

## Appendices to the Teaching and Examination Regulations 2021-2022

### **Appendix I. Learning outcomes of the degree programme Biomolecular Sciences\* (art. 1.3)**

The graduate:

- 1 a) has acquired in depth knowledge on one or more scientific disciplines within the field of Biomolecular Sciences and can use this knowledge to explain in detail the relevant concepts, using the appropriate terminology
- b) has acquired cross disciplinary knowledge of issues across scientific disciplines within the field of Biomolecular Sciences and can use this knowledge to explain current societal and scientific challenges;
- 2 can design, and conduct scientific research, and systematically organize his/her work in 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 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 Biomolecular Sciences students can follow the specialization Chemical Biology

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

**The degree programmes consist of:**

<b>Study elements</b>	<b>ECTS</b>	<b>entry requirements</b>
<i>Protein and Enzyme Engineering</i>	5	
3 compulsory master courses <sup>#</sup>	15	see Ocasys
Research project (RP)*	40 or ≥	see appendix V
Research project (RP)*	30 or ≥	see appendix V
Colloquium	5	RP
Essay	5	-
Electives**	≤20	see Ocasys

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

- The student chooses a mentor from the list of Biomolecular Sciences 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 ≥40 EC) must be an internal project. Internal projects must be performed at the FSE (within Life Sciences-oriented research groups) or the University Medical Centre Groningen under supervision of one of the examiners of the degree 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 either 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.
- The course unit Animal Experimentation is mandatory for students planning to participate in an "animal experiment" as defined by law (directive 2010/63/EU) during their research project work
- #Students have to pass three courses out of the following courses:
  1. Advances in Signal Transduction; 5 ECTS
  2. Advanced Membrane Biology; 5 ECTS
  3. Organelle and Membrane Biogenesis; 5 ECTS
  4. Molecular Dynamics and Modelling of Membranes and Proteins; 5 ECTS
  5. Electron microscopy of biological macromolecules: 5 ECTS
  6. Advanced Protein Crystallography; 5 ECTS
  7. Tools and Approaches of Systems Biology; 5 ECTS
  8. Transcriptomics: DNA Microarrays and RNAseq; 5 ECTS

9. Advanced Genetic Engineering and Complex Gene Regulatory Circuitries; 5 ECTS

**Additional requirements for the specialization *Chemical biology***

Students have to pass the following courses:

1. Advanced Protein Crystallography; 5 ECTS
2. Advances in Chemical Biology; 5 ECTS
3. Synthetic Biology & Systems Chemistry; 5 ECTS

#### Appendix IV. Electives (art. 2.4)

The following lists present study elements that can be chosen as 'electives'. 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 programmes, or other universities in the Netherlands or abroad.

#### Electives 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*	5
Biological Modelling and Model Analysis	10
Mathematical Models in Ecology and Evolution	6
Mathematics in the Life Sciences	5
Meta-analyses in Ecology ( <i>biennial, does not run in 2021/2022</i> )	5
Molecular Methods in Ecology & Evolution ( <i>biennial, runs in 2021/2022</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

\* Course unit only possible in combination with an MSc research project involving animals.

\*\* 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.

#### Master courses/Electives organised by the research institute GBB:

Course	ECTS
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

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

Course	ECTS
Applied Statistics and Modelling	5
Big Data and Applications in Biomedicine	5
Data Science in Biomedicine	5
Microbiological Safety	1
Microbiome & Health	5
Molecular Biology of Ageing and Age-related Diseases	5
Neurobiology of Nutrition	5
Neurodegenerative Diseases	5

Scientific Writing	5
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\*Students MSc Biomedical Sciences have priority in enrolment

#### **Electives organised by Science & Society:**

<b>Course</b>	<b>ECTS</b>
Introduction Science & Business	10
Introduction Science & Policy	10

#### **Electives organised by Energy and Environmental sciences\*:**

<b>Course</b>	<b>ECTS</b>
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 in enrolment

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

<b>Course</b>	<b>ECTS</b>
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\*\***

<b>Course</b>	<b>ECTS</b>
Basiscursus Master Lerarenopleiding	5
Masterstage 1	5

\*\* Dutch-speaking students only

#### **Electives organised by The Donald Smits Center for Information Technology:**

<b>Course (max 2 ECTS per individual programme<sup>^</sup>)</b>	<b>½ day unit<sup>^</sup></b>
Access basic	5
Excel basic	3
Excel advanced	5

<sup>^</sup> 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.

#### **Electives organised by Chemistry:**

<b>Course</b>	<b>ECTS</b>
Advances in Chemical Biology	5
Biophysical Imaging & Manipulation Techniques	5
Synthetic Biology & Systems Chemistry	5

#### **Elective organised by the centre for Synthetic Biology:**

<b>Course</b>	<b>ECTS</b>
iGEM (International Genetically Engineered Machine competition)*	≤20

\* Selection for this course takes place in wintertime, an advertisement about application details is announced via Nestor and other means 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 1
Biological Modelling & Model Analysis	Mathematics in the Life Sciences or equivalent



## Appendix VI. Admission to the degree programmes 2021/2022

(art. 5.1 + art. 5.2)

### 1. Requirements for admission to the selective Master's degree in Biomolecular Sciences

Applicants have to fulfil the admission requirements:

- an academic Bachelor's degree with a specialization in Biochemistry, Molecular Biology, Biotechnology or Molecular Genetics;

Holders of a Bachelor's degree in Biology or a Bachelor's degree in Life Science & Technology, from the University of Groningen, with the major Molecular Life Sciences, or the combination of the University of Groningen major Biomedical Sciences or the major Behaviour and Neurosciences with the minor Molecular Life Sciences, have sufficient knowledge and skills and can be admitted to the Master's degree programme in Biomolecular Sciences on that basis.

Holders of a Bachelor's degree in Pharmacy, from the University of Groningen, with the combination of the major Medical Pharmaceutical Sciences with the minor Molecular Life Sciences, have sufficient knowledge and skills and can be admitted to the Master's degree programme in Biomolecular Sciences on that basis.

Holders of a Bachelor's degree in Chemistry, from the University of Groningen, with the major Chemistry of Life can be admitted to this Master's programme.

- sufficient English proficiency;

Score □ Test	Overall	Reading	Listening	Speaking	Writing
IELTS (academic)	6.5	6.5	6.5	6.5	6.5
TOEFL IBT (internet-based)	90	21 * (19-23)	21 * (20-23)	21* (20-22)	24 (24-26)
Cambridge English	CAE or CPE Certificate with a minimum score of 180				
English language test - TC		B2	B2	B2	C1

This requirement is also fulfilled in case the applicant:

- is a native speaker and completed secondary education in any one of the following countries: Australia, Canada, Ireland, New Zealand, UK or USA;
- has completed a full-time Bachelor's degree programme (nominal duration of at least three years) in one of the following countries: Australia, Canada, Ireland, New Zealand, UK or USA;
- has an International Baccalaureate;
- has an European Baccalaureate diploma.

### 2. Applications procedure for selective Master degree programmes: (art. 4.2)

All candidates have to register in Studielink and upload the following documents before 1 May (start 1 September):

- ID card or passport
- Diploma of relevant Bachelor's degree programme (if possible)
- List of grades (transcript of records)
- Proof of English language proficiency
- CV
- Motivation form:
- List of subjects/courses (to be) followed
- Brief description of 5 key subjects/courses
- A report as a result of an academic assignment in the context of the programme
- The report has to reflect the student's ability to produce a well-structured and concise report

After candidates have completed their registration in Studielink, applications will be processed in the following way:

For holders of a Dutch BSc diploma:

1. The Student Administration FSE (SA FSE) compiles the individual selection file
2. The SA FSE submits the individual selection file to the Admissions Board of the individual programme

For holders of a non-Dutch BSc diploma:

1. Admissions Office compiles the individual selection file
2. Admissions Office validates individual Bachelor's degree diploma
3. Admissions Office submits the individual selection file to the SA FSE
4. SA FSE submits the individual selection file to the Admission Board of the individual programme

### **3 Selection procedure**

In order to select the best-suited and motivated students, the Admission Board requires a complete selection file from all candidates. The Admission Board of the individual programmes will review all individual applicants on the basis of their selection file. All candidates who meet the selection criteria 'academic performance' and 'motivation' (as specified by the different programmes) will be admitted to the ranking list. The maximum number of students who will be admitted to the programme is 30.

At least two members of the Admission Board score the selection criteria. Scoring is on a 9-point scale from 1 to 5 (1 = insufficient to 5 = excellent). If the scores on academic performance and/or motivation deviate 1 point or more, the members of the Admission Board that gave the scores have to confer, after which they grade a second time. This outcome constitutes the final score. Candidates with minimally a sufficient average score of 3 for each criterion, and an average overall score of at least 3.5 are selected.

#### **1. Academic performance (60%)**

The score on academic performance is the result of the scores on relevance (70%) and proficiency (30%).

- **Relevance and affiliation/fit** of the followed Bachelor programme to the Master programme (list of subjects/courses followed and grades obtained; brief description of the content of 5 key subjects/courses demonstrating the knowledge and skill(s) acquired by the student).

**Key subjects<sup>1</sup>:**

1. Genetics (Genetics Ecology & Evolution, Molecular Genetics, Bioinformatics)
2. Biochemistry (Molecules of Life, Basic Cell & Molecular Biology, Bio-organic Chemistry)
3. Microbiology (Microbiology, Host-Microbe Interactions, Enzymology & Thermodynamics)
4. Cell Biology (Basic Cell & Molecular Biology, Cell Biology & Immunology, Cell Biology & Microscopy)
5. Practical skills in Molecular Biology (Lab Course, Research Skills In Life Sciences 1+2+3, Bioinformatics, Practical Carrousel, Modelling Life)

<sup>1</sup> *Key subjects/courses; the nature of the knowledge and relevant skill(s) are defined by the programme director in consultation with the programme committee, and are approved by the director of the Graduate School.*

*Please consult our online catalogue [www.rug.nl/ocasys/](http://www.rug.nl/ocasys/) for the intended learning outcomes of the course units that cover these subjects*

- **Proficiency** in completing an academic assignment in the context of the programme and in individually producing a written report on the assignment topic. The report has to reflect the student's ability to produce a well-structured and concise report. It also has to show that the student is developing a critical attitude and is capable of critical thinking. The assignment handed in is free of choice and can be a report on a practicum, experiment, field-work, a literature review, a bachelor thesis, etc.<sup>2</sup>)

<sup>2</sup> *If the student has not made an individually written report during the Bachelor programme, he/she should contact the selection committee to receive an assignment on the basis of which a written report should be prepared.*

## **2. Motivation (40%)**

The candidate has to provide a motivation form (max. 500 words) demonstrating a suitable stance and talent to follow the programme. The letter should address the following specific questions/issues:

1. *Why did you choose this specific Master's degree programme?*
2. *How did the Bachelor's degree programme, extracurricular activities, and/or other experiences prepare you for this specific Master programme?*
3. *In case it took you longer than nominal to acquire the Bachelor's degree, please briefly explain the cause(s) of the delay*
4. *How will this Master's degree programme prepare you for your future career and/or serve your ambitions?*
5. *Please shortly address specific topics in Biomolecular Sciences that particularly interest you*
6. *Free space to mention anything you feel is relevant and is not addressed by the questions above*

### **Timeline for the application and selection procedure**

The application procedure for the start on the 1<sup>st</sup> of September 2021 will open on the 1<sup>st</sup> of October 2020 and will close on the 1<sup>st</sup> of May 2021. The details of the entire application procedure are published on the *Admission and Application* website for the individual Master's degree programme.

After registration in Studielink, all candidates will receive an email with an overview of the application procedure, the deadlines and instructions on how to proceed.

After candidates have successfully submitted all necessary documents, the Student Administration FSE (for holders of a Dutch BSc diploma,) or the Admissions Office (for holders of a non-Dutch BSc diploma) will send the candidate a confirmation of receipt.

The Admission Board will carry out the ranking. The top 30 students will be offered placements between the 15<sup>th</sup> of May and the 8<sup>th</sup> of June. The Admission Board can offer a maximum of 3 early admission placements to excellent students between the 1<sup>st</sup> of October and the 1<sup>st</sup> of May.

Students who are offered a place have to accept or decline the placement within four weeks after receiving the offer. If the student does not accept the placement within four weeks, this placement expires and will be offered to a candidate on the waiting list. If a student declines their placement, that placement will be offered to a candidate on the waiting list.

There will be one round of offering placements to candidates on the waiting list.

Candidates who are not selected or not in the top 30 of the ranking can lodge a written appeal against this decision within four weeks of the date of sending, with the Board of Appeal for Examinations, P.O. Box 72, 9700 AB Groningen, the Netherlands

## **Appendix VII Transitional provisions (art. 7.1)**

Non-applicable

## **Appendix VIII Additional Requirements Open degree Programmes (Art. 5.6)**

In exceptional circumstances students wishing to pursue an open degree programme may file a request with the Board of Examiners. The Board of Examiners will evaluate whether the proposed curriculum meets the learning outcomes of the degree programme and can determine further conditions in their rules and regulations.

## **Appendix IX**

### **Application and decision deadlines for admission**

(art. 2.6.1 and 2.6.3)

#### **Programmes starting on 1 September 2021**

<b>Programme</b>	<b>Deadline of Application</b>	<b>Deadline of decision</b>
Behavioural and Cognitive Neurosciences	1 May 2021	1 June 2021
Biology	1 May 2021	1 June 2021
Biomedical Engineering	1 May 2021	1 June 2021
Biomedical Sciences	1 May 2021	1 June 2021
Biomolecular Sciences	1 May 2021	1 June 2021
Ecology and Evolution	1 May 2021	1 June 2021
Energy and Environmental Sciences	1 May 2021	1 June 2021
Human-Machine Communication	1 May 2021	1 June 2021
Marine Biology	1 May 2021	1 June 2021
Mechanical Engineering	1 May 2021	1 June 2021
Medical Pharmaceutical Sciences	1 May 2021	1 June 2021
Nanoscience: for non-EU/EEA students	1 February 2021	1 June 2021

Nanoscience: for EU/EEA students	1 May 2021	1 June 2021
Science Education and Communication	1 May 2021	1 June 2021

**Programmes starting on 1 September 2021 and 1 February 2022**

<b>Programme</b>	<b>Deadline of Application for 1 September</b>	<b>Deadline of decision for 1 September</b>	<b>Deadline of Application for 1 February</b>	<b>Deadline of decision for 1 February</b>
Applied Mathematics	1 May 2021	1 June 2021	15 October 2021	15 November 2021
Applied Physics	1 May 2021	1 June 2021	15 October 2021	15 November 2021
Artificial Intelligence	1 May 2021	1 June 2021	15 October 2021	15 November 2021
Astronomy	1 May 2021	1 June 2021	15 October 2021	15 November 2021
Chemical Engineering	1 May 2021	1 June 2021	15 October 2021	15 November 2021
Chemistry	1 May 2021	1 June 2021	15 October 2021	15 November 2021
Computing Science	1 May 2021	1 June 2021	15 October 2021	15 November 2021
Farmacie	1 May 2021	1 June 2021	15 October 2021	15 November 2021
Industrial Engineering and Management	1 May 2021	1 June 2021	15 October 2021	15 November 2021
Mathematics	1 May 2021	1 June 2021	15 October 2021	15 November 2021
Physics	1 May 2021	1 June 2021	15 October 2021	15 November 2021