Appendix for the Bachelor degree programmes in Biology and Life Science & Technology

Appendix I Learning outcomes of the Bachelor's degree programme (Article 1.3.a)

Graduates are able to:

1. Explain general basic principles of biology and describe how they relate to each other;
2. A (Biology): Estimate the relevance of research results in one or more areas of biology published in academic journals and discuss these results with peers;
   B (LST): Estimate the relevance of research results in medicine and STEM published in academic journals and discuss these results with peers;
3. A (Biology): Describe fundamental and/or applied scientific research and recognize areas of interest within it;
   B (LST): Describe fundamental and/or applied scientific research and/or a technological biomedical design method and recognize areas of interest within it;
4. Describe the relationship between various disciplines and integrate terms and concepts from the subject areas;
5. Recognise and analyse scientific problems, and design a scientific/academic approach to them in a systematic manner.
6. 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;
7. Explain the societal relevance of the discipline, evaluate the related responsibilities and judge their individual role in that context.
8. Develop a work method independently and proactively, justify it, and carry it out in order to achieve a specific aim;
9. Contribute to and take responsibility for solving a specific problem or task in a specific role as part of a team;
10. Report about research in a structured manner, both orally and in writing;

The degree programmes also offer the student:

11. To explore career opportunities and opportunities for follow-on degree programmes.

Appendix II Majors and Minors of the degree programme (Article 2.1.4)

The degree programme has the following Major(s):

Majors within the degree programme Biology:
- Behaviour and Neurosciences
- Biomedical Sciences
- Ecology and Evolution
- Molecular Life Sciences
- Integrative Biology*

Majors within the degree programme Life Science & Technology
- Behaviour and Neurosciences
- Biomedical Engineering
- Biomedical Sciences
- Molecular Life Sciences

Minors available to students from both degree programmes**
- Behaviour and Neurosciences
- Biomedical Engineering
- Biomedical Sciences
- Biomedical Sciences/Behaviour and Neurosciences
- Ecology & Evolution
- Implantation and Function Recovery
- Molecular Life Sciences
- Pharmacy

* Can be chosen from year 2 onward.
** Depending on chosen major

Minors available to students within the Faculty of Science & Engineering:
- Modelling in the Life Sciences

Minors available to students from outside the degree programme:
- Neuroscience

Appendix III Course units in the propaedeutic phase

- **List of course units; Article 3.1.1**
- **Compulsory order of examinations; Article 8.2**

First semester:

Course unit name	ECTS	Practical	Entry requirements
Basic Cell and Molecular Biology	5		
Physiology	5	X	
Genetics, Ecology & Evolution	5		
Biostatistics 1	5		
Microbiology	5		
Lab Course	3	X	
First Year Symposium	2		

Second semester:

Major Ecology & Evolution

Course unit name	ECTS	Practical	Entry requirements
Behavioural Neurosciences	5	X	
Evolutionary Ecology	5	X	
Biochemistry and Cell Biology in Ecology and Evolution	5		
Ecophysiology of Plants and Animals	5	X	
Research Skills in Ecology and Evolution	10	X	

Majors Behaviour and Neurosciences, Biomedical Sciences, Molecular Life Sciences

Course unit name	ECTS	Practical	Entry requirements
Behavioural Neurosciences	5	X	
Molecules of Life	5		
Cell Biology and Immunology	5		

Metabolism	5		
Research skills in Life Sciences	10	X	

Major Biomedical Engineering

Course unit name	**ECTS**	**Practical**	**Entry requirements**
Methodical Design 1a*	5		
Molecules of Life	5		
Cell Biology and Immunology	5		
Methodical design 1b*	5		
Mathematics for Life Sciences	5		
Biological Physics	5	X	
*Methodical design is a 10 ECTS course but given in two parts			

Appendix IV Course units in the post-propaedeutic phase

- **List of course units; Article 6.1.1**
- **Compulsory order of examinations; Article 8.2**

The post-propaedeutic phase of the new curriculum that will start in 2018/2019 has not yet been established.

The post-propaedeutic phase described below only applies to students who started with Biology or LST in the academic year 2017/2018 or earlier, which is why the sections describing general requirements regarding Level 1, Level 2 and Level 3 courses and major-specific requirements (section 1.1 through 1.8) are in Dutch.

Algemene eis: Niveau-indicatoren

De vakken in de bacheloropleidingen zijn op één van de drie niveaus ingeschaald.
De drie niveaus worden globaal als volgt gedefinieerd:

1 Informatie en basiskennis verwerven. Instructie in kleinschalige oefening van academische vaardigheden, zoals spreek- en schrijfvaardigheden.
2 Inzicht krijgen in aangeleerde concepten en verworven kennis. Zelfstandig mondeling en schriftelijk presenteren. De student leert kennis abstraheren, interpreteren en uitleggen.
3 Toepassen van opgedane kennis. Integreren van kennisgebieden, voorspellen op basis van theorie. Opzetten van onderzoeksvraagstelling met plan van aanpak.

Voor de diplomatoekenning van de bachelor wordt verlangd dat van de 150 ECTS die de major omvat de student:

- Maximaal 50 ECTS aan vakken op niveau 1 en
- Minimaal 50 ECTS aan vakken op niveau 3 heeft afgerond.

Het staat de student vrij om extra vakken op niveau 1 te volgen. Deze gelden echter niet voor het verplichte deel van het bachelorexamen (d.w.z. binnen de 180 ECTS).

1. Major-specific requirements

Several courses in the post-propaedeutic phase have entry requirements. These courses are in **bold** and the exact entry requirements for each courses are listed in 4.4.

1.1 Major Biologie

Verplichte vakken (20 ECTS)

	niv	ECTS
Wetenschap, Technologie, Ethiek en Maatschappij	2	5
Bachelorproject bestaande uit:		
Bachelorscriptie	3	5
Plus eén van de bacheloronderzoeken	3	10
/researchcursussen binnen de opleiding Biologie		

Totaal 70 ECTS aan keuzevakken vrij te kiezen binnen levenswetenschappen en uit de lijst in Appendix IV 1.8.

1.2 Major Biomedische technologie

Verplichte vakken (85 ECTS)

	niv	ECTS
Anatomie & Histologie	2	5
Biologische evaluatie	3	5
Biomaterialen I	2	5
Biomechanica	2	5
Materiaalkunde	2	5
Medische Implantaten	3	5
Medische technologie en maatschappij	2	5
Numerieke methoden	3	5
Ontwerpen II	3	5
Regenerative medicine	2	5
Researchcursus BMT	3	10
Thermodynamica	2	5
Transport in biologische systemen	3	5
Bachelorproject bestaande uit:		
Bachelorscriptie	3	5
Plus Bacheloronderzoek BMT	3	10

Keuzevakken (5 ECTS):

	niv	ECTS
Practicum chemie voor BMT	3	5
Programmeren in Levenswetenschappen	2	5

1.3 Major Biomedische wetenschappen

Verplichte vakken (45 ECTS)

	niv	ECTS
Bio-organische chemie	2	5
Immunologie I	2	5
Medische genetica óf Integratieve neurobiologie	2	5
Medische microbiologie	2	5
Moleculaire biologie en medische biologie	2	5
Wetenschap, Technologie, Ethiek en Maatschappij	2	5
Bachelorproject bestaande uit:		
Bachelorscriptie	3	5
Plus eén van de volgende bacheloronderzoeken:	3	10
Age research ERIBA		
Drug disposition & toxicology research		
Immunologie & infectieziekten research		
Metabole regulatie research		
Moleculaire farmacologie research		
Gedragsbiologie research		
Ontwikkelingsbiologie en Regenerative medicine research		
Oncologie research		
Neurowetenschappen research		
Pathofysiologie research		
Medische celbiologie research		

Totaal 30 ECTS aan keuzevakken uit de volgende lijst

	niv	ECTS
Beeldvormende technieken	3	5
Big Data in Systems Medicine	3	5
Bioinformatica	2	5
Biologie van kanker	3	5
Biologische fysica	1	5
Biostatistiek N2	2	5
Endocrinologie	3	5
Genes & Behaviour	2	5
Hematologie	3	5
Het cardiovasculair systeem	3	5
Humane gedragsbiologie	3	5
Humane genetica & Genomics	3	5
Immunologie II	3	5
Integratieve neurobiologie	2	5
Medical proteomics and genomics	3	5
Medische celbiologie	3	5
Medische fysiologie	3	5
Medische genetica	2	5
Medische implantaten	3	5
Metabolisme en Toxicologie	3	5
Metabolisme en voeding	3	5
Moleculaire celfysiologie	3	5
Moleculaire onderzoekstechnieken in humane ziektes	3	5
Neurobiologie van veroudering	3	5
Programmeren voor Levenswetenschappen	2	5
Psychobiologie	3	5

Receptor Pharmacology	2	5
Regenerative medicine	2	5
Wiskunde voor levenswetenschappen	2	5
Biotechnologie	3	10
Age research ERIBA	3	10
Drug disposition & toxicology research	3	10
Gedragsbiologie research	3	10
Immunologie & Infectieziekten research	3	10
Medische celbiologie research	3	10
Metabole regulatie research	3	10
Moleculaire farmacologie research	3	10
Neurowetenschappen research	3	10
Oncologie research	3	10
Ontwikkelingsbiologie en Regenerative medicine research	3	10
Pathofysiologie research	3	10

Daarnaast nog 15 ECTS aan vakken vrij te kiezen binnen levenswetenschappen en de lijst Appendix IV 1.8

1.4 Major Ecologie & Evolutie

Verplichte vakken (45 ECTS)

	niv	ECTS
Biostatistiek N2	2	5
Ecologische interacties	2	5
Evolutionaire ecologie	3	5
Genen & Evolutie	2	5
Systeemecologie	2	5
Wetenschap, Technologie, Ethiek & Maatschappij	2	5
Bachelorproject bestaande uit:		
Bachelorscriptie	3	5
Plus eén van de volgende bacheloronderzoeken:	3	10
Chronobiologie research		
Community ecology research		
Dierecologie research		
Fysiologische Ecologie Research		
Ecological & Evolutionary Genomics Research		
Gedragsbiologie research		
Mariene biologie research		
Neurowetenschappen research		

30 ECTS aan keuzevakken uit de volgende lijst

	niv	ECTS
Biochemie en Biofysische chemie	2	5
Bioinformatica	2	5
Biologische fysica	1	5
Bio-organische chemie	2	5
Chronobiologie	3	5
Conservation biology	3	5
Endocrinologie	3	5
Flora & Fauna	2	5
Gedragsbiologie	2	5
Genes & Behaviour	2	5
Humane gedragsbiologie	3	5
Humane genetica en Genomics	3	5
Immunologie I	2	5
Integratieve neurobiologie	2	5
Medische genetica	2	5
Medische microbiologie	2	5
Metabolisme & Voeding	3	5
Microbiologie	2	5
Moleculaire biologie & Medische biologie	2	5
Moleculaire celfysiologie	3	5
Programmeren voor Levenswetenschappen	2	5
Psychobiologie	3	5
Wiskunde voor levenswetenschappen	2	5
Zelforganisatie van ecologische en sociale systemen	3	5
Chronobiologie research	3	10
Community ecology research	3	10
Dierecologie research	3	10
Fysiologische Ecologie Research	3	10
Ecological & Evolutionary Genomics Research	3	10
Gedragsbiologie research	3	10

Mariene biologie research	3	10
Microbiologie en Genetica research	3	10
Neurowetenschappen research	3	10

Daarnaast nog 15 ECTS aan vakken vrij te kiezen binnen levenswetenschappen en de lijst Appendix IV 1.8

1.5 Major Gedrag & Neurowetenschappen

Verplichte vakken (30 ECTS)

	niv	ECTS
Gedragsbiologie	2	5
Integratieve neurobiologie	2	5
Wetenschap, Technologie, Ethiek & Maatschappij	2	5
Bachelorproject bestaande uit:		
Bachelorscriptie	3	5
Plus eén van de volgende bacheloronderzoeken:	3	10
Chronobiologie research		
Dierecologie research		
Drug disposition & toxicology research		
Gedragsbiologie research		
Medische celbiologie research		
Moleculaire farmacologie research		
Neurowetenschappen research		
Pathofysiologie research		

Verplichte vakken (10 ECTS) 2 vakken uit volgende lijst

	niv	ECTS
Moleculaire Biologie & Medische Biologie	2	5
Genes & Behaviour	2	5
Humane gedragsbiologie	2	5
Receptor Pharmacology	2	5

Totaal 35 ECTS aan keuzevakken uit de volgende lijst

	niv	ECTS
Beeldvormende technieken	3	5
Bioinformatica	2	5
Biologie van kanker	3	5
Biologische fysica	1	5
Bio-organische chemie	2	5
Biostatistiek N2	2	5
Centraal Zenuwstelsel: geneesmiddelen van het	3	5
Chronobiologie	3	5
Endocrinologie	3	5
Genen & Evolutie	2	5
Genes & Behaviour	2	5
Humane gedragsbiologie	3	5
Humane genetica & Genomics	3	5
Immunologie I	2	5
Medische celbiologie	3	5
Medische fysiologie	3	5
Metabolisme & voeding	3	5
Moleculaire biologie en medische biologie	2	5
Moleculaire celfysiologie	3	5
Neurobiologie van veroudering	3	5
Programmeren voor Levenswetenschappen	2	5
Psychobiologie	3	5
Receptor Pharmacology	2	5
Wiskunde voor levenswetenschappen	2	5
Chronobiologie research	3	10
Dierecologie research	3	10
Drug disposition & toxicology research	3	10

Gedragsbiologie research	3	10
Medische celbiologie research	3	10
Moleculaire farmacologie research	3	10
Neurowetenschappen research	3	10
Pathofysiologie research	3	10

Daarnaast nog 15 ECTS aan vakken vrij te kiezen binnen levenswetenschappen en de lijst Appendix IV 1.8

1.6 Major Medisch farmaceutische wetenschappen
(Deze major wordt uitgefaseerd en gaat over naar de opleiding Farmacie)

Verplichte vakken (45 ECTS)

	niv	ECTS
Bio-organische chemie	2	5
Receptor Pharmacology	2	5
Immunologie I	2	5
Pharmacology Practical	2	5
Moleculaire biologie en medische biologie	2	5
Wetenschap, Technologie, Ethiek en Maatschappij	2	5
Bachelorproject bestaande uit:		
Bachelorscriptie	3	5
Plus eén van de volgende bacheloronderzoeken:	3	10
Drug disposition & Toxicology research		
Bachelorproject farmacie		
Immunologie & infectieziekten research		
Medische celbiologie research		
Moleculaire farmacologie research		
Pathofysiologie research		

Totaal 30 ECTS aan keuzevakken uit de volgende lijst

	niv	ECTS
Beeldvormende technieken	3	5
Bioinformatica	2	5
Biologische fysica	1	5
Biostatistiek N2	2	5
Centraal zenuwstel: geneesmiddelen van het	3	5
Endocrinologie	3	5
Pharmaceutical Analysis A	2	5
Farmaceutische analyse B	3	5
Farmaceutische microbiologie	2	5
Farmaceutische technologie en biofarmacie	2	5
Farmacokinetiek	3	5
Farmaco-epidemologie	3	5
Geneesmiddelen van endo, TD/TR, TC*	3	10
Infecties en Tumoren: Geneesmiddelen bij	3	5
Medical proteomics and genomics	3	5
Medische celbiologie	3	5
Medische fysiologie	3	5
Medische genetica	2	5
Metabolisme & toxicologie	3	5
Moleculaire celfysiologie	3	5
Practicum chemie voor levenswetenschappen	3	5
Programmeren voor Levenswetenschappen	2	5
Wiskunde voor levenswetenschappen	2	5
Drug disposition & Toxicology research	3	10
Immunologie & Infectieziekten research	3	10
Medische celbiologie research	3	10
Moleculaire farmacologie research	3	10
Pathofysiologie research	3	10

Daarnaast nog 15 ECTS aan vakken vrij te kiezen binnen levenswetenschappen en de lijst Appendix IV 1.8

* Vak is per 2018/2019 gesplitst in drie afzonderlijke vakken met een totaal van 10ECTS.

1.7 Major Moleculaire levenswetenschappen

Verplichte vakken (45 ECTS)

	niv	ECTS
Biochemie & Biofysische chemie	2	5
Bio-organische chemie	2	5
Microbiologie	2	5
Moleculaire biologie en Medische biologie	2	5
Thermo/kinetiek/enzymologie	2	5
Wetenschap, Technologie, Ethiek & maatschappij	2	5
Bachelorproject bestaande uit:		
Bachelorscriptie	3	5
Plus eén bacheloronderzoek MLW:	3	10

30 ECTS aan keuzevakken uit de volgende lijst

	niv	ECTS
Biologische fysica	1	5
Biostatistiek N2	2	5
Genomics en Proteomics	3	5
Moleculaire en cellulaire microscopie	3	5
Practicum chemie voor Levenswetenschappen	3	5
Programmeren voor Levenswetenschappen	2	5
Structural biology	3	5
Wiskunde voor levenswetenschappen	2	5
Biokatalyse en Membraanenzymologie research	3	10
Biomoleculaire chemie research	3	10
Biotechnologie	3	10
Microbiologie & Genetica research	3	10
Moleculaire celbiologie research	3	10
Structural biology research	3	10

Daarnaast nog 15 ECTS aan vakken vrij te kiezen binnen levenswetenschappen en de lijst Appendix IV 1.8

1.8. Vakken aangeboden buiten levenswetenschappen

	niv	ECTS
Bewoners van de Poolgebieden	2	5
Exploitatie van de Poolgebieden	2	5
GIS voor Archeologen (Regionale Archeologie I)	2	5
Global Development Studies I	2	5
Onderwijs & Communicatie	2	5
Filosofie van de levenswetenschappen	3	5
Applied Archaeozoology	3	5
Archaeozoological Method and Theory	3	5
Archaeobotany I	3	5
Archaeobotany II	3	5

2. Minor

The minors on offer within the Life Sciences that are listed below only apply to students who started with Biology or LST in the academic year 2017/2018 or earlier, which is why a lot of course names are still in Dutch.
The content of minors for students who start in 2018/2019 has not yet been established.

2.1 Deepening minor

Minor Implantation and Function Recovery

This minor is mandatory for students of the major Biomedical Engineering

	niv	ECTS
Medische Microbiologie	2	5
Ontwerpen III	3	5
Elektronica	3	5
Imaging Technieken in Radiologie	3	5
Biomedische instrumentatie	3	5
Signalen & Systemen	3	5

2.2. Broadening minor

These minors are open to students of Biology and LST, depending on their chosen major.

Minor *Biomedical Sciences/Behaviour and Neurosciences*
- Medische microbiologie of Receptor Pharmacology of Genen & Evolutie
- Immunologie I of Neurobiologie of Gedragsbiologie
- Bio-organische chemie of Genes & Behaviour
- Medische genetica of Biochemie en Biofysische chemie of Evolutionaire ecologie
- Moleculaire biologie & Medische biologie of Chronobiologie
- Minorcongres

Minor *Ecology and Evolution*
- Genen & Evolutie
- Systeemecologie
- Ecologische interacties
- Evolutionaire ecologie
- Conservation biology of Chronobiologie of Moleculaire biologie & Medische biologie
- Minorcongres

Minor *Behaviour and Neurosciences (only in combination with the major Biomedical Sciences)*
- Receptor Pharmacology
- Gedragsbiologie
- Genes & Behaviour
- Integratieve neurobiologie of Medische genetica (if Integratieve neurobiologie is part of the major)
- Chronobiologie
- Minorcongres

Minor *Biomedical Sciences (only in combination with the major Behaviour and Neurosciences)*
- Medische microbiologie of Receptor Pharmacology
- Immunologie 1 of Microbiologie (if Immunologie 1 is part of the major)
- Bio-organische chemie
- Medische genetica
- Moleculaire biologie & Medische biologie
- Minorcongres

Minor *Molecular Life Sciences*

- Thermo, kinetiek & enzymologie
- Microbiologie of Farmacochemie & Spectroscopie (if Medische Microbiologie is part of the major).
- Bio-organische chemie of Individuele opdracht (if Bio-organische chemie Is part of the major)
- Biochemie en Biofysische chemie
- Moleculaire biologie en Medische biologie of Chronobiologie (if Moleculaire biologie & Medische biologie is part of the major)
- Minorcongres

Minor *Biomedical Engineering*

- Materiaalkunde
- Anatomie en Histologie
- Ontwerpen 2
- Biomechanica
- Biomaterialen 1
- Minorcongres

Minor *Pharmacy*

- Receptor Pharmacology / Medische microbiologie (if Receptor Pharmacology is part of the major)
- Medicinal Chemistry and Biophysics
- Organische & Biosynthese (if Bio-organische chemie isn't part of the major) of Centraal zenuwstelsel
- Geneesmiddelen van Endo, TD/TR, TC (10 ECTS)
- Minorcongres

2.3. Minors available to students within the Faculty of Science and Engineering

- Mathematical Foundations of Modelling in the Life Sciences (5 ECTS)
- Biological Modelling and Model Analysis (10 ECTS)
- Programming in C++ for Biologists (5 ECTS)
- Modelling in the Life Sciences Research (10 ECTS)

3. Courses with one or several practical components

The courses listed in Appendix IV have a strong integration of practicals, lectures, and tutorials. Courses where the final assessment isn't solely through a written exam are assessed through practicals. For further information, see OCASYS.

4. Compulsory order of examinations

As these entry requirements only apply to the cohort of 2017/2018 or earlier, the course names are still in Dutch.

Entry requirements, which are mandatory:

Courses year 2 and 3	Course-specific entry requirements
Bachelorondersoek	- Minimaal 120 EC behaald (waaronder propedeuse)
Bachelorscriptie	- In combinatie met Bachelorondersoek
Biostatistiek N2	- Inleiding in de biomathematica & biostatistiek
Biokatalyse & membraanenzymologie research	- Thermo, kinetiek & enzymologie
Biologische evaluatie van Implantaten	- Biomaterialen I - Celbiologie
Biomoleculaire chemie research	- Moleculen & reactiviteit - Bio-organische chemie
Chronobiologie research	- Chronobiologie
Computational Molecular Biology research	- Celbiologie - Biochemie - Moleculaire genetica & Genomics - Programmeren voor Levenswetenschappen of equivalente programmeerervaring
Dierecologie research	Een van de vakken: - Systeemecologie - Ecologische interacties - Gedragsbiologie - Ecologie & Gedrag
Pharmacology Practical	- Practicum minimale cel - Practicum anatomie & fysiologie - Fysiologie mens & dier - Receptor Pharmacology
Farmaceutische microbiologie	- Practicum minimale cel - Biochemie - Celbiologie
Farmaceutische analyse B	- Pharmaceutical Analysis A
Farmacokinetiek	- Practicum minimale cel - Fysiologie & therapie - Practicum anatomie & fysiologie - Fysiologie mens & dier
Gedragsbiologie research	Een van de vakken: - Systeemecologie - Ecologische interacties - Gedragsbiologie - Ecologie & Gedrag
Genomics & proteomics	- Moleculaire genetica & genomics
Immunologie 2	- Immunologie 1
Immunologie & infectieziekten research	- Immunologie 1 - Medische microbiologie - VMT certificaat verplicht
Medical proteomics & genomics	- Moleculaire biologie & Medische biologie - Moleculaire Celfysiologie gevolgd
Medische celbiologie research	- Moleculaire biologie & Medische biologie

Courses year 2 and 3	Course-specific entry requirements
Medische fysiologie	- Fysiologie mens & dier
Medische implantaten	- Fysiologie mens & dier
Metabole regulatie research	- VMT certificaat verplicht Eén van de vakken: - Moleculaire Celfysiologie - Metabolisme & Voeding - Moleculaire Onderzoekstechnieken in Humane Ziektes
Metabolisme & toxicologie	- Practicum minimale cel - Fysiologie & therapie - Practicum anatomie & fysiologie - Fysiologie mens & dier
Microbiologie & genetica research	- (Medische) Microbiologie of Fysiologie van planten & micro-organismen of Moleculaire genetica & Genomics of Moleculaire biologie & medische biologie
Minorcongres	Alleen voor studenten ingeschreven voor minor Levenwetenschappen
Moleculaire celbiologie research	- Moleculaire biologie & medische biologie
Moleculaire farmacol. research	- Fysiologie & therapie
Neurobiologie van veroudering	- Hersenen & Gedrag of een bachelor Bewegingswetenschappen of Psychologie
Neurowetenschappen research	- Integratieve neurobiologie
Oncologie research	- Biologie van kanker
Ontwerpen 3	- 100 ECTS waaronder propedeuse behaald
Ontwikkelingsbiologie & Regenerative Medicine Research	- Regenerative Medicine
Pathofysiologie research	- Immunologie 1 - VMT
Practicum chemie voor Levenwetenschappen	- Moleculen & Reactiviteit - Bio-organische Chemie
Practicum chemie voor BMT	- Moleculen & Reactiviteit
Psychobiologie	- Integratieve neurobiologie

Apart from entry requirements, there also entry recommendations, which are not mandatory.

Courses year 2 and 3	**Course-specific entry recommendations**
Biomaterialen 1	- Moleculen & Reactiviteit
Biomedisch onderzoek	- Fysiologie & Therapie - Fysiologie van mens & dier
Biomoleculaire chemie research	- Celfysiologie: Energie & Structuur - Thermo, kinetiek & enzymologie - Practicum chemie voor levenswetenschappen
Bio-organische chemie	- Moleculen & Reactiviteit
Community ecology research	- Ecologische interacties - Biostatiek N2
Endocrinologie	- Fysiologie mens & dier
Ecological & Evolutionary Genomics Research	- Genen & evolutie - Diversiteit & Evolutie
Fysiologische ecologie research	- Fysiologie van planten &micro-organismen
Gedragsbiologie	- Hersenen & gedrag
Humane gedragsbiologie	- Hersenen & gedrag of Gedragsbiologie
Humane genetica & Genomics	- Bio-informatica - Medische genetica
Integratieve neurobiologie	- Fysiologie mens & dier - Hersenen & gedrag
Microbiologie	- Biochemie - Celbiologie
Moleculaire & cellulaire microscopie	- Moleculaire biologie & medische biologie
Moleculaire farmacol. research	- Receptor Pharmacology
Ontwikkelingsbiologie & Regenerative medicine research	- Moleculaire biologie & medische biologie
Structurele biologie research	- Structural Biology
Transport in biologische systemen	- Fysiologie mens & dier - Wiskunde voor Levenswetenschappen
Wiskunde voor Levenswetenschappen	- Inleiding biomathematica & biostatistiek

Appendix V Entry requirements (Article 10.2.1)

A. Deficient VWO-diploma

1. The following requirements apply to the entrance examination as defined in Article 7.28.3 of the Act:

Bacheloropleiding *Bachelor's degree programme*	**N+T**	**N+G**	**E+M**	**C+M**
Biologie *Biology*	Biologie	Natuurkunde	Wiskunde A of B Natuurkunde Scheikunde Biologie	Wiskunde A of B Natuurkunde Scheikunde Biologie
Farmacie *Pharmacy*	V	Natuurkunde	Natuurkunde Scheikunde	Wiskunde A of B Natuurkunde Scheikunde
Life Science and Technology **Scheikunde** *Chemistry* **Scheikundige Technologie** *Chemical Engineering*	V	Wiskunde B Natuurkunde	Wiskunde B Natuurkunde Scheikunde	Wiskunde B Natuurkunde Scheikunde
Informatica *Computing Science* **Technische Bedrijfskunde** *Industrial Engineering and Management* **(Technische) Wiskunde** *(Applied) Mathematics*	V	Wiskunde B	Wiskunde B	Wiskunde B
Kunstmatige Intelligentie *Artificial Intelligence*	V	V	V	Wiskunde A of B
(Technische) Natuurkunde *(Applied) Physics* **Sterrenkunde** *Astronomy*	V	Wiskunde B Natuurkunde	Wiskunde B Natuurkunde	Wiskunde B Natuurkunde

2. The Admissions Board Bachelor's programmes FSE will determine whether deficiencies have been compensated satisfactorily.

B. HBO (university of applied science) propaedeutic certificate, other universities

1. The following requirements apply to the entrance examination as defined in Article 7.28.3 of the Act:

Bachelor's degree programme	**Subjects at VWO (pre-university) level**
B Biology	wia or wib + na+sk+bio
B Pharmacy	wia or wib + na+sk
B Life Science and Technology	wib+na+sk
B Computing Science	Wib
B Artificial Intelligence	wia or wib
B Physics	wib+na
B Chemistry	wib+na+sk
B Astronomy	wib+na
B Mathematics	Wib
B Chemical Engineering	wib+na+sk
B Industrial Engineering and Management Science	Wib
B Applied Physics	wib+na
B Applied Mathematics	Wib

wia = Mathematics A; wib = Mathematics B; na = Physics; sk = Chemistry; bio = Biology

2. In addition, candidates are required to be competent in English:

IELTS (Academic)	6.5 - no less than 6.0 on each section
TOEFL IBT (internet-based test)	92 - no less than 21 on each section
TOEFL CBT (computer-based test)	237 - no less than 21 on each section
TOEFL PBT (paper-based test)	580 - no less than 55 on each section
Cambridge English	CAE or CPE Certificate
English language test - University of Groningen Language Centre	Minimum section scores C2 or C1 (one B2 allowed)

3. The Admissions Board Bachelor's programmes FSE will determine whether deficiencies have been compensated satisfactorily.

C. Foreign qualifications (EEA)

1. Any certificate that grants access to a university in a European country will also grant access to Dutch universities.

2. In the entrance examination, as referred to in art. 7.28, paragraph 3 of the Act, per country and educational institution specific training conditions are mentioned. These are standardized. The entrance examination is, in accordance with the Admissions Board Bachelor's programmes FSE, carried out by the Admissions

Office. If for a specific diploma no standardisation has taken place then the requirements as formulated for candidates with a HBO (university of applied science) propaedeutic certificate will apply to these candidates in the entrance examination as defined in Article 7.28.3 of the Act (see A).

3. In addition, candidates are required to be competent in English:

IELTS (Academic)	6.5 - no less than 6.0 on each section
TOEFL IBT (internet-based test)	92 - no less than 21 on each section
TOEFL CBT (computer-based test)	237 - no less than 21 on each section
TOEFL PBT (paper-based test)	580 - no less than 55 on each section
Cambridge English	CAE or CPE Certificate
English language test - University of Groningen Language Centre	Minimum section scores C2 or C1 (one B2 allowed)

4. The Admissions Board Bachelor's programmes FSE will determine whether deficiencies have been compensated satisfactorily.

D. Foreign qualifications (non-EEA)

1. A non-European certificate that according to NUFFIC and/or NARIC standards is equivalent to a Dutch VWO certificate will grant access to university in the Netherlands.

2. In the entrance examination, as referred to in art. 7.28, paragraph 3 of the Act, per country and educational institution specific training conditions are mentioned. These are standardized. The entrance examination is, in accordance with the Admissions Board Bachelor's programmes FSE, carried out by the Admissions Office. If for a specific diploma no standardisation has taken place then the requirements as formulated for candidates with a HBO (university of applied science) propaedeutic certificate will apply to these candidates in the entrance examination as defined in Article 7.28.3 of the Act (see A).

3. In addition, candidates are required to be competent in English:

IELTS (Academic)	6.5 - no less than 6.0 on each section
TOEFL IBT (internet-based test)	92 - no less than 21 on each section
TOEFL CBT (computer-based test)	237 - no less than 21 on each section
TOEFL PBT (paper-based test)	580 - no less than 55 on each section
Cambridge English	CAE or CPE Certificate
English language test - University of Groningen Language Centre	Minimum section scores C2 or C1 (one B2 allowed)

4. The Admissions Board Bachelor's programmes FSE will determine whether deficiencies have been compensated satisfactorily.

E. Entrance examination (Colloquium Doctum)

1. The following requirements apply to the entrance examination as defined in Article 7.29 of the Act:

Degree programme	**Nature and Health VWO level**	**or**	**Nature and Technology VWO level**
B Biology	en, wia or b, sk, bio, na		en, wib, na, sk, bio
B Pharmacy	en, wia or b, sk, bio, na		en, wib, na, sk
B Life Science and Technology	en, wib, sk, bio, na		en, wib, na, sk
B Computing Science	en, wib, sk, bio		en, wib, na, sk
B Artificial Intelligence	en, wia or b, sk, bio		en, wib, na, sk
B Physics	en, wib, sk, bio, na		en, wib, na, sk
B Chemistry	en, wib, sk, bio, na		en, wib, na, sk
B Astronomy	en, wib, sk, bio, na		en, wib, na, sk
B Mathematics	en, wib, sk, bio		en, wib, na, sk
B Chemical Engineering	en, wib, sk, bio, na		en, wib, na, sk
B Industrial Engineering and Management Science	en, wib, sk, bio		en, wib, na, sk
B Applied Physics	en, wib, sk, bio, na		en, wib, na, sk
B Applied Mathematics	en, wib, sk, bio		en, wib, na, sk

en = English; wia = Mathematics A; wib = Mathematics B; na = Physics; sk = Chemistry; bio = Biology

2. In addition, candidates are required to be competent in English:

IELTS (Academic)	6.5 - no less than 6.0 on each section
TOEFL IBT (internet-based test)	92 - no less than 21 on each section
TOEFL CBT (computer-based test)	237 - no less than 21 on each section
TOEFL PBT (paper-based test)	580 - no less than 55 on each section
Cambridge English	CAE or CPE Certificate
English language test - University of Groningen Language Centre	Minimum section scores C2 or C1 (one B2 allowed)

3. The Admissions Board Bachelor's programmes FSE will determine whether deficiencies have been compensated satisfactorily.

Appendix VI Clustering of Bachelor's degree programmes Article 4.3.4, Article 4.6.1

Degree programme CROHO code	Name of degree programme	Clustered with CROHO code	Name of degree programme
56286	B Life Science and Technology	56860 56157	B Biology B Pharmacy
56860	B Biology	56286 56157	B Life Science and Technology B Pharmacy
56157	B Pharmacy	56860 56286	B Biology B Life Science and Technology
56980	B Mathematics	56965 50206 56962 50205	B Applied Mathematics B Physics B Applied Physics B Astronomy
56965	B Applied Mathematics	56980 50206 56962 50205	B Mathematics B Physics B Applied Physics B Astronomy
50206	B Physics	56962 50205 56965 56980	B Applied Physics B Astronomy B Applied Mathematics B Mathematics
56962	B Applied Physics	50206 50205 56965 56980	B Physics B Astronomy B Applied Mathematics B Mathematics
50205	B Astronomy	56962 56965 50206 56980	B Applied Physics B Applied Mathematics B Physics B Mathematics
56857	B Chemistry	56960	B Chemical Engineering
56960	B Chemical Engineering	56857	B Chemistry

Appendix VII Admission to the post-propaedeutic phase Article 5.1.1

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

Students who have been issued a positive study advice from the degree programmes Biology or Life Science & Technology at the University of Groningen.

The Admission Board decides over students from other degree programmes.

Appendix VIII Contact hours propaedeutic phase Article 2.3

Degree programme year 1	
Structure contact hours	**Contact hours per year (depends on chosen major)**
Lectures	250-290
Tutorials	130-170
Practicals	150-240
Supervision during an internship	10
Examinations	30-35
Career services	8

Appendix IX University Minors of the faculty Science and Engineering
Article 7.5.1

1. Minor Neurosciences (taught in English):
   - Neuroscience (15 ECTS)
   - Behavioural Neuroscience (15 ECTS)

   Minor Future Planet Innovation (taught in English):
   - Overview and Coherence People Planet Profit (10 ECTS)
   - Paper People Planet Profit (5 ECTS)
   - Project People, Planet, Profit (15 ECTS)

   Minor Astronomy through Space and Time (taught in English):
   - The Evolving Universe (5 ECTS)
   - Cosmic Origins (5 ECTS)
   - Astrobiology (5 ECTS)

   Minor Einstein's physics: Space-time and parallel worlds:
   - Einstein's Universe (5 ECTS)
   - Quantum world (5 ECTS)
   - Building blocks of matter (5 ECTS)

2. The Programme Committee for the Bachelor's degree programmes in Biology and Life Science & Technology also has authority in the field of the Minor Neurosciences and/or its course units.

   The Programme Committee for the Master's degree programme in Energy & Environmental Sciences also has authority in the field of the Minor Future Planet Innovation and/or its course units.

   The Programme Committee for the Bachelor's degree programme in Astronomy also has authority in the field of the Minor Astronomy through Space and Time and/or its course units.

   The Programme Committee for the Bachelor's degree programmes in Physics and Applied Physics also has authority in the field of the Minor Einstein's physics and/or its course units.

3. The Board of Examiners for the Bachelor's degree programmes in Biology and Life Science & Technology and the Master's degree programmes in Biology, Ecology & Evolution, Marine Biology and Molecular Biology & Biotechnology also has authority in the field of the Minor Neurosciences and/or its course units.

   The Board of Examiners for the Master's degree programme in Energy & Environmental Sciences also has authority in the field of the Minor Future Planet Innovation and/or its course units.

The Board of Examiners for the Bachelor's degree programme in Astronomy also has authority in the field of the Minor Astronomy through Space and Time and/or its course units.

The Board of Examiners for the Bachelor's degree programmes in Physics and Applied Physics also has authority in the field of the Minor Einstein's Physics and/or its course units.

4. These Teaching and Examination Regulations also apply in their entirety to the Minors in Neurosciences, Future Planet Innovation, Astronomy through Space and Time and Einstein's Physics and/or their course units.

Appendix X Transitional arrangement:

Transitional arrangement for the Bachelor's Biology and Life Science & Technology

The following propaedeutic courses will no longer be taught:

First semester courses:

Celbiologie
Biochemie
Genetica
Practicum minimale cel
Diversiteit, ecologie en gedrag
Fysiologie & Therapie
Practicum anatomie en fysiologie

Second semester courses:

Bio-medisch onderzoek
Biomoleculair onderzoek 1
Biomoleculair onderzoek 2
Celfysiologie: Energie en Structuur
Diversiteit & Evolutie
Ecologie & Gedrag
Fysiologie mens en dier
Fysiologie van planten & micro-organismen
Hersenen & Gedrag
Inleiding biomathematica en biostatistiek
Moleculaire genetica en Genomics
Moleculen & Reactiviteit
Geneesmiddel van target tot gebruik
Medisch farmaceutisch onderzoek

Students who started in 2017/2018 or earlier who still need to pass any of these courses will be offered two scheduled moments during 2018/2019 to pass the course, either through an exam, or through completing an assignment, depending on the assessment criteria for each course.

A more detailed transitional arrangement for the old curriculum and equivalent courses in the new curriculum will follow as soon as possible.