Appendix for the Bachelor degree programmes in Life Science & Technology 2024/2025

Appendix I Learning outcomes of the Bachelor's degree programme (Article 3.1)

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;

Through the mentorate, the degree programme also offers the graduate the ability to explore career opportunities and opportunities for follow-on degree programmes

Appendix II Majors and Minors of the degree programme (Article 3.7)

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

This consists of the course units listed in Appendix III.

The degree programme includes a minor of 30 ECTS, see also TER article 7.1. Students who started with Life Science & Technology after the 1st 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 1st of September 2020 should check Appendix VII 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 (for LST students who started in 2020/2021 or 2021/2022)
- Biomolecular Sciences
- Chemistry
- Energy and Environmental Sciences
- Medical Pharmaceutical Sciences
- Physics
- Science Education and Communication

Appendix III Course units of the programme

- **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 1st of September 2020.

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

First year programme:

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		
Programming for Life Sciences	WBLT009-05	5	X (computer)	
Thermodynamics	WBLT008-05	5		
Principles of Physiology	WBLT011-05	5	X (lab)	
Pharmaceutical Analysis	WBFA035-05	5	X (lab)	
Biophysics	WBLT007-05	5		
Scientific Reading and Communication Skills	WBLT010-05	5		

Second year programme

Course unit name	Course code	ECTS	Practical	Entry requirements
Applied Microbiology	WBLT012-05	5		
Linear Algebra for LST	WBLT015-05	5		
Practical Course Microbiology	WBLT014-05	5	X (lab)	
Bioinorganic Chemistry	WBLT013-05	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		

Third year programme

Course unit name	ECTS	Practical	Entry requirements
Minor	30	Depends on minor	
Bachelor Research Project *	15	X	At least 120 ECTS, including the complete first year programme
Electives * • Biology • Chemistry • Biomedical Engineering • Medical Pharmaceutical Sciences • Physics	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 first year programme 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	Course code	ECTS
Anatomy and Physiology	WBBE024-05	5
Applied Medical Visualization	WBBE045-05	5
Biomechanics	WBBE002-05	5
Ethics 3: Research Ethics	WBBE046-01	1
Mathematical Tools (for BME)	WBBE055-05	5
Microscopy and Imaging	TBA	5
Physics and Technology of Medical Imaging	WBBE057-05	5
Research Course BME	WBBE010-09	9
Signals and Systems	WBIE030-05	5
Waves and Optics for BME	WBBE040-05	5
Bachelor Project in Biomedical Engineering	WBBE901-15	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 and the Ocasys database.

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	Course code	ECTS
Biostatistics	WBFA011-05	5
Drugs for the Central Nervous System	WBFA033-05	5
Medicinal Chemistry and Biophysics	WBFA038-05	5
Metabolism and Toxicology	WBFA016-05	5
MG: Circulatory Tract	WBFA040-05	5
MG: Endocrine System and Digestive and Respiratory Tract	WBFA039-05	5
MG: Infectious diseases and Oncology	WBFA041-05	5
Pharmacoepidemiology	WBFA028-05	5
Pharmacokinetics	WBFA018-05	5
Bachelor project	WBFA903-15	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 and the Ocasys database.

Electives and bachelor project in Chemistry

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

Course unit name	Course code	ECTS
Artificial Intelligence and Machine Learning in Chemistry	WBCH060-05	5
(Bio)Catalysis	WBCH019-05	5
Bioenergy, Metabolism and Bioresources	WBCH009-05	5
Carbohydrates	WBCH010-05	5
Electrochemical Technology	WBCE021-05	5
Nuclear and Radiochemistry	WBCH052-05	5
Organic Synthesis	WBCH051-05	5
Physical Chemistry 2	WBCH015-05	5
Physical Organic and Photochemistry	WBCH027-05	5
Research Practical Chemical Biology	WBCH054-05	5
Research Practical Materials Design	WBCH057-05	5
Research Practical OMIC	WBCH058-05	5
Research Practical Polymer Chemistry	WBCH056-05	5
Soft Molecular Materials	WBCH017-05	5
Synthesis 2 Lab Course	WBCH008-05	5
Bachelor Research Project in Chemistry	WBCH901-15	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 and the Ocasys database.

Electives and bachelor project in Physics

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

Course unit name	Course code	ECTS
Calculus 2 (for IEM)	WBIE017-05	5
Calculus 2 (for Physics)	WBPH058-05	5
Electricity and Magnetism	WBPH033-10	10
Experimental Particle Physics	WBPH040-05	5
Ionizing Radiation in Medicine	WBPH007-05	5
Mathematical Physics	WBPH049-05	5
Mechanics and relativity (only mechanics part, i.e. 2nd part of the course)	WBPH001-10 / WBPH021-05	5
Nuclear Energy	WBPH010-05	5
Quantum Physics 2	WBPH052-05	5
Relativity Theory	WBPH061-05	5
Solid state physics	WBPH030-05	5
Structure of Matter	WBPH034-10	10
Subatomic Physics	WBPH031-05	5
Waves and Optics	WBPH032-05	5
Bachelor Research Project Physics for LST *	WBPH904-15	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 and the Ocasys database.

* Entry requirements for LST students are 120 ECTS within the LST programme, including completion of the first year programme.

Electives, research project and bachelor thesis in Biology

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

Course unit name	Course code	ECTS
Behavioural Biology	WBBY013-05	5
Big Data Management in Ecology and Evolution	WBBY028-05	5
Bioanalytical and Omics Techniques	WBBY073-05	5
Bioinformatics	WBBY002-05	5
Biology of Cancer	WBBY030-05	5
Biology of Human Behaviour	WBBY031-05	5
Biostatistics II	WBBY032-05	5
C++ for Biologists	WBBY015-05	5
Cell Migration and Communication	WBBY072-05	5
Chronobiology	WBBY003-05	5
Endocrinology	WBBY035-05	5
Evolution and Development	WBBY037-05	5
Evolutionary and Ecological Genomics	WBBY054-05	5
Evolutionary Medicine	WBBY039-05	5
Evolutionary Processes	WBBY040-05	5
Food and Metabolism	WBBY041-05	5
Genes & Behaviour	WBBY018-05	5
Host-microbe Interactions	WBBY019-05	5
Human Genetics and Genomics	WBBY042-05	5
Immunology	WBBY020-05	5
Integrative Biology	WBBY056-05	5
Integrative Neuroscience	WBBY006-05	5
Medical Structural Biology	WBBY007-05	5
Microbiome	WBBY060-05	5
Modelling Life	WBBY024-05	5
Molecular Genetics	WBBY008-05	5
Practical Carrousel	WBBY048-05	5
Systems Ecology & Ecological Interactions 1	WBBY070-05	5
Systems Ecology & Ecological Interactions 2	WBBY071-05	5
Research project (in discipline of interest)	Varies	10
Bachelor thesis (in discipline of interest)	WBBY901-05	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.

Miscelleanous electives from FSE bachelor programmes

These are elective courses that do not go with a specific specialization.

Course unit name	Course code	ECTS
Autonomous Systems	WBAI002-05	5
Calculus 2	WBMA029-05	5
Imperative Programming	WBCS003-05	5
Introduction to Graph Theory	WBMA052-05	5
Introduction to Science Communication	WBEC001-05	5
Oriëntatie op Onderwijs in de Bètawetenschappen	WBEC002-05	5
Statistics	WBAI049-05	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.

Appendix IV Contact hours
Article 3.6

Degree programme year 1	
Type of contact hours	**Contact hours per year**
Lectures	+/- 210
Tutorials	+/- 136
Practicals	+/- 236
Supervision during an internship	N/A
Examinations	+/- 30
Career services/Mentorate	+/- 6

Degree programme year 2	
Structure contact hours	**Contact hours per year**
Lectures	+/- 186
Tutorials	+/- 123
Practicals	+/- 198
Supervision during an internship	N/A
Examinations	+/- 30
Career services/Mentorate	+/- 5

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

Appendix V 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 VI Transitional arrangement (article 12.1):

This transitional arrangement applies to students who started in the degree programme before the 1st of September 2020:

LST students who started the programme before the 1st of September 2020:

See the TER appendix for Life Science & Technology from 2022/2023 and https://student.portal.rug.nl/infonet/studenten/fse/programmes/bsc-bio-lst/year-3/transitional-arrangements

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 1st of September 2020 have until the 1st of September 2023 to finish their programme. After the 1st of September 2023 the Board of Examiners will look at each individual student on a case-by-case basis.

LST students who started the programme after the 1st of September 2020:

There are no changes within the LST part of the programme.

There are some changes in the electives offered by other programmes. Applicable transitional agreements can be found in the TER appendix of that programme.