Teaching and Examination Regulations

2017-2018

Appendices master's degree programme Biomedical Engineering

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

A graduate with a Master of Science in BME is able to:

1. Acquire expertise in Biomedical Engineering
A Biomedical Engineer is able to continuously improve his/her expertise (knowledge and competences) by building on his/her thorough mastery of a specific field of biomedical engineering. This is demonstrated, not only by the Biomedical Engineer's ability to develop and apply new knowledge based on a critical reflection on standard knowledge, but more so by increasing or adapting his/her competences by critically and independently reflecting on his/her own thinking, decision making, and acting.

2. Analyse the problem and define aim
A Biomedical Engineer is able to analyse biomedical problems by (re)formulating ill-structured biomedical problems of a complex nature by choosing the appropriate level of abstraction and by critically examining existing theories, models or interpretations, based on the assessment of the scientific value of current research within Biomedical Engineering. The Biomedical Engineer thereby creates a cause-effect model, distinguishes the problems that are fundamental and solvable and defines the aim which has the highest priority.

3. Create a R&D proposal
A Biomedical Engineer is able to design different strategies to obtain the defined aim, and has the skills in, and the affinity with, the use, development and validation of models to allow the Biomedical Engineer to consciously choose the most efficient and effective Research & Design (R&D) plan.

4. Execute the R&D plan
A Biomedical Engineer is able to execute a R&D plan and to adapt it when external circumstances or advancing insight requires it. Depending on the project the focus may be more on the scientific approach to increase knowledge and understanding (research) or on the design of new techniques or systems (development) although both aspects are essential in the R&D cycle of innovative products.

5. Analyse and interpret the data
A Biomedical Engineer is able to ask adequate questions, and has a critical, yet constructive attitude towards analysing and solving complex real-life biomedical problems. The Biomedical Engineer is able to form a well-reasoned opinion in the case of incomplete or irrelevant data; is able to analyse and interpret the results of R&D in terms of statistics, limitations and the relation to existing literature aiming to contribute to the advancement of knowledge in his or her field of Biomedical Engineering and beyond it.

6. Communicate results
A Biomedical Engineer, as an interdisciplinary specialist, is able to communicate orally and in writing about R&D with colleagues, non-colleagues and other involved parties including health care providers and patients. In addition, the Biomedical Engineer is able to debate about both Biomedical Engineering and the place of Biomedical Engineering in society.

7. Embed the results in scientific and social context
A Biomedical Engineer is able to analyse and to discuss the social consequences (economic, social, cultural) of new developments in Biomedical Engineering with colleagues and non-colleagues; has insight into (debates about) scientific practice and is able to analyse and to discuss the ethical and the normative aspects of the consequences and assumptions of the scientific practice with colleagues and non-colleagues and is able to integrate these ethical and normative aspects in its own work.

Appendix II. Tracks of the degree programme
(art. 2.2)

The degree programme is divided into the following tracks:

a. Diagnostic Imaging and Instrumentation
b. Prostheses & Implant Interface Technology
c. Prostheses & Implant Design

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

Course details, mode of assessment and examination are described in Ocasys.

1. Course elements of the track Diagnostic Imaging & Instrumentation

Course elements year 1

Course element	ECTS
Radiation Physics	5
Introduction to MATLAB programming for BME	5
Conventional Imaging Techniques and Ultrasound	5
Medical Physics in Radiation Oncology	5
Computed Tomography	5
Image Processing	5
Statistical Methods in BME	5
Biomedical Instrumentation 2	5
Interdisciplinary Project	5
Internship [1]	15
Seminars (4) [1]	-

[1] As described in the Guidelines on the Study Portal

Course elements year 2

Course element	ECTS
Physics in Nuclear Medicine	5
MRI	5
Optical Imaging	5
Applied Medical Visualization	5
Technology and Ethics	5
Master's Project [1, 2]	35
Seminars (4) [1]	-

[1] As described in the Guidelines on the Study portal

[2] Including Master project preparation, Winter symposium and Summer symposium

2. Course elements of the track Prostheses & Implant Interface Technology

Course elements year 1

Course element	ECTS
Interface Biology	5
Biomaterials 2	5
Introduction to MATLAB programming for BME	5
Biofilms	5
Engineering and Biotribology	5
Surface Characterisation	5
Statistical Methods in BME	5
Biomedical Instrumentation 2	5
Interdisciplinary Project	5
Internship [1]	15
Seminars (4) [1]	-

[1] As described in the Guidelines on the Study Portal

Course elements year 2

Course element	ECTS
Optical Imaging	5
Recent Development in Biomaterials	5
Integrated Lab Course in Biomaterials	5
Colloid and Interface Science	5
Technology and Ethics	5
Master's Project [1, 2]	35
Seminars (4) [1]	-

[1] As described in the Guidelines on the Study portal

[2] Including Master project preparation, Winter symposium and Summer symposium

3. Course elements of the track Prostheses & Implant Design

Course elements year 1

Course element	ECTS
Biomaterials 2	5
Introduction to MATLAB programming for BME	5
Control Engineering	5
Prosthetics and Orthotics	5
Engineering and Biotribology	5
Mechatronics	5
Statistical Methods in BME	5
Biomedical Instrumentation 2	5
Interdisciplinary Project	5
Internship [1]	15
Seminars (4) [1]	-

[1] As described in the Guidelines on the Study Portal

Course elements year 2

Course element	ECTS
Interface Biology	5
Product Design by Finite Elements Method	5
Robotics	5
Neuromechanics	5
Technology and Ethics	5
Master's Project [1, 2]	35
Seminars (4) [1]	-

[1] As described in the Guidelines on the Study portal

[2] Including Master project preparation, Winter symposium and Summer symposium

4. CEMACUBE

Students of CEMACUBE registered at the University of Groningen will follow one of the tracks of Appendix II in year 1 or year 2 of the programme.

Appendix IV. Electives (article 2.4)

Courses selected by students

Upon request of the student, the Board of Examiners may approve a course that is not mentioned in Appendix III. The request procedure must be started at least 6 weeks before the start of the course, and starts when the Board of Examiners receives a new programme proposal, supplemented with argumentation for the request and a detailed course description. The argumentation should contain the relevance of the selected course for the student's individual curriculum.

The Board of Examiners will decide on an individual basis if permission is granted. The student will be informed about the Board's decision, within 6 weeks by email.

Appendix VI. Admission to the degree programme and different tracks (art. 5.1.1 + art. 5.2)

Admission to the Master's degree programme

1. Holders of a Bachelor's degree in Life Science & Technology with a major Biomedical Engineering from the University of Groningen, holders of a Bachelor's degree in Physics with the track Life and Health from the University of Groningen, and holders of a Dutch University Bachelor's degree in Biomedical Engineering are considered to have sufficient knowledge and skills and will be directly admitted to the Master's degree programme.

2. Holders of a non-university Bachelor's degree in electrical engineering or mechanical engineering may be admitted individually, under the condition of successfully finishing a premaster programme first. This premaster programme will have a fixed amount of ECTS (15, 30, 45 or 60 ECTS).

Appendix VIII.

Application deadlines for admission
(art. 5.6.1)

Deadline of Application	EU/EEA students	non-EU/EEA students
Biomedical Engineering master	May 01, 2018	May 01, 2018

Decision deadlines
(art. 5.6.3)

Deadline of decision	EU/EEA students	non-EU/EEA students
Biomedical Engineering master	November 01, 2018	November 01, 2018