Appendices
to
Teaching and Examination Regulations
2025-2026

Bachelor degree programme
in
Biomedical Engineering

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

A. Generic learning outcomes — Knowledge

A1. Bachelor's graduates have general knowledge and understanding of mathematics, natural sciences (biology, physics, chemistry), life sciences (biochemistry, anatomy, physiology) and engineering sciences (mechanical, electrical) underlying biomedical engineering.

A2. Bachelor's graduates are familiar with the quantitative nature of mathematics, natural sciences and engineering sciences, and have a general understanding of the models and methods used in these fields, including computer-aided methods.

A3. Bachelor's graduates are familiar with the learning methods necessary to follow developments in biomedical engineering. They are able to engage in lifelong learning and are prepared to continue in any Master's programme on Biomedical Engineering.

B. Generic Learning outcomes — Application of knowledge

B1. Bachelor's graduates are able to apply knowledge of mathematics, natural sciences, life sciences and engineering sciences to conduct research on basic biomedical problems; to contribute to design of new solutions to biomedical problems and to contribute to the further development of devices, instruments or materials.

B2. Bachelor's graduates are familiar with materials, equipment and technologies typically used in the biomedical practice. They know how to perform measurements on biological systems and are able to interpret the data, and are aware of the problems associated with the interaction between living and non-living materials and systems.

B3. When involved in design, research and/or development, Bachelor's graduates demonstrate the ability to critically formulate the relevant questions, choose or propose appropriate methods, procedures and/or systems.

C. Generic Learning outcomes — Decision making

C1. Bachelor's graduates are aware of the key aspects of professional, ethical and societal responsibilities linked to the biomedical engineering practice, to decision making and to formulating judgments.

C2. Bachelor's graduates are able to reflect on professional, ethical and social responsibilities of biomedical engineering.

D. Generic Learning outcomes — Communication

D1. Bachelor's graduates have a general understanding of functioning methods of multidisciplinary teams and are able to function effectively as team members, contributing to meet deliverable, schedule and budget requirements.

D2. Bachelor's graduates are familiar with the established methods/tools of communication and their limitations.

D3. Bachelor's graduates are able to identify the appropriate method to effectively, clearly and unambiguously communicate their findings/results in a multidisciplinary setting.

Appendix II. Majors and Minors of the Bachelor's degree programme (art. 3.7 and 7.13)

The programme consists of a core part, laying down the foundations for all biomedical engineers, and a 60 ECTS specialisation in one of the following three specialisations:

- Biomaterials Science and Engineering (BSE)
- Medical Imaging (MI)
- Medical Device Design (MDD)

Each specialisation includes a 15 ECTS deepening minor in period 1a of year 3. A minor from the collection of university, faculty minors or personal minor this period is permitted, but not recommended.

The degree programme has the following Minor(s):

- Minor Biomaterial Science and Engineering
- Minor Medical Imaging
- Minor Medical Device Design

Appendix III. Course units in the first year of the degree programme

- **List of course units (art. 4.1.1)**
- **Compulsory order of examinations (art. 9.3)**

Course elements year 1

The propaedeutic phase comprises a number of compulsory course units, listed in the table below. Course details, practical, entry requirement, mode of assessment and examination are described in Ocasys.

Compulsory course

Course code	Course unit name	ECTS
WBBE024-05	Anatomy and Physiology	5
WBBE007-05	Biomaterials 1	5
WBBE002-05	Biomechanics	5
WBBE054-05	Calculus (for BME)	5
WBBE062-05	Principles of Design Engineering	5
WBBE030-02	Ethics 1: Philosophy of Science & Scientific Integrity	2
WBBE029-05	Linear Algebra for BME	5
WBLT002-05	Mammalian Cell Biology	5
WBBE005-05	Material Science	5
WBBE026-05	Microbiology	5
WBBE041-05	Molecules of Life for BME	5
WBBE028-03	Physics Lab for BME	3
WBBE025-05	Statistics 1 for BME	5

Appendix IV. Course units in the second and third year of the degree programme

- **List of course units (art. 7.1.1)**
- **Compulsory order of examinations (art. 9.3)**

Course elements year 2

Year 2 consists of compulsory course units and elective courses. All course units in the second year comprise a workload of 5 ECTS. Course details, practical, entry requirements, mode of assessment, examination and entry requirements are described in Ocasys.

Compulsory courses

Course code	Course unit name	ECTS
WBBE055-05	Mathematical Tools for BME	5
WBIE054-05	Dynamics and Vibrations	5
WBBE032-05	Electricity and Magnetism	5
WBBE063-04	Designing Biomedical Products	4
WBBE034-01	Ethics 2: Biomedical Ethics	1
WBBE057-05	Physics and Technology of Medical Imaging	5
WBBE033-05	Python and Numerical Methods	5
WBIE030-05	Signals and Systems	5
WBBE059-05	Thermodynamics	5
WBBE040-05	Waves and Optics for BME	5
WBBE060-05	Biomedical Image Processing	5
WBBE009-05	Electronics	5
	Electives (1)	5

Electives

During the second semester (period 2B) the students have to choose one elective course from:

Course code	Course unit name	ECTS
WBBE037-05	Surface characterization	5
WBBE038-05	Biological Physics	5

Course elements year 3

Year 3 consists of compulsory course units, elective courses, a bachelor project (15 ECTS) and a minor (15 ECTS). To start the *Bachelor's project Biomedical Engineering* the student needs to have obtained a minimum of 145 ECTS of within the Biomedical Engineering bachelor degree programme, including all first year courses as well as the Research Course BME (WBBE010-09 or WBBE010-08). Course details, practical, entry requirements, mode of assessment, examination and entry requirements are described in Ocasys.

Compulsory courses

Course code	Course unit name	ECTS
WBBE901-15	Bachelor's Project Biomedical Engineering	15
WBBE035-05	Cell Biology and Immunology	5
WBBE009-05	Electronics	5
WBBE010-08	Research Course BME	8
WBBE042-05	Tissue Engineering and Regenerative Medicine	5
	Minor	15
	Elective (1)	5

Minor

During the first half of the first semester (period 1A) students will have to do a 15 ECTS minor. Within the programme three deepening minors are offered:

Minor Biomaterial Science and Engineering

Course code	Course unit name	ECTS
WBBE052-05	Biofabrication	5
WBBE058-05	Microscopy and Imaging	5
WBBE056-05	Polymeric Materials for Biomedical Application	5

Minor Medical Imaging

Course code	Course unit name	ECTS
WBBE045-05	Applied Medical Visualization	5
WBBE003-05	Biomedical Instrumentation	5
WBBE058-05	Microscopy and Imaging	5

Minor Medical Device Design

Course code	Course unit name	ECTS
WBBE052-05	Biofabrication	5
WBBE003-05	Biomedical Instrumentation	5
WBBE004-05	Designing Biomedical Products 3	5

Electives

During the first half of second semester (period 2A) students have to choose one specialisation elective course from:

Specialisation	Course code	Course unit name	ECTS
Biomaterial Science and Engineering	WBBE044-05	Physicochemical Concepts in Bionanotechnology	5
Medical Imaging	WBBE043-05	Imaging Laboratory 2	5
Medical Device Design	WBBE048-05	Biomedical Sensors	5

Appendix V. Contact hours (art. 3.6)

The following candidates will be admitted to the second year:
Students who have been issued a positive study advice from the degree programme Biomedical Engineering at the University of Groningen.

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

Degree programme year 1	
Structure contact hours	**Contact hours per year**
Lectures	110
Tutorials	60
Practicals	120
Supervision during an internship	N/A
Examinations	30

Degree programme year 2	
Structure contact hours	**Contact hours per year**
Lectures	180
Tutorials	120
Practicals	200
Supervision during an internship	N/A
Examinations	30

Contact hours during year 3 depend on courses chosen during the minor and/or elective.

Appendix VI. Additional Requirements Open degree Programmes (art. 7.3)

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 VII. Transitional provisions (art. 12.1)

Course unit	**Replaced by**
Changes curriculum 2022-2023: *Applies to all registered student who have to finalise one of the below mentioned courses*	
WBPH021-05 Mechanics and Relativity 2	WBIE054-05 Dynamics and Vibrations
WBBE008-03 Designing Biomedical Products 2 & WBBE034-02 Ethics 2: Biomedical Ethics	WBBE008-04 Designing Biomedical Products 2 & WBBE034-01 Ethics 2: Biomedical Ethics
WBBE010-09 Research Course BME & WBBE046-01 Ethics 3: Research Ethics	WBBE010-08 Research Course BME & WBBE046-02 Ethics 3: Research Ethics

Changes curriculum 2023-2024: *Applies to all registered student who have to finalise one of the below mentioned courses*	
WBIE003-05 Calculus 1 (for IEM)	WBBE054-05 Calculus (for BME)
WBBE012-05 Imaging Techniques in Radiology 1	WBBE057-05 Physics and Technology of Medical Imaging
WBBE050-05 Biomedical Nanotechnology	WBBE056-05 Polymeric Materials for Biomedical Applications

Changes curriculum 2024-2025: *Applies to all registered student who have to finalise one of the below mentioned courses*	
WBBE047-05 Designing Biomedical Products 1	WBBE062-05 Principles of Design Engineering
WBBE039-05 Capitum Selectum Medical Imaging Principles and Applications	WBBE060-05 Biomedical Image Processing
WBFA021-05 Thermodynamics	WBBE059-05 Thermodynamics
WBBE026-05 Microbiology	WBBE026-04 Microbiology & WBBE061-01 Safe Microbiological Techniques

Changes curriculum 2025-2026: *Applies to all registered student who have to finalise one of the below mentioned courses*	
WBBE008-05 Designing Biomedical Products 2	WBBE063-05 Designing Biomedical Products
WBBE036-05 Lab course Biomaterials	Course will return in the curriculum of 2026-2027
WBBE031-05 Imaging Laboratory 1	Two exam opportunities in 2025-2026, course will return in the curriculum of 2026-2027
WBBE023-05 Transport in Biological Systems	Two exam opportunities in 2025-2026, course will return in the curriculum of 2026-2027