

## Appendices to the Teaching and Examination Regulations 2020-2021

### **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.
  - c. Modelling in the Life Sciences-track (M-track), which provides training as a researcher with a focus on modelling.

**Appendix III. Content of the degree programme  
(art. 2.3)**

**The degree programme consist of one of the following tracks:**

*Research-Track:*

<b>Study elements</b>	<b>ECTS</b>	<b>entry requirements</b>
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-Track:*

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

<sup>@</sup>Part of the skills internship SBP (5 ECTS) is taught at the UG

*Modelling in the Life Sciences-Track:*

<b>Study elements</b>	<b>ECTS</b>	<b>entry requirements</b>
research project (RP)* @	40 or ≥	see appendix V
research project (RP)* @	30 or ≥	see appendix V
colloquium	5	RP
essay	5	-
Mathematics in the Life Sciences	5	
Biological Modelling and Model Analysis	10	Mathematics in the Life Sciences or equivalent
Programming C++ for Biologists	5	
electives**	≤20	see Ocasys

@ At least one research project focusing on modelling in one of the domains of Life Science.

**In addition to the above scheme, the following rules apply:**

- The student chooses a mentor from the list of Biology to get advice on and discuss the contents of the individual degree programme before requesting approval from the Board of Examiners.
- \* The first research project (preferably the one  $\geq 40$  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 courses 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 of the master programme.
- \*\* 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), include a maximum of 10 ECTS of courses from other relevant Life Sciences programmes, and/or 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.

## 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'.

### 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
Advanced self-organisation of social systems	5
Advanced imaging techniques	5
Advanced Statistics	6
Animal experimentation: design, practice and ethics	5
Biological Modelling and Model Analysis	10
Ecology of Sustainable Farming ( <i>biennial, does not run in 2020/2021</i> )	5
Flyway ecology ( <i>biennial, runs in 2020/2021</i> )	5
Mathematical models in ecology and evolution	6
Mathematics in the Life Sciences	5
Marine ecosystem service & global change	5
Meta-analyses in Ecology ( <i>biennial, runs in 2020/2021</i> )	5
Molecular methods in ecology & evolution ( <i>biennial, does not run in 2020/2021</i> )	5/10
Orientation on International Careers	5
Practical bioinformatics for biologists	5
Practical modelling for biologists	5
Programming in C++ for biologists *	5/10
Polar ecosystems	5
Research proposal Ecology and Evolution**	5
Skills and Scopes in Biology	5

\* Students who have already followed similar courses during their bachelor's degree, will be given a deepening version of the course more tailored to their individual background knowledge and skills.

\*\* Students MSc Ecology and Evolution have priority in enrolment

**Master courses organised by the research institute GBB:**

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

\* Students MSc Biomolecular Sciences have priority for these courses

**Electives organised by Biomedical Sciences/GELIFES:\***

<b>Course</b>	<b>ECTS</b>
Microbiological safety	1
Microbiome & Health	5
Molecular biology of ageing and age-related diseases	5
Neurobiology of nutrition	5
Neurodegenerative diseases	5
Nutrition, Brain Development and Cognition	5
Scientific writing	5

\*Students MSc Biomedical Sciences have priority

**Master courses organised by Science & Society:**

<b>Course</b>	<b>ECTS</b>
Science & Business <sup>#</sup>	10
Science & Policy <sup>#</sup>	10

<sup>#</sup> 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'. 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
Impacts of Energy and Material Systems	5
Sustainable Use of Ecosystems	5
Sustainability & Society	5
Systems Integration and Sustainability	5

\* Students MSc Energy and Environmental Sciences have priority

### Electives organised by Education and Communication\*:

Course	ECTS
Research Methods in Science Education and Communication	5
Skills in Science Communication (2a only)	5

\*Students MSc Science Education and Communication have priority in enrolment

### Elective master courses organised by Teacher Education\*\*

Course	ECTS
Basiscursus Master Lerarenopleiding	5
Masterstage 1	5

\*\* Dutch-speaking students only

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

Course (max 2 ECTS per individual programme^)	½ day unit^
Access basic	5
Excel basic	3
Excel advanced	5

^ 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 (at a low fee for students), 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
iGEM (International Genetically Engineered Machine competition)*	≤20

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

**Appendix V. Compulsory order of examinations** (art 3.4)

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



## 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 Biology 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 *Biomedical Sciences*, *Behaviour and Neurosciences* or *Molecular Life Sciences* 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