results in a labjournal, written report and oral presentation;
- can analyse and evaluate planning, execution and results of research independently and critically;
- can collaborate with researchers from the same and other disciplines and can think multidisciplinary;
- can contribute to scientific discussions about plans, results and consequences of research;
- has insight in the scientific and social relevance of current research in biomolecular sciences and can apply scientific knowledge on issues in society;
- can reflect on ethical aspects of research and applications of research;
- can evaluate his or her own functioning, both by reflection and in discussions with others.

3. Further admission requirements

Article 3.1 Admission requirements

1. Admission to the Master's programme in Biomolecular Sciences is possible with a Bachelor's degree from a Dutch university in Biomedical Sciences, Gezondheid en Leven (major Biomedische Wetenschappen), Biology, Medical Natural Sciences, Pharmaceutical Sciences, Molecular Life Sciences, (Bio)chemistry or related studies with a grade average 7.0 or higher and a Bachelor internship in a relevant field (Biochemistry/ Cell Biology) with a minimum grade of 7.5. If a final grade is not yet available an interim evaluation by the internship supervision will be considered.
The Admissions Board will investigate whether the interested person meets the admission requirements.
2. With a Bachelor's degree in another field from a Dutch university, or a Bachelor's degree from an institute of higher education in the Netherlands, or a Bachelor's degree from abroad, the Admission board will decide on your admission on the basis of the following criteria:
 - 1) a minimum of 24 EC education in Biochemistry/Molecular Cell Biology level 300 (last years Bachelors level)
 - 2) Bachelor grade average at least 7.0 out of 10, or equivalent (GPA at least 3.0 out of 4.0, second class upper or higher)
 - 3) a Bachelor internship in a relevant field (Biochemistry/ Cell Biology) with a minimum grade of 7.5 out of 10 or equivalent in other grading systems. If a final grade is not yet available an interim evaluation by the internship supervision will be considered
 - 4) experience in practical laboratory techniques gained in courses plus Bachelor internship
 - 5) competence to function at academic MSc level and motivation for a career in research evaluated during an interview (in person or by computer).
3. When the programme commences, the candidate must have fully completed the Bachelor's programme or pre-Master's programme allowing admission to this Master's programme.

Article 3.2 Pre-Master's programme

Not applicable

Article 3.4 Final deadline for application and registration

Application and registration to the programme are given on the following site:

<http://www.vu.nl/en/programmes/practical/policies/index.asp>

Article 3.5 English language requirement for English-language Master's programmes

1. International applicants are required to pass an English language proficiency test. 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 the first paragraph to students who, within two years of the start of the programme:
 - 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 3.6 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 Examination Board.
3. The free curriculum is put together by the student and must at least have the size, breadth and depth of a regular Master's programme in Biomolecular Sciences.

4. Curriculum structure

Article 4.1 Composition of programme

1. The programme contains the following specializations
 - a. Molecular Cell Biology
 - b. Biological Chemistry
2. The programme consists of the following components:
 - a. compulsory units of study
 - b. restricted options
 - c. optional courses or capita selecta
3. The programme has the following general composition:

General setup specialization a and b	
name	EC
Short Research Placement *	24-30
Long Research Placement *	30-36
Thesis based on literature study	9
General compulsory MSc courses	6
Specific compulsory courses*	30
Optional courses or Capita Selecta	15

**depending on the specialization. To qualify for a specialization one Research Placement and 12 EC of courses in the context of the specialization are compulsory. In total the short and long placement should equal 60 EC*

Article 4.2 Specialisation programme Biological Chemistry

a) Compulsory units of study

Name of course component	Course code	Number of credits	Period	Teaching method	Type of test	Level
Ethics in Life Sciences	AM_470707	3	3	Lectures, Workgroups, Group assignments, Presentation, Self-study	Degree of participation in workgroups (10%), exam (50%) has to be passed, written and verbal execution of the ethical dialogue (40%)	400
Scientific Writing in English	AM_1156	3	1,2,3,4, 5,6	2 contact hours a week. 6 to 8 hours of Self-study/assignments per week	Three writing assignments (Introduction, Methods or Results, Discussion) pass for all writing assignments, peer feedback, active participation	400

Internship I Biological Chemistry	AM_471129	24 or 30	1,2,3,4, 5,6	Practicals, Self study	Essay/ report, performance/ participation/ portfolio, attitude, presentation	600
Internship II Biological Chemistry	AM_471130	30 or 36	1,2,3,4, 5,6	Practicals, Self study	Essay/ report, performance/ participation/ portfolio, attitude, presentation	600
Thesis Based on Literature Study	AM_471153	9	1,2,3,4, 5,6	Literature study, self study	Essay/ report, presentation	600
Genomes and Gene Expression	AM_470614	6	1	Lectures and discussions (ca 45 hr), Weblectures by experts (ca 6 hr), Self-study (ca 110 hr)	Two written exams with open and multiple choice (MC) questions, first (only MC), second (MC and open questions),	400
Protein Science	AM_470145	6	1	Lectures (30h), Work discussions (4 h), Self-study (individual or in small groups).	Written exam	400

b) Restricted options*1) At least 1 is compulsory from*

Drug-induced Stress and Cellular Responses (FEW)	X_432536	6	2	Lectures, Self- study	Written exam	500
Signal Transduction in Health and Disease (FEW)	X_432535	6	2	Lectures, Self- study, Case studies in groups	Assignment and presentation, written exam	600

2) At least 6 EC are compulsory from:

Biomolecular Screening (FEW)	X_432542	3	4	Explanation of the course and its contents, Lectures, Practicals	Literature report, practical report. Both marks have to be at least 5.5. Presence is obligatory	400
Biophotonics 1: Microspectroscopy	AM_470629	3	3	Lectures (28 hours), Group assignment (8 hours), Self-study	Written exam, oral presentation by group	400
Biophotonics 3: Practical training	AM_470630	3	3	Experiments (± 24 hours) in small groups, Preparation of experiments, Writing reports	Participation during labwork and discussion, written report	400
Molecular Biology Techniques (FEW)	X_432540	3	3	Laboratory practicals, Lectures, Tutorials	Laboratory work, assignments, written report	400
Molecular Pharmacology (FEW)	X_432541	3	4	Laboratory practicals, Lectures, Tutorials	Active participation, written reports	400
Protein Science Techniques	AM_470641	3	3	Laboratory practicals (16h), Lectures (4h), Self-study to prepare for the practical, Writing reports	Active participation, written reports	400

c) Optional courses

Microbial Genomics	AM_1021	3	1	14 Lectures (obligatory), Literature study	Per student a written perspective for of one of the 12 lectures	500
Chemical Biology (FEW)	X_432538	6	1	Lectures, Tutorial, Consultancy sessions, Case study/presentation	Report and oral presentation, written examination	400
Dynamics of Biomolecules and Cells (FEW)	X_422583	6	4	Lectures, Literature study	Oral presentation	400
Introduction to Systems Biology	X_428565	6	1	Lectures, Computer practicals, project work	Mathematics, Programming or Biology classes Assignments and exercises Project plus presentation	400
Fundamentals of Bioinformatics	X_405052	6	1	12 Lectures, 12 Computer practicals, project work	Programming or Biology classes • Project and group work • Oral or written exam	400
Structural Bioinformatics (FEW)	X_405019	6	4	13 Lectures, 12 Computer practicals	practical assignments and theoretical assessment	400
Project Computational Design and Synthesis of Drugs	X_432734	6	4	Project basis: Lectures, Tutorials, Self-study, Assignments, Group-work on a case-study.	Written examination, preparation of a report.	400

The Research Placements/internships have to be submitted to the master's coordinator on behalf of the Examination Board for approval.

* The Examination Board can, to a limited extent (no more than 6 EC), grant the student permission to use the time that is normally reserved for optional studies to extend a period of Research Placement.

Article 4.3 Specialisation Programme Molecular Cell Biology

a) Compulsory units of study

Name of course component	Course code	Number of credits	Period	Teaching method	Type of test	Level
Ethics in Life Sciences	AM_470707	3	3	Lectures, Workgroups, Group assignments, Presentation, Self-study	Degree of participation in workgroups, exam has to be passed, written and verbal execution of the ethical dialogue	400
Scientific Writing in English	AM_1156	3	1	2 contact hours a week. 6 to 8 hours of Self-study/assignments per week	Three writing assignments (Introduction, Methods or Results, Discussion) pass	400

					for all writing assignments, peer feedback, active participation	
Internship I Molecular Cell Biology	AM_471127	24 or 30	1,2,3,4,5,6	Practicals, Self study	Essay/ report, performance/ participation/ portfolio, attitude, presentation	600
Internship II Molecular Cell Biology	AM_471128	30 or 36	1,2,3,4,5,6	Practicals, Self study	Essay/ report, performance/ participation/ portfolio, attitude, presentation	600
Thesis Based on Literature Study	AM_471153	9	1,2,3,4,5,6	Literature study, self study	Essay/ report, presentation	600
Genomes and Gene Expression	AM_470614	6	1	Lectures and discussions (ca 45 hr), Weblectures by experts (ca 6 hr), Self-study (ca 110 hr)	Two written exams with open and multiple choice (MC) questions, first (only MC) contributing of end grade, second (MC and open questions), which contributes	400
Protein Science	AM_470145	6	1	Lectures (30h), Work discussions (4 h), Self-study (individual or in small groups).	Written exam	400

b) Restricted options

1) At least 1 is compulsory from:

Cell Structures and Functions	AM_470615	6	2	Work groups, Excursions to labs specialized in specific techniques (10 contact hours), Lectures and discussions, Self-study	A written exam (open book exam)	400
Signal Transduction in Health and Disease (FEW)	X_432535	6	2	Lectures, Self-study, Case studies in groups	Assignment and presentation, written exam	600
Molecular Infection Biology	AM_470657	6	2	Lectures, Work groups, practicals	WR, individual assignment, practical performance	600

2) At least 6 EC are compulsory from:

Biomolecular Screening (FEW)	X_432542	3	4	Explanation of the course and its contents, Lectures, Practicals	Literature report of the final mark), practical report of the final mark. Both marks have to be at least 5.5. Presence is obligatory	400
Biophotonics 1: Microspectroscopy	AM_470629	3	3	Lectures (28 hours), Group assignment (8 hours), Self-study	Written exam, oral presentation by group	400
Biophotonics 3: Practical training	AM_470630	3	3	Experiments (± 24 hours) in small groups, Preparation of experiments, Writing reports	Participation during labwork and discussion, written report	400
Protein Science Technique	AM_470641	3	3	Laboratory practicals (16h), Lectures (4h), Self-study to prepare for the practical, Writing reports	Active participation, written reports	400
Molecular Biology Techniques (FEW)	X_432540	3	3	Laboratory practicals, Lectures, Tutorials	Laboratory work, assignments, written report	400
Molecular Pharmacology (FEW)	X_432541	3	4	Laboratory practicals, Lectures, Tutorials	Active participation, written reports	400
Molecular Photobiology	X_432763	3		Lectures, Practicals	Written report, oral presentation	400

c) Optional courses

Microbial Genomics	AM_1021	3	2	14 Lectures (obligatory), Literature study	Per student a written perspective for one of the 12 lectures	500
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Developmental Biology	AM_470613	6	2	Lectures, Masterclasses (58 hrs), Self-study (55 hrs)	Written exam, oral presentations and (written) abstract. Active participation to discussions during masterclasses	500
Dynamics of Biomolecules and Cells	X_422583	6	4	Lectures, literature study	Oral presentation	400
Extreme Biology	AM_470509	6	2	Lectures, Workshops, Presentations. Research proposal and defending	Written exam with essay questions, Journal Club presentations and Research Proposal. Grades for both parts must be 5.5 or higher.	500
Introduction to Systems Biology	X_428565	6	1	Lectures, Computer practicals, Project work	Mathematics, Programming or Biology classes Assignments and exercises Project plus presentation	400
Fundamentals of Bioinformatics	X_405052	6	1	12 Lectures, 12 Computer practicals, project work	Programming or Biology classes • Project and group work • Oral or written exam	400
Structural Bioinformatics	X_405019	6	4	13 Lectures, 12 Computer practicals	practical assignments and theoretical assessment	400

The Research Placements/internships have to be submitted to the master's coordinator on behalf of the Examination Board for approval.

* The Examination Board can, to a limited extent (no more than 6 EC), grant the student permission to use the time that is normally reserved for optional studies to extend a period of Research Placement.

Article 4.4 Electives

In addition to the courses listed above, the following optional elements will be offered in 2014-2015:

Name of course component	Course code	Number of credits	Period	Teaching method	Type of test	Level
<i>Optional Capita Selecta</i>						
Caput Cellular Protein Trafficking	AM_470605	6	1,2,3,4, 5,6	Meetings, Self-study literature	Written exam with assay questions	500
Caput Epigenetics	AM_470606	6	1,2,3,4, 5,6	Self-study, Group meetings (1-2 per week) Weblectures by experts (ca 10 hr)	Written exam	500
Caput Molecular Biotechnology	AM_470604	6	1,2,3,4, 5,6	Meetings, Self-study literature	Written exam with assay questions	500
Caput Protein Structure as Molecular Basis of Disease	AM_470120	6	1,2,3,4, 5,6	Meetings, Self-study literature	Oral or written presentation (choice)	500
Caput Structural Biology	AM_470607	6	1,2,3,4, 5,6	Meetings, Self-study literature	Oral discussion with the lecturer	500
Caput AIMMS Lectures and Seminars	X_432764	3	1,2,3,4, 5,6	6 Seminars or lectures	Written summary/reflection	400

If the student wishes to take a different course than the units of study listed, advance permission must be obtained in writing from the Examination Board.

Article 4.5 Sequence of examinations

Students may participate in examinations [and/or practical exercises] for the units below only if they have passed the examination or examinations for the units mentioned:

AM_471127 Internship I Molecular Cell Biology
 AM_471128 Internship II Molecular Cell Biology
 AM_471129 Internship I Biological Chemistry
 AM_471130 Internship II Biological Chemistry
 AM_471153 Thesis Based on Literature Study

after passing of at least 18 EC of the master programme concerned
 Second internships may only be started after the first internship is completely finished.

Article 4.6 Participation in practicals and assignments

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 %, he/she must repeat the practical

training, or the examiner of the course may have one or more supplementary assignments issued.

2. In the case of tutorials with assignments, the student must attend at least 100 % of the tutorials. Should the student attend less than 100 %, he/she must repeat the study group, or the examiner of the course may have one or more supplementary assignments issued.
3. In exceptional circumstances, the Examinations Board may, at the request of the student, permit an exemption from this requirement if, in the opinion of the Board, the assessment of the intended skills is also possible with a lesser percentage of participation, with or without the imposition of supplementary requirements.

Article 4.7 Maximum exemption

There is a maximum to the number of in total 40 EC of the curriculum that can be accumulated through granted exemptions (each student should at least obtain 80 EC within the master programme):

- either a maximum 40 EC can be accumulated from a *completed* master programme with a duration of two years (120 EC)
- or a maximum of 20 EC can be accumulated from a *completed* master programme with a duration of one year (60 EC)

Article 4.8 Validity period for results

As laid down in article 4.8 of OER part A.

Article 4.9 Degree

Students who have successfully completed their Master's final examination are awarded a Master of Science degree.

5. Transitional and final provisions

Article 5.1 Amendments and periodic review

1. Any amendment to the Teaching and Examination Regulations will be adopted by the faculty board after taking advice from the relevant Board of Studies. A copy of the advice will be sent to the authorised representative advisory body.
2. An amendment to the Teaching and Examination Regulations requires the approval of the authorised representative advisory body if it concerns components not related to the subjects of Section 7.13, paragraph 2 sub a to g and v, as well as paragraph 4 of the WHW and the requirements for admission to the Master's programme.
3. An amendment to the Teaching and Examination Regulations can only pertain to an academic year that is already in progress if this does not demonstrably damage the interests of students.

Article 5.2 Transitional provisions

Notwithstanding the current Teaching and Examination Regulations, the following transitional provisions apply for students who started the programme under a previous set of Teaching and Examination Regulations:

1. Elective components that have been removed from the curriculum

The courses below are no longer available in the program but are still elective components for students who started their program before academic year 2013-2014 and have passed the courses' examinations.

Courses ended in academic year 2014-2015:

a. *Both specializations*

- X_432539 Business and innovation in Life Sciences

b. Molecular Cell Biology

- AM_1020 Evolving Networks (6 EC)

Courses ended in academic year 2012-2013:

b. *Both specializations*

- AM_471017 History of Life Sciences (3 EC)
- c. *Molecular Cell Biology*
- AM_470616 Molecular Cell Physiology and Function (6 EC)
- X_422516 Biophysical Techniques (FEW) (3 EC)
- X_470641 Molecular Pharmacology (FEW) (3 EC)

Courses ended in academic year 2011-2012:

- a. *Molecular Cell Biology*
- X_432537 Protein Modeling, Flexibility and Folding (FEW) (6 EC)

Courses ended in academic year 2010-2011:

- a. *Molecular Cell Biology*
- 422503 Biophotonics 2: Advanced Biophysics (FEW) (3 EC)
- 422505 Biophotonics 4: Medical Imaging (FEW) (3 EC)

2. Total of 120 EC

The final examination program should always total at least 120 EC.

Article 5.3 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 the faculty website and deemed to be included in the course catalogue.

Article 5.4 Effective date

These Regulations enter into force with effect from 1 September 2015

Advice from Board of Studies, April 29 2015

Approved by authorised representative advisory body on 15 July 2015

Adopted by the faculty board on 21 August 2015