

## **Appendix for the Bachelor degree programmes in Life Science & Technology 2022/2023**

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## **Appendix I      Learning outcomes of the Bachelor's degree programme (Article 3.1.1)**

Graduates are able to:

1. Explain general basic principles of biology from chemical and physical perspectives;
2. Explain the basic principles of applied technology within the field of life sciences;
3. Estimate the relevance of research results in Science, Technology, Engineering and Mathematics (STEM) published in academic journals and discuss these results with peers;
4. Describe fundamental and/or applied scientific research and/or a technological method and recognize areas of interest within it;
5. Describe the relationship between various disciplines and integrate terms and concepts from the subject areas;
6. Recognise and analyse scientific problems, and design a scientific/academic approach to address them in a systematic manner;
7. Under supervision, formulate a research hypothesis or propose a research design within their own discipline, and possess sufficient practical skills to conduct the research themselves;
8. Explain the societal relevance of the discipline, evaluate the related responsibilities and judge their individual role in that context;
9. Develop a work method independently and proactively, justify it, and carry it out in order to achieve a specific aim;
10. Contribute to and take responsibility for solving a specific problem or task in a specific role as part of a team;
11. Report about research in a structured manner, both orally and in writing;

## **Appendix II    Majors and Minors of the degree programme (Article 3.7.4)**

As of September 2020, the degree programme has one major: Life Science & Technology.

This consists of the propaedeutic phase as listed in Appendix III and the post-propaedeutic phase as listed in Appendix IV.

The degree programme includes a minor of 30 ECTS, see also TER article 8A. Students who started with the Life Science & Technology after the 1<sup>st</sup> of September 2020 are allowed to do all the university minors, including the ones offered by the Faculty of Science and Engineering.

Students who started with the Life Science & Technology programme before the 1<sup>st</sup> of September 2020 should check Appendix VIII for information on the transitional arrangement.

Students who complete their bachelor degree programme have access to several master programmes within FSE. Admission requirements are listed in the TER appendix of those master programmes:

- Biology
- Biomedical Engineering
- Biomedical Sciences
- Biomolecular Sciences
- Chemistry
- Energy and Environmental Sciences
- Medical Pharmaceutical Sciences
- Physics
- Science Education and Communication

## Appendix III Course units in the propaedeutic phase

- List of course units; Article 4.1.1
- Compulsory order of examinations; Article 9.3

For students who started the degree programme on or after the 1<sup>st</sup> of September 2020.

Course unit name	Course code	ECTS	Practical	Entry requirements
Optics	WBLT001-05	5		
Mammalian Cell Biology	WBLT002-05	5		
Practical Course Optics and Cell Biology	WBLT003-05	5	X (lab)	
Organic Chemistry for Life Science 1	WBLT004-05	5		
Biochemistry for LST	WBLT005-05	5	X (computer)	
Calculus for LST	WBLT006-05	5		
Biophysics	WBLT007-05	5		
Thermodynamics	WBLT008-05	5	X (computer)	
Principles of Physiology	WBLT011-05	5	X (lab)	
Pharmaceutical Analysis	WBFA035-05	5	X (lab)	
Programming for Life Sciences	WBLT009-05	5	X (computer)	
Scientific Reading and Communication Skills	WBLT010-05	5		

## Appendix IV Course units in the post-propaedeutic phase

- List of course units; Article 7.1.1
- Compulsory order of examinations; Article 9.3

Students who started the degree programme before the 1<sup>st</sup> of September 2020 should check Appendix XI for information on the transitional arrangement.

For students who started the degree programme on or after the 1<sup>st</sup> of September 2020 the information below applies.

### Year 2

Course unit name	Course code	ECTS	Practical	Entry requirements
Applied Microbiology	WBLT012-05	5		
Bioinorganic Chemistry	WBLT013-05	5		
Practical Course Microbiology	WBLT014-05	5	X (lab)	
Linear Algebra for LST	WBLT015-05	5		
Quantum and Classical Mechanics for LST	WBLT016-05	5		
Imaging	WBLT020-05	5		
Organic Chemistry for Life Science 2	WBLT018-05	5		
Spectroscopic Tools for Life Sciences	WBLT017-05	5		
Practical Skills in Organic Chemistry for LST	WBLT019-05	5	X (lab)	
Genetics and Evolution	WBLT023-05	5		
Applied Biotechnology	WBLT021-05	5		
LST and Society: Ethical and Professional Aspects	WBLT022-05	5		

### Year 3:

Course unit name	ECTS	Practical	Entry requirements
Minor	30	Depends on minor	Propaedeutic exam
Bachelor Research Project *	15	X	At least 120 ECTS, including the propaedeutic exam
Electives * <ul style="list-style-type: none"> <li>• Biology</li> <li>• Chemistry</li> <li>• Biomedical Engineering</li> <li>• Medical Pharmaceutical Sciences</li> </ul>	15	Depends on elective	Depends on course

\* Electives and bachelor research project will also depend on the master programme the student wants to pursue. Electives and bachelor research project must be approved by the Board of Examiners. For entry requirements, check the TER appendix of the relevant bachelor programme.

Students who have not completed the propaedeutic phase are not allowed to enroll for more than 15 ECTS in one period (e.g. period 1a) including re-examinations. Students who have not passed first-year courses need to prioritise these when enrolling for second-year courses.

## Electives and bachelor project in Biomedical Engineering

These electives can also be used to create a minor in Biomedical Engineering.

Course unit name	ECTS
Applied Medical Visualization	5
Big Data for BME	5
Quantitative Image Analysis	5
Anatomy and Physiology	5
Research Course BME	9
Ethics 3: Research Ethics	1
Imaging Techniques in Radiology 1	5
Signals and Systems	5
Waves and Optics for BME	5
Bachelor Project in Biomedical Engineering	15

The assessment method of the courses can be found in the assessment plan of the degree programme and in the Ocasys database. For entry requirements, check the TER appendix of the relevant bachelor programme.

## Electives and bachelor project in Medical Pharmaceutical Sciences

These electives can also be used to create a minor in Medical Pharmaceutical Sciences.

Course unit name	ECTS
MG: Endocrine System and Digestive and Respiratory Tract	5
Pharmacokinetics	5
Metabolism and Toxicology	5
Biostatistics	5
MG: Circulatory Tract	5
MG: Infectious diseases and Oncology	5
Pharmacoepidemiology	5
Collected Medicine Groups	5
Drugs for the Central Nervous System	5
Bachelor project	15

The assessment method of the courses can be found in the assessment plan of the degree programme and in the Ocasys database. For entry requirements, check the TER appendix of the relevant bachelor programme.

## Electives and bachelor project in Chemistry

These electives can also be used to create a minor in Chemistry.

Course unit name	ECTS
Electrochemical Technology	5
Synthesis 2 Lab Course	5
Physical Chemistry 2	5
Soft Molecular Materials	5
Research Skills Practical OMIC	5
(Bio)Catalysis	5
Physical Organic and Photochemistry	5
Bachelor Research Project in Chemistry	15

The assessment method of the courses can be found in the assessment plan of the degree programme and in the Ocasys database. For entry requirements, check the TER appendix of the relevant bachelor programme.

### **Electives and bachelor project in Physics**

These electives can also be used to create a minor in Physics.

Course unit name	ECTS
Bachelor Research Project (Applied) Physics *	15
Solid state physics	5
Mechanics and relativity (only mechanics part, i.e. 2nd part of the course)	5
Waves and Optics	5
Electricity and Magnetism (part 1)	5
Structure of Matter (part 1)	5
Calculus II	5
Electricity and Magnetism (part 2)	5
Structure of Matter (part 2)	5
Quantum Physics 2	5

The assessment method of the courses can be found in the assessment plan of the degree programme and in the Ocasys database. Check for entry requirements the TER of the relevant bachelor programme.

### **Electives, research project and bachelor thesis in Biology**

These electives can also be used to create a minor in Biology.

Behavioural Biology	5
Big Data Management in Ecology and Evolution	5
Bioanalytical and Omics Techniques	5
Bioinformatics	5
Biology of Cancer	5
Biology of Human Behaviour	5
Biostatistics II	5
C++ for Biologists	5
Cell Migration and Communication	5
Chronobiology	5
Conservation Biology	5
Endocrinology	5
Evolution and Development	5
Evolutionary and Ecological Genomics	5
Evolutionary Medicine	5
Evolutionary Processes	5
Food and Metabolism	5
Genes & Behaviour	5
Host-microbe Interactions	5
Immunology	5
Integrative Biology	5
Integrative Neuroscience	5
Marine Biology	5

Microbiome	5
Modelling Life	5
Molecular Genetics	5
Practical Carrousel	5
Self-organization	5
Systems Ecology & Ecological Interactions 1	5
Systems Ecology & Ecological Interactions 2	5
Research project (in discipline of interest)	10
Bachelor thesis (in discipline of interest)	5

The assessment method of the courses can be found in the assessment plan of the degree programme and in the Ocasys database. Check for entry requirements the TER of the relevant bachelor programme.

LS&T students who started in 2020-2021 and 2021-2022 can apply for the Master BMS after completing the appropriate course package. The outflow to the Master BMS is no longer possible for students from later cohorts.



## Appendix V Admission to the post-propaedeutic phase

### Article 6.1.1

The following candidates will be admitted to the post-propaedeutic phase:

Students who have been issued a positive study advice from the degree programme Life Science & Technology (cohort from 2020/2021 onwards) at the University of Groningen.

The Board of Examiners decides about students from other degree programmes.

## Appendix VI Contact hours propaedeutic and post-propaedeutic phase

### Article 3.6

<b>Degree programme year 1</b>	
<b>Type of contact hours</b>	<b>Contact hours per year</b>
Lectures	+/- 210
Tutorials	+/- 136
Practicals	+/- 236
Supervision during an internship	N/A
Examinations	+/- 30
Career services	+/- 8 (mentor sessions)

<b>Degree programme year 2</b>	
<b>Structure contact hours</b>	<b>Contact hours per year</b>
Lectures	+/- 186
Tutorials	+/- 123
Practicals	+/- 198
Supervision during an internship	N/A
Examinations	+/- 30

Contact hours during year 3 depend on courses chosen during the minor and as electives.

## **Appendix VII Additional Requirements Open degree Programmes (Art. 7.3)**

Students wishing to pursue an open degree should file a request with the Board of Examiners.

## Appendix VIII Transitional arrangement (article 12.1):

This transitional arrangement applies to students who started in the degree programme before the 1<sup>st</sup> of September 2020.

See also: <https://student.portal.rug.nl/infonet/studenten/fse/programmes/bsc-bio-lst/year-3/transitional-arrangements>

Students who started with the Life Science & Technology programme before the 1<sup>st</sup> of September 2020 can choose from the following majors:

- Behaviour and Neurosciences
- Biomedical Engineering
- Biomedical Sciences
- Molecular Life Sciences

Students who started with the Life Science & Technology programme before the 1<sup>st</sup> of September 2020 can choose from the following minors:

- Behaviour and Neurosciences
- Biomedical Engineering
- Biomedical Sciences
- Implantation and Function Recovery (only available to and mandatory for students of the major Biomedical Engineering)
- Molecular Life Sciences

The major-specific requirements and minors for the following majors are listed in the TER Appendix of the bachelor programme Biology 2022/2023:

- Behaviour and Neurosciences
- Biomedical Sciences
- Molecular Life Sciences

### Graduating

Students of the majors Behaviour and Neurosciences, Biomedical Engineering, Biomedical Sciences and/or Molecular Life Sciences who started the degree programme Life Science and Technology before the 1<sup>st</sup> of September 2020 have until the 1<sup>st</sup> of September 2023 to finish their programme. After the 1<sup>st</sup> of September 2023 the Board of Examiners will look at each individual student on a case-by-case basis.

Old course	New course
Biological Physics (WPLS18004)	Biophysics (WBLT007-05)
Computer-aided Design (CAD) (WPLS18020)	Individual assignment
Mathematics for Life Sciences (WPLS18012)	Calculus for LST (WBLT006-05) <i>or</i> Calculus 1 (for IEM) (WBIE003-05)
Methodical Design 1 (WPLS18014)	Designing Biomedical Products 1 (WBBE027-05)
Biomechanics (WBBE002-05)	Biomechanics (WBBE002-05)
Material Science (WBBE005-05)	Material Science (WBBE005-05)
Anatomy and Histology (WBBE001-05)	Anatomy and Histology (WBBE024-05)
Design of Biomedical Products 2 (WBBE008-05)	Design of Biomedical Products 2 (WBBE008-05) + Individual assignment
Biomaterials 1 (WBBE007-05)	Biomaterials 1 (WBBE007-05)
Thermodynamics (WBFA021-05)	Thermodynamics (WBFA021-05)
Regenerative Medicine (WBBY078-05)	Regenerative Medicine (WBBY078-05)

Medical Implants (WBBE013-05)	Individual assignment
Biological Implant Evaluation (WBBE011-05)	Cell Biology & Immunology (WBBE035-05)
Practical Chemistry BME (WBBE021-05)	Practical Course: Synthesis and Analysis (WBCH016-05)
Programming in Life Sciences (WBBE022-05)	Programming for Life Sciences (WBBY075-05)  Or  Programming for Life Sciences (WBLT009-05)
Medical Technology and Society (WBBE020-05)	Biology & Society: EPA (WBBY049-05)  Or  LST & Society: EPA (WBLT022-05)
Transport in Biological Systems (WBBE023-05)	Transport in Biological Systems (WBBE023-05)
Medical Microbiology (WBBE006-05)	Microbes and Infection (WBBY059-05)
Biomedical Instrumentation (WBBE003-05)	Biomedical Instrumentation (WBBE003-05)
Designing Biomedical Products 3 (WBBE004-05)	Design of Biomedical Products 3 (WBBE004-05)
Electronics (WBBE009-05)	Electronics (WBBE009-05)
Research Course BME (WBBE010-10)	Research Course (WBBE010-XX)
Imaging Techniques in Radiology 1 (WBBE012-05)	Imaging Techniques in Radiology 1 (WBBE012-05)
Numerical Methods (WBMA037-05)	Numerical Methods (WBMA037-05)
Signals and Systems (WBIE-030-05)	Signals and Systems (WBIE-030-05)
Bachelor Research Project BME (WBBE016-10)	Bachelor Research Project (WBBE901-15)
Bachelor Thesis Life Sciences (WBBY091-05)	Bachelor Thesis Life Sciences (WBBY091-05)