



Teaching and Examination Regulations

MASTER's Degree Programme

B. Programme-specific section
M Biomolecular Sciences

Academic year 2017-2018

Section B: Programme-specific section

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Section B: Programme-specific section

1. General provisions

Article 1.1 Definitions

Not applicable

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 6 EC or a multiple thereof. The units listed below have a different size:

Code	Name	EC
AM_1021	Microbial Genomics	3
AM_1156	Scientific Writing in English (AM_BMOL)	3
AM_470707	Ethics in life sciences	3
AM_471153	Thesis Based on Literature Study	9
X_432763	Molecular Photobiology	3
XB_432764	Caput AIMMS Lectures and Seminars	3

Article 1.3 Intake dates

The programme is offered starting in the first semester of the academic year (1 September). The intake date mentioned in this paragraph ensures 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: (listed according Dublin descriptors)

- A. Knowledge and understanding
 - has knowledge of the terminology, current theories, and research topics in the biomolecular sciences disciplines, such as molecular biology, biochemistry, cell biology, bioinformatics, and biophysics;

- B. Applying knowledge and understanding
- has the ability to use the principles from the different disciplines in the design of research projects, the execution of research, and the analysis of results;
 - has command of the relevant research techniques, laboratory procedures, including safety measures, and the application of computer software relevant to the field; and the ability to solve emerging problems;
 - can collaborate with researchers from the same and other disciplines and can think interdisciplinary;
- C. Making judgements
- is familiar with the general and specific scientific literature and knows how to analyse, summarize and critically evaluate this information;
 - can independently and critically evaluate the planning and execution of research, interpret results, thereby contributing to scientific discussions;
 - can reflect on ethical aspects of research and applications of the results;
- D. Communication
- is able to communicate experimental results in a labjournal, written report and oral presentation;
- E. Life long learning
- has insight in the scientific and societal relevance of current research in biomolecular sciences and can apply scientific knowledge on issues in society;
 - can incorporate and interpret new knowledge and insights into existing theories in the domain of the Biomolecular Sciences;
 - can evaluate his or her own functioning, both by self-reflection and in discussions with others;

3. Further admission requirements

Article 3.1 Admission requirements

1. Admission to the Master's programme is possible for an individual who has a BSc degree from the VU in Biomedical Sciences, Life and Health Sciences (major Biomedical Sciences) or Biology. With a Bachelor's degree in Biomedical Sciences, Biology, Medical Natural Sciences, Pharmaceutical Sciences, Molecular Life Sciences, (Bio)chemistry or related studies from another university in the Netherlands, it is also possible to enrol in the Master's programme.

In all of the above cases, students should also meet the following criteria:

1. An average Bachelor grade of 7.0 or higher
2. A Bachelor internship in a relevant field (Biochemistry/ Molecular Cell Biology) with a minimum grade of 7.

University bachelor students from other fields, students from institutes of higher education and international students:

An individual with a Bachelor's degree from a Dutch university in a field not mentioned above, 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 based on the following criteria:

1. A minimum of 24 EC coursework in Biochemistry/Molecular Cell Biology at the 300 level (last year of Bachelor).

2. An average Bachelor grade of at least 7.0 out of 10, or equivalent (GPA of at least 3.0 out of 4.0, second class upper division or higher).
3. Bachelor internship in a relevant field (Biochemistry/ Molecular 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 with practical laboratory techniques gained in coursework and the Bachelor internship.
5. Academic competence suitable for commencing a Masters program and motivation for a career in research which will be evaluated during an interview (either in person or by computer).
6. The Admission Board may set additional requirements if necessary, for example Bachelor courses from the VU [Minor Biomolecular Sciences](#).

HBO/HLO students:

Some [HBO/HLO specializations](#), for example, the research specializations Biochemistry, Molecular Biology, Cell Biology or Biotechnology) provide adequate preparation for the Biomolecular Sciences Master's programme. The Admission Board will decide about admission on the basis of the above criteria.

2. The Admissions Board will investigate whether the applicant meets the admission requirements.

[Article 3.2](#) Pre-Master's programme

Not applicable

[Article 3.3](#) Limited programme capacity

Not applicable

[Article 3.4](#) Final deadline for registration

A candidate must submit a request to be admitted to the programme through Studielink before 1 June in the case of Dutch students, before 1 April in the case of EU students and before 1 February in the case of non-EU students. Under exceptional circumstances, the Examinations Board may consider a request submitted after this closing date.

[Article 3.5](#) English language requirement for English-language Master'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 the first paragraph to students who, within two years prior to 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
 - have a Dutch university BSc degree, followed a Minor taught in the English language, and have done a BSc internship comprising an English written report and presentation.

[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 most appropriate Examinations Board.
3. The free curriculum is put together by the student from the units of study offered by the Vrije Universiteit Amsterdam or another institution of higher education and must at least have the size, breadth and depth of a regular Master's programme.
4. To be eligible for the Master's degree, the level of the programme must match the objectives and exit qualifications that apply for the programme for which the student is enrolled.

4. Curriculum structure

Article 4.1 Composition of programme

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

General setup specialization a and b	
name	EC
Research Internship I *	24-30
Research Internship II *	30-36
Thesis based on literature study	9
General compulsory MSc courses	6
Compulsory and elective* specialization courses	30
Optional courses / Capita Selecta	15

**depending on the specialization. To qualify for a specialization, one Research Internship and 12 EC of courses in the context of the specialization are compulsory. Both internships should equal 60 EC.*

General setup specialization c	
name	EC
Research Internship	30-36
Thesis based on literature study	12
General compulsory MSc courses	6
Compulsory and elective specialization courses	48
Optional courses / Capita Selecta	24

To qualify for the specialization, one Research Internship and 36 EC of courses in the context of the specialization are compulsory.

Article 4.2a Compulsory units of study – Biological Chemistry

Abbreviations of teaching method and examination format are defined in Article 1.1.

The Research 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 a Research Internship.

The compulsory units of study are:

AM-BML-BC-V Biological Chemistry: Compulsory courses				
Course code	Name	EC	Period	Level
AM_470145	Protein Science	6	1	400
AM_470614	Genomes and Gene Expression Scientific Writing in English	6	1	400
AM_1156	(AM_BMOL)	3	3	400
AM_470707	Ethics in life sciences	3	3	400
AM_471129	Internship I Biological Chemistry	30	Ac. Jaar	600
AM_471130	Internship II Biological Chemistry	30	Ac. Jaar	600
AM_471153	Thesis Based on Literature Study	9	Ac. Jaar	600
AM1_BML-BCvk Elective Specialization courses - 6 EC required				
Course code	Name	EC	Period	Level
X_432535	Signal Transduction. in Health and Disease	6	2	500
X_432536	Drug-induced Stress and Cellular Response	6	2	500

Article 4.2b Compulsory units of study – Molecular Cell Biology

Abbreviations of teaching method and examination format are defined in Article 1.1.

The Research 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 a Research Internship.

The compulsory units of study are:

AM_BML-MC-V Molecular Cell Biology: Compulsory courses				
Course code	Name	EC	Period	Level
AM_470145	Protein Science	6	1	400
AM_470614	Genomes and Gene Expression Scientific Writing in English	6	1	400
AM_1156	(AM_BMOL)	3	3	400
AM_470707	Ethics in life sciences	3	3	400
AM_471127	Internship I Molecular Cell Biology	30	Ac. Jaar	600
AM_471128	Internship II Molecular Cell Biology	30	Ac. Jaar	600
AM_471153	Thesis Based on Literature Study	9	Ac. Jaar	600
AM1_BMLmcVK Elective Specialization courses - 6 EC required				
Course code	Name	EC	Period	Level
AM_470615	Cell Structures and Functions	6	2	500
AM_470657	Molecular Infection Biology Signal Transduction in Health and Disease	6	2	500
X_432535		6	2	500

Article 4.2c Compulsory units of study – Molecular Bioinformatics

Abbreviations of teaching method and examination format are defined in Article 1.1.

The Research Internship has 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 Internship.

The compulsory units of study are:

AM_BML-MC-V Molecular Bioinformatics: Compulsory courses

Course code	Name	EC	Period	Level
AM_470145	Protein Science	6	1	400
AM_470614	Genomes and Gene Expression	6	1	400
AM_1156	Scientific Writing in English (AM_BMOL)	3	3	400
AM_470707	Ethics in life sciences	3	3	400

AM1_BMLmcVK Elective specialization courses - 12 EC required

Course code	Name	EC	Period	Level
AM_470615	Cell Structures and Functions	6	2	500
AM_470657	Molecular Infection Biology	6	2	500
X_432535	Signal Transduction in Health and Disease	6	2	500
X_432536	Drug-induced Stress and Cellular Response	6	2	500

Article 4.3 Practical exercise

Except for those practical components incorporated in the compulsory units of study above and in relevant electives, the programme has no separate practical exercise.

Article 4.4a Optional courses – Biological Chemistry

The student can take the following courses:

AMBML_OPT-BC Recommended optional courses BC

Course code	Name	EC	Period	Level
AM_1021	Microbial Genomics	3	3	500
AM_470120	Caput Protein Structure as Molecular Basis of Disease	6	5-6	500
AM_470604	Caput Molecular Biotechnology	6	Ac. Jaar	500
AM_470605	Caput Cellular Protein Trafficking	6	Ac. Jaar	500
AM_470606	Caput Epigenetics	6	Ac. Jaar	500
AM_470607	Caput Structural Biology	6	Ac. Jaar	500
	Caput RNA biology	6	Ac. Jaar	500
AM_470509	Extreme Biology	6	2	500
AM_470613	Developmental biology	6	2	500
AM_470629	Biophotonics	6	3	400
AM_1209	Biobusiness	3	3	500
X_405019	Structural Bioinformatics	6	4	400
X_405052	Fundamentals of Bioinformatics	6	1	400
X_422583	Dynamics of Biomolecules and Cells	6	4	400
X_428565	Introduction to Systems Biology	6	1	400
X_432734	Project Computational Design and Synthesis	6	4	400

X_432764	Caput AIMMS Lectures and Seminars	3	Ac. Jaar	400
X_432538	Chemical Biology	6	1	400
X_432542	Biomolecular Screening	6	4	400
X_432763	Molecular Photobiology	3	4	400

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

Article 4.4b Optional courses – Molecular Cell Biology

The student can take the following courses:

Recommended optional courses				
AMBOL_OPT	MC			
Course code	Name	EC	Period	Level
AM_1021	Microbial Genomics Caput Protein Structure as Molecular.	3	3	500
AM_470120	Basis of Disease	6	5-6	500
AM_470604	Caput Molecular Biotechnology	6	Ac. Jaar	500
AM_470605	Caput Cellular Protein Trafficking	6	Ac. Jaar	500
AM_470606	Caput Epigenetics	6	Ac. Jaar	500
AM_470607	Caput Structural Biology Caput RNA biology	6	Ac. Jaar	500
AM_470629	Biophotonics	6	3	400
AM_1209	Biobusiness	3	3	500
AM_470509	Extreme Biology	6	2	500
AM_470613	Developmental biology	6	2	500
X_405019	Structural Bioinformatics	6	4	400
X_405052	Fundamentals of Bioinformatics	6	1	400
X_422583	Dynamics of Biomolecules and Cells	6	4	400
X_428565	Introduction to Systems Biology	6	1	400
X_432764	Caput AIMMS Lectures and Seminars	3	Ac. Jaar	400
X_432538	Chemical Biology	6	1	400
X_432542	Biomolecular Screening	6	4	400
X_432763	Molecular Photobiology	3	4	400

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

Article 4.4c Optional courses– Molecular Bioinformatics

The student can take the following courses:

Recommended optional courses				
AMBOL_OPT	MC			
Course code	Name	EC	Period	Level
AM_1021	Microbial Genomics	3	3	500
AM_470509	Extreme Biology	6	2	500
AM_470120	Caput Protein Structure as Molecular Basis of Disease.	6	5-6	500
AM_470604	Caput Molecular Biotechnology	6	Ac. Jaar	500
AM_470605	Caput Cellular Protein Trafficking	6	Ac. Jaar	500
AM_470606	Caput Epigenetics	6	Ac. Jaar	500
AM_470607	Caput Structural Biology Caput RNA Biology	6	Ac. Jaar	500
AM_470509	Extreme Biology	6	2	500
AM_470629	Biophotonics	6	3	400

AM_1209	Biobusiness	3	3	500
X_401096	Inleiding Programmeren (Python)	6	2	100
X_422583	Dynamics of Biomolecules and Cells	6	4	400
X_428565	Introduction to Systems Biology	6	1	400
X_432538	Chemical Biology	6	1	400
X_432764	Caput AIMMS Lectures and Seminars	3	Ac. Jaar	400
X_432542	Biomolecular Screening	6	4	400
X_432763	Molecular Photobiology	3	4	400

If the student wishes to take a different course than the units of study listed, prior 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 after passing of at least 18 EC of the master programme concerned.

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

Second internships may only be started after the first internship is completely finished.

Article 4.6 Participation in practical exercise and tutorials

1. In the case of a practical training, the student must attend 100 % of the practical sessions. Should the student attend less than 100 %, he/she must repeat the practical training, or the Examiner may have one or more supplementary assignments issued.
2. In the case of tutorials with assignments, the student must attend 100 % of the tutorials. Should the student attend less than 100 %, he/she must repeat the study group, or the Examination Board may have one or more supplementary assignments issued.
3. In exceptional circumstances, the Examination 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

A maximum of 40 EC of the curriculum can be accumulated through granted exemptions.

Article 4.8 Validity period for results

No further specific provisions.

Article 4.9 Degree

Students who have successfully completed their Master's final examination are awarded a Master of Science degree. The degree awarded is stated on the diploma. If it is a joint degree, this will also be stated on the diploma.

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, 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 subjects of Section 7.13, paragraph 2 sub a to g and v 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. Components that have been removed from the curriculum

The courses below are no longer available in the program.

Molecular Cell Biology and Biological Chemistry specializations

- AM_470630 *Biophotonics II: practical training (3 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 VUnet

Article 5.4 Effective date

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

Advice from Programme Committee, on 29 March 2017

Approved by authorized representative advisory body, on 6 July 2016

Adopted by the Faculty Board, 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. 2.1	7.13, para 2 sub w
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 u
Art. 5.2	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. 4.1	7.13, para 2 sub a
Art. 4.2	7.13, para 2 sub e, h, j, l
Art. 4.3	7.13, para 2 sub t
Art. 4.4	7.13, para 2 sub e, h, j, l
Art. 4.5	7.13, para 2 sub s
Art. 4.6	7.13, para 2 sub d
Art. 4.8	7.13, para 2 sub k