

Appendices to the Teaching and Examination Regulations 2019-2020

Appendix I. Learning outcomes of the degree programme Biology* (art. 1.3)

The graduate:

- 1 has acquired in depth knowledge on one or more scientific disciplines within the general field of Biology and can use this knowledge to explain in detail the relevant concepts, using the appropriate terminology;
- 2 can design and conduct scientific research;
- 3 can independently investigate and critically evaluate scientific literature;
- 4 can identify new developments in the relevant disciplines, and can become familiar with these developments;
- 5 can systematically organize his/her work in scientific research and formulate realistic and original solutions to complex problems;
- 6 can participate in and contribute to a multidisciplinary team;
- 7 can effectively communicate acquired knowledge, insights and skills to others, both in writing and in oral presentation;
- 8 can identify societal and ethical implications of scientific research and is able to critically reflect on his/her actions in this context;
- 9 can independently acquire new knowledge and skills that are relevant for his/her professional career, in science, in policy & management or society.

* These are based on the taxonomy of Bloom

Appendix II. Tracks/Specializations of the degree programmes

(art. 2.2)

1. Within the degree programme Biology, the student chooses one of the following tracks:
 - a. Research-track (R-track), which provides training as a researcher.
 - b. Science, Business and Policy -track, (SBP-track), which prepares for professions in a societal, political and/or commercial context.
2. Within the degree programme Biology students can also follow the track Modelling in Life Sciences

Appendix III. Content of the degree programme

(art. 2.3)

The degree programme consist of either the R- or the SBP-track programme:

Research-Track:

Study elements	ECTS	entry requirements
research project (RP)*	40 or ≥	see appendix V
research project (RP)*	30 or ≥	see appendix V
colloquium	5	RP
essay	5	-
compulsory master courses	20	see Ocasys
electives**	≤20	see Ocasys

Science Business and Policy (SBP)-Track:

Study elements	ECTS	entry requirements
research project (RP)*	40 or ≥	see appendix V
compulsory master course	5	see Ocasys
colloquium	5	RP
internship SBP	35 + 5@	RP
Science and Business	10	
Science and Policy	10	
electives**	≤ 10	see Ocasys

@Part of the skills internship SBP (5 ECTS) is taught at the UG

In addition to the above scheme the following rules apply:

- The student chooses a mentor -from the list of Biology- to advise and discuss the contents of the individual degree programme before approval of the Board of Examiners.
- * The first research project (preferably the one ≥40 EC) must be an internal project. Internal projects must be performed at the FSE (within life sciences oriented research groups), the University Medical Centre Groningen or the Netherlands Institute for Sea Research, under supervision of one of the examiners of the degree programme.
- The subject of the SBP- internship and the compulsory master course must be clearly related to the scientific domain of the chosen master programme (see Appendix I, 1). Therefore, two examiners must be involved in the assessment of the internship: one SBP-examiner and one appointed examiner.
- ** The student may choose to use 5, 10, 15 or 20 ECTS to extend a research project, prepare a manuscript related to a master research project (no more than 10 ECTS, the assessment will be Pass or Fail), attend master courses (appendix IV), to include a maximum of 10 ECTS of courses from other relevant Life Sciences programmes, to repair specific deficiencies or perform a research

assignment of 5, 10, 15 or 20 ECTS. During the mid-term assessment one may extend the research project with only 5 or 10 ECTS.

- Research projects, colloquium and essay must deal with different subjects, be supervised by a different examiner, and be approved of by the Board of Examiners.

Additional requirements for the track *Modelling in Life Sciences*

1. Mathematics in the Life Sciences; 5 ECTS
2. Biological Modelling and Model Analysis; 10 ECTS
3. Programming C++ for biologists; 5 ECTS
4. At least one research project focusing on modelling in one of the domains of Life Science

Appendix IV. Courses (art. 2.4)

Master courses and electives

The following lists present study elements that can be chosen as 'master courses' and 'electives'. The column on the right indicates the master's programmes for which the courses were developed in particular:

B = Biology

EE = Ecology and Evolution

MB = Marine Biology

BiMoS = Biomolecular Sciences

Master courses

The following list presents study elements that can be chosen as part of the 'master courses' (unless stated differently). After consultation with the study mentor and approval of the Board of Examiners (use the proposal form) students may also choose from options available from other departments, other universities in the Netherlands or even abroad. In case the 'master courses' in an individual programme are completely filled, additional master courses may be chosen, which will automatically be part of the 'electives'.

Master courses organised by the research institutes GELIFES and ESRIG:

Course	ECTS	Programmes
Advanced self-organisation of social systems	5	B, EE, MB
Advanced imaging techniques	5	B, BiMoS
Advanced Statistics	6	B, EE, MB, BiMoS
Animal and human experimentation: design, practice and ethics	5	B, EE, MB, BiMoS
Biological Modelling and Model Analysis	10	B, EE, MB, BiMoS
Current themes seminar series	2	B, EE, MB
Ecology of Sustainable Farming	5	B, EE, MB
Evolutionary ecology of marine organisms	5	B, EE, MB
Flyway ecology (not in 2019-2020)	5	B, EE, MB
GELIFES lectures	2	B, EE, MB
Mathematical models in ecology and evolution	6	B, EE, MB
Mathematics in the Life Sciences	5	B, EE, MB, BiMoS
Marine ecosystem service & global change	5	B, EE, MB
Meta-analyses in Ecology (not in 2019-2020)	5	B, EE, MB
Molecular methods in ecology & evolution	5/10	B, EE, MB
Orientation on International Careers	5	B, EE, MB, BiMoS
Practical bioinformatics for biologists	5	B, EE, MB, BiMoS
Practical modelling for biologists	5	B, EE, MB
Programming in C++ for biologists	5/10	B, BN, EE, MB, BiMoS
Polar ecosystems	5	B, EE, MB
Research proposal Ecology and Evolution*	5	EE, MB
Skills and Scopes in Biology	5	B

* Students EE have priority in enrolment

Master courses organised by the research institute GBB:

Course	ECTS	Programmes
Advanced light microscopy	5	B, EE, MB, BiMoS
Advanced Membrane Biology*	5	B, BiMoS
Advanced genetic engineering and complex gene regulatory circuitries*	5	B, BiMoS
Advances in signal transduction*	5	B, BiMoS
Advanced protein crystallography*	5	B, BiMoS
Biocatalysis & Green chemistry	5	B, BiMoS
Electron microscopy of biological macromolecules	5	B, BiMoS
Molecular dynamics and modeling of membranes and proteins*	5	B, BiMoS
Organelle and membrane biogenesis	5	B, BiMoS
Radioisotopes in experimental biology	5	B, EE, MB, BiMoS
Tools and approaches of systems biology*	5	B, BiMoS
Transcriptomics: DNA microarrays and RNAseq*	5	B, EE, MB, BiMoS

* Students Biomolecular Sciences have priority for these courses

Electives organised by Biomedical Sciences/GELIFES:*

Course	ECTS	Programmes
Microbiological safety	1	B, BiMoS
Microbiome & Health	5	B, EE, MB, BiMoS
Molecular biology of ageing and age-related diseases	5	B, BiMoS
Neurobiology of nutrition	5	B
Neurodegenerative diseases	5	B
Nutrition, Brain Development and Cognition	5	B
Scientific writing	5	B, EE, MB, BiMoS

*Students BMS have priority

Master courses organised by Science & Society:

Course	ECTS	Programmes
Science & Business [#]	10	B, EE, MB, BiMoS
Science & Policy [#]	10	B, EE, MB, BiMoS

[#] Students who follow the R-track may only choose these courses as part of the 'electives' not as part of the 'master courses'

Electives

The following lists presents study elements that can only be chosen as 'electives' in the indicated master's programmes (see two columns on the right). After consultation with the study mentor and approval of the Board of Examiners students may also choose from options available from other departments, other universities in the Netherlands or even abroad.

Elective master courses organised by Energy and Environmental sciences*:

Course	ECTS	Programmes
Impacts of Energy and Material Systems	5	B, EE, BiMoS
Sustainable Use of Ecosystems	5	B, EE, BiMoS
Sustainability & Society	5	B, EE, BiMoS
Systems Integration and Sustainability	5	B, EE, BiMoS

* Students EES have priority

Electives organised by Education and Communication*:

Course	ECTS	Programmes
History and Philosophy of Science	5	B, EE, MB, BiMoS
Research Methods in Science Education and Communication	5	B, EE, MB, BiMoS
Nature of Scientific Disciplines	5	B, EE, MB, BiMoS
<u>Design for Science Education and Communication</u>	10	B, EE, MB, BiMoS
<u>Skills in Science Communication</u>	5	B, EE, MB, BiMoS
Science and the Public	5	B, EE, MB, BiMoS
Science Communication and Journalism	5	B, EE, MB, BiMoS

*Students EC have priority in enrolment

Elective master courses organised by The Donald Smits Center for Information Technology:

Course (max 2 ECTS per individual programme^)	½ day unit^	Programmes
Access basic	5	B, EE, MB, BiMoS
Excel basic	3	B, EE, MB, BiMoS
Excel advanced	5	B, EE, MB, BiMoS

^ A minimum of 5 half day units is required for a study load of 1 ECTS, for 2 ECTS 11 units are needed.

These courses have additional costs (low student tariff), which are at the student's own expenses. These courses are not available in Ocasys. Please consult the Donald Smits Center for further information, time schedules and enrolment details.

Elective master course organised by the centre for Synthetic Biology:

Course	ECTS	Programmes
iGEM (International Genetically Engineered Machine competition)*	≤20	B, EE, MB, BiMoS

* Selection for this competition takes place in winter time, an advertisement about application details will be announced via Nestor during the academic year.

Appendix V. Compulsory order of examinations (art 3.4)

Course unit	Entry requirement
Colloquium	Research project
Research project 2	Research project
Internship Science Business & Policy	Research project, Science & Policy, Science & Business
<i>Biological Modelling and Model Analysis</i>	<i>Mathematics in the Life Sciences</i>

Appendix VI. Admission to the degree programmes 2019/2020

(art. 5.1 + art. 5.2)

1. Requirements for admission to the master's degree in Biology

Holders of a Dutch Bachelor's degree in Biologie are considered to have sufficient knowledge and skills and will be admitted to the Master's degree programme in Biology on that basis. Holders of a Bachelor's degree in Life Science & Technology from the University of Groningen with the majors *Biomedische wetenschappen*, *Gedrag & Neurowetenschappen* of *Moleculaire levenswetenschappen* will be admitted to the Master's degree programme in Biology on that basis. For holders of another relevant Bachelor's degree in life sciences there is an individual admission procedure based on the content of the bachelor's programme and language skills.

Appendix VII Transitional provisions (art. 7.1)

Non-applicable

Appendix VIII Application deadlines for admission (art. 2.6.1 en 2.6.3)

Programmes starting on 1 September

Programme	Deadline of Application	Deadline of decision
Behavioural and Cognitive Neurosciences	1 May 2019	1 June 2019
Biology	1 May 2019	1 June 2019
Biomedical Engineering	1 May 2019	1 June 2019
Biomedical Sciences	1 May 2019	1 June 2019
Biomolecular Sciences	1 May 2019	1 June 2019
Ecology and Evolution	1 May 2019	1 June 2019
Energy and Environmental Sciences	1 May 2019	1 June 2019
Human-Machine Communication	1 May 2019	1 June 2019
Marine Biology	1 May 2019	1 June 2019
Medical Pharmaceutical Sciences	1 May 2019	1 June 2019
Nanoscience: for non-EU/EEA students	1 February 2019	1 June 2019
Nanoscience: for EU/EEA students	1 May 2019	1 June 2019

Programmes starting on 1 September and 1 February

Programme	Deadline of Application for 1 September	Deadline of decision for 1 September	Deadline of Application for 1 February	Deadline of decision for 1 February
Applied Mathematics	1 May 2019	1 June 2019	15 October 2019	15 November 2019
Applied Physics	1 May 2019	1 June 2019	15 October 2019	15 November 2019
Artificial Intelligence	1 May 2019	1 June 2019	15 October 2019	15 November 2019
Astronomy	1 May 2019	1 June 2019	15 October 2019	15 November 2019
Chemical Engineering	1 May 2019	1 June 2019	15 October 2019	15 November 2019

Chemistry	1 May 2019	1 June 2019	15 October 2019	15 November 2019
Computing Science	1 May 2019	1 June 2019	15 October 2019	15 November 2019
Farmacie	1 May 2019	1 June 2019	15 October 2019	15 November 2019
Industrial Engineering and Management	1 May 2019	1 June 2019	15 October 2019	15 November 2019
Mathematics	1 May 2019	1 June 2019	15 October 2019	15 November 2019
Physics	1 May 2019	1 June 2019	15 October 2019	15 November 2019