

Appendices to the Teaching and Examination Regulations 2020-2021

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

The graduate:

- 1 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;
- 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 Biomolecular Sciences students can follow the specialization Chemical Biology

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

The degree programmes consist of:

| Study elements | ECTS | entry requirements |
|--|-------------|---------------------------|
| <i>Protein and Enzyme Engineering</i> | 5 | |
| 3 compulsory master courses [#] | 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 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.
- [#]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. Advanced Protein Crystallography; 5 ECTS
 6. Tools and approaches of systems biology; 5 ECTS
 7. Transcriptomics: DNA Microarrays and RNAseq; 5 ECTS
 8. 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, other universities in the Netherlands or even abroad.

Electives organised by the research institutes GELIFES and ESRIG:

| Course | ECTS |
|--|------|
| Advanced selforganisation of social systems | 5 |
| Advanced imaging techniques | 5 |
| Advanced Statistics | 6 |
| Animal experimentation: design, practice and ethics | 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, 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 |

* 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 |
|--|------|
| 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 |

*Students MSc Biomedical Sciences have priority in enrolment

Electives organised by Science & Society:

| Course | ECTS |
|--------|------|
|--------|------|

| | |
|--------------------|----|
| Science & Business | 10 |
| Science & Policy | 10 |

Electives 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 in enrolment

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

Electives 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.

Electives organised by Chemistry:

| Course | ECTS |
|---------------------------------------|-------------|
| Advances in Chemical Biology | 5 |
| Modern Laser Microscopy | 5 |
| Synthetic Biology & Systems Chemistry | 5 |

Elective 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)

| Course unit | Entry requirement |
|---------------------------------------|--|
| 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 2020/2021

(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 major Biomedical Sciences or the major Behaviour and Neurosciences or the major Medical Pharmaceutical Sciences in combination 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 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 a 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. Education Support Centre compiles the individual selection file
2. Education Support Centre 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 ESC
4. ESC 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 student 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 subjects¹:

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)

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

Please consult our on-line catalogue 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.²)

² 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 can be prepared.

2. Motivation (40%)

The candidate has to provide a motivation form (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 serves 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 1st of September 2020 will open on the 1st of October 2019 and will close on the 1st of May 2019. 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 Education Support Centre (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 15th of May and the 8th of June. The Admission Board can offer a maximum of 3 early admission placements to excellent students between the 1st of October and the 1st 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 the placement 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