Assessment plan for the curriculum of the Bachelor's degree programme in Biomedical Engineering

Curriculum 2026/2027

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Date advice Board of Examiners: May 2026

Date approval Faculty Board:

1. Vision on assessment

1. Assessment should evaluate the student's ability to apply knowledge, make judgments, and communicate in a professional way (both written and oral) with the aim to increase the quality of medical care and to decrease the cost and manpower, necessary for providing health care nowadays.
2. Assessment should enable qualification of a student to work in med-tech companies and (non-) academic hospitals
3. Assessment should enable qualification of a student to work in academic institutions to perform scientific research to new technologies that will contribute to more efficient health care and high quality of life
4. *Assessment as learning*: Assessment is part of the learning process to provide students feedback in their learning process.
   a. Assessment involves both feedback and summative assessment.
   b. Assessment is contextualized: this means that students receive feedback or are tested in practical context-rich assignments as much as possible.
   c. Learning and developing competencies is often team-based. Peers as well as teachers and/or professionals from the field are needed as a mirror, to conduct a discussion, develop new insights and to ask critical questions.
   d. Problem solving and coping with problem-solving tasks are seen as the core of the learning process.
5. Assessment should enable the evaluation of learning outcomes.

2. Assessment guidelines

1. Summative and formative assessments should be balanced in order to avoid "assessment steers learning" and to stimulate internal motivation.
2. Formative assessment is primarily intended to provide feedback about the learning process and progress.
3. Written and oral deliverables should receive extensive feedback from the available staff. In case staff is unable to deliver this feedback, the use of such deliverables should be reconsidered.
4. Group projects/assignments allow for self-reflection and for intergroup summative assessment. Both of these enrich the academic learning process.

3. Learning outcomes of the degree programme

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 deliverables, 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.

4. Overview of assessment methods, test moments for course units, and examiners

There is a distinction between a BME course examiner (4.1) and a Project examiner (4.2) within the Biomedical Engineering Bachelor's programme.

4.1. BME Course examiner

A BME course examiner is an examiner involved in the curriculum of the Bachelor's and/or Master's Biomedical Engineering programme, appointed by the Board of Examiners as first or second course examiner.

The BME examiner of a project has the responsibility to check the Biomedical Engineering content of the project application. The overview of assessment methods, test moments for course units, and examiners can be found in Table 4.1.

Table 4.1. Course overview with assessment method(s), test moments, formative function and examiners. Courses in italics are organised by other programmes.

Year	Period	Course code	Course	ECTS	Assessment method(s) *	Does (part of the) assessment have a formative function?	Test moment(s)	First examiner	Second examiner
1	1a	WBBE054-05	Calculus 1 (for BME)	5	WE, IT, AST	-	start, halfway, end	dr. W.P. (Wim) Krijnen	dr. ir. R. (Roel) Luppes
1	1a	WBBE062-05	Principles of Design Engineering	5	AST, Peer	Peer	halfway, end	dr. ir. R (René) Fluit	dr. ir. C.C. (Charissa) Roossien
1	*1a*	WBLT002-05	*Mammalian Cell Biology*	*5*	*MC/WE*	-	*end*	*prof. Dr. G. (Geert) van den Bogaart*	*dr. F. (Frans) Bianchi*
1	1b	WBBE024-05	Anatomy and Physiology	5	AST, PR, WE/MC	-	end	dr. T.G. (Theo) van Kooten	dr. T.M. (Tim) Valk
1	1b	WBBE002-05	Biomechanics	5	WE, P, IT	IT	halfway, end	dr. A. (Andrea) Giuntoli	dr. P.K. (Prashant) Sharma
1	1b	WBBE005-05	Material Science	5	WE, IT, P	IT, P	halfway, end	dr. P.K. (Prashant) Sharma	dr. P. (Patrick) van Rijn
1	2a	WBBE041-05	Molecules of Life for BME	5	WE, IT, AST	IT, AST	start, halfway, end	dr. M.M. (Michael) Lerch	dr. C. (Clemens) Mayer
1	2a	WBBE028-03	Physics Lab for BME	3	WE, R	R	halfway, end	dr. M. (Mattia) Fontana	dr. J.S. (Jelle) Blijleven
1	2a	WBBE030-02	Ethics 1: Philosophy of Science and Scientific Integrity	2	MC, AST, P	-	end	dr. G. (Gorazd) Andrejc	prof. dr. C. (Christoph) Jedan
1	2a	WBBE025-05	Statistics 1 for BME	5	WE/MC, AST, P	AST	halfway, end	dr. B.W. (Brandon) Peterson	dr. J. (Jelmer) Sjollema
1	2b	WBBE007-05	Biomaterials 1	5	AST/P, MC	-	end	dr. P. (Patrick) van Rijn	dr. P.K. (Prashant) Sharma
1	2b	WBBE029-05	Linear Algebra for BME	5	AST, WE	-	halfway, end	prof. dr. J. (Jaap) Top	dr. ir. H.J. (Henk) van Waarde
1	2b	WBBE026-04	Microbiology	5	WE, PR, R	PR, R	start, halfway, end	dr. B.W. (Brandon) Peterson	dr. ir. G. (Girbe) Buist
1	2b	WBBE061-01	Safe Microbiological Techniques	1	WE, PR	-	end	dr. B.W. (Brandon) Peterson	dr. ir. G. (Girbe) Buist
2	1a	WBBE055-05	Mathematical Tools for BME	5	WE, IT, AST	-	halfway, end	prof. dr. C. (Cagri) Karakurt	dr. ir. R (René) Fluit
2	*1a*	WBBE033-05	*Dynamics and Vibrations*	*5*	*AST, WE*	-	*halfway, end*	*dr. L. (Liangliang) Cheng*	*prof. dr. A. (Antonis) Vakis*
2	1a	WBIE054-05	Python and Numerical Methods	5	WE, PR	WE, PR	start, halfway, end	dr. J. (Jelle) Aalbers	dr. J.W.A. (Jan-Willem) Brijan
2	1b	WBBE032-05	Designing Biomedical Products	4	AST, R, P, Peer	AST, R, Peer	start, halfway, end	dr. ir. C.C. (Charissa) Roossien	dr. ir. R. (René) Fluit
2	1b	WBBE063-04	Ethics 2: Biomedical Ethics	1	MC	-	end	dr. G. (Gorazd) Andrejc	prof. dr. C. (Christoph) Jedan
2	1b	WBBE034-01	Electricity and Magnetism	5	AST, WE, P	AST	start, halfway, end	dr. M. (Myroslav) Kavatsyuk	prof. dr. N. (Nasser) Kalantar-Nayestanaki
2	1b	WBBE059-05	Thermodynamics	5	WE, AST, P	-	halfway, end	dr. J. (Jelmer) Sjollema	prof. dr. M.M.G. (Marleen) Kamperman
2	2a	WBBE057-05	Physics and Technology of Medical Imaging	5	WE, P	-	end	dr. M.J.W. (Marcel) Greuter	ir. A.L.J. (Arjen) van Hulzen
2	2a	WBIE030-05	Waves and Optics for BME	5	WE, AST, IT	IT	halfway, end	prof. dr. R. (Rifka) Vlijm	prof. dr. W.H. (Wouter) Roos
2	*2a*	WBBE040-05	*Signals and Systems*	*5*	*WE*	-	*end*	*dr. S. (Saeed) Ahmed*	*prof. dr. ir. B. (Bayu) Jayawardhana*

* Assessment method: Written exam (WE), Multiple-choice exam (MC), Oral exam (OR), Report (R), Interim Test (IT), Assignment (AST), Practical exercise (PR), Presentation (P), Peer review (Peer).

Table 4.1. Continued.

Year	Period	Course code	Course	ECTS	Assessment method(s) *	Does (part of the) assessment have a formative function?	Test moment(s)	Course coordinator (first examiner)	Second examiner
2	2b	WBBE060-05	Biomedical Image Processing	5	WE/MC, PR	-	end	dr. J.B.C. (Jan Bernard) Marsman	dr. ir. P.M.A. (Peter) van Ooijen
2	2b	WBBE035-05	Cell Biology and Immunology	5	WE, R	-	end	dr. T.G. (Theo) van Kooten	dr. J. (Jelmer) Sjollema
2	2b	WBBE009-05	Electronics	5	WE	-	end	prof. dr. G. (George) Palasantzas	prof. dr. ir. B.J. (Bart) Kooi
3	1a	WBBE052-05	Biofabrication	5	MC, P	-	end	dr. P.K. (Prashant) Sharma	dr. M. (Monize) Caiado Decarli
3	1a	WBBE003-05	Biomedical Instrumentation	5	MC	-	end	dr. ir. G. (Gloria) Araiza Illan	prof. dr. ir. N.M. (Natasha) Maurits
3	1a	WBBE066-05	Smart Biomedical Prototyping	5	AST, R, P, PR	AST, R, PR	halfway, end	dr. ir. C.C. (Charissa) Roossien	dr. Ir. R (René) Fluit
3	1a	WBBE058-05	Microscopy and Imaging	5	WE, AST	-	start, halfway, end	dr F.P. (Felipe) Perona Martínez	dr. B.W. (Brandon) Peterson
3	1a	WBBE036-05	Lab course Biomaterials	5	P, PR, R	-	start, halfway, end	dr. P. (Patrick) van Rijn	dr. P.K. (Prashant) Sharma
3	*1a*	WBEC016-05	*Teach like a scientist*	*5*	*AST, P, R, Peer*	*AST, P, R, Peer*	*start, halfway, end*	*dr. D. (Deniz) Haydar*	*dr. S. (Sofie) van den Eynde*
3	1b	WBBE031-05	Imaging Laboratory 1	5	OR, R	-	end	dr. M.J.W. (Marcel) Greuter	dr. R.J. (Remco) Renken
3	1b	WBBE023-05	Transport in Biological Systems	5	WE, AST	AST	halfway, end	dr. Ir. R (René) Fluit	dr. ir. P.D. (Pablo) Druetta
3	1b	WBBE037-05	Surface characterization	5	WE, AST	-	halfway, end	prof. dr. R. (Romana) Schirhagl	dr. J. (Jelmer) Sjollema
3	1b	WBBE048-05	Biomedical Sensors	5	WE, P, PR	-	halfway, end	prof. dr. A.G.P. (Ajay) Kottapalli	dr. E. (Elisabeth) Wilhelm
3	1b	WBBE056-05	Polymeric Materials for Biomedical Applications	5	WE, R, PR	R, PR	halfway, end	dr. M.K. (Gosia) Wlodarczyk-Biegun	dr. D. (Dina) Maniar
3	1b	WBBE035-05	Cell Biology and Immunology	5	WE, R	-	end	dr. T.G. (Theo) van Kooten	dr. J. (Jelmer) Sjollema
3	2a	WBBE010-03	Research course Biomedical Engineering	3	AST	-	start, halfway, end	dr. M.A. (Mohammed Ali) Shahbazi	prof. dr. H.A. (Hélder) Santos
3	2a	WBBE046-02	Ethics 3: Research Ethics	2	MC	-	end	dr. G. (Gorazd) Andrejc	prof. dr. C. (Christoph) Jedan
3	2a	WBBE065-05	Computational Methods	5	WE, AST	-	start, halfway, end	dr. Ir. R (René) Fluit	dr. J. (Jelle) Aalbers
3	2a	WBBE042-05	Tissue Engineering and Regenerative Medicine	5	MC, AST, Peer	-	end	dr. A.M. (Sandra) Smink	dr. T.G. (Theo) van Kooten
3	2a	WBBE043-05	Imaging Laboratory 2	5	OR, R	-	end	dr. M.J.W. (Marcel) Greuter	dr. R.J. (Remco) Renken
3	2b	WBBE901-15	Bachelor's Project Biomedical Engineering	15	R, P, PR	PR, P	halfway, end	BME examiner	BME examiner or project examiner
Course not given in 2026-2027:									
3	1b	WBBE045-05	Applied Medical Visualization	5	MC, R	-	end		

* Assessment method: Written exam (WE), Multiple-choice exam (MC), Oral exam (OR), Report (R), Interim Test (IT), Assignment (AST), Practical exercise (PR), Presentation (P), Peer review (Peer).

4.2. Project examiner

Project examiners are appointed by the Engineering Board of Examiners as examiner of Bachelor projects, and will always operate next to a BME examiner. The BME examiner will have the final say on the assessment of the project.
The project examiners mentioned in table 4.2. are involved in the programme as a lecturer in the bachelor's and/or master's BME programmes and/or are on the central FSE examiners list.

A Bachelor's research project will always have 2 examiners, of which one has to be a BME examiner. A BME examiner is always a course examiner involved in one of the Biomedical Engineering programmes (see 4.1).

Table 4.2. Project examiners and their field of expertise.

Project examiner	**Department/Expertise**
dr. E.H.J.G. (Erik) Aarntzen	UMCG - Nuclear medicine, Imaging the immune system
dr. M.I. (Monica) Acuautla Menese	UG - Mechatronic engineering, Piezoelectric materials, Micro/Nano Electro Mechanical Systems (MEMS/NEMS), Flexible electronics, Sensors (piezoelectric, gas)
dr. N. (Nick) Assink	UMCG - Technical Physician and 3D-expert Trauma (3D Lab UMCG)
dr. H. (Hamed) Ayoobi	UMCG - Artificial Intelligence in Health
dr. ir. P. (Paul) Baron	UMCG - MRI Physics researcher
prof. dr. ir. D. (Deniz) Baskent	UMCG - Speech perception, speech technology, hearing loss, hearing aids, cochlear implants, development
prof. dr. R.M.F. (Rolf) Berger	UMCG - Pediatrics
prof. C.A. (Cristóbal) Bertoglio	UG - Mathematics, Interdisciplinary Applications/ BME/ Cardiac & Cardiovascular Systems
prof. dr. H.J.G. (Henk) Bilo	UMCG - Internist
prof. dr. G.H. (Truuske) de Bock	UMCG - Oncological Epidemiology
dr. R.P.H. (Reinoud) Bokkers	UMCG - Intervention radiologist
dr. R.M. (Raoul) Bongers	UMCG - Rehabilitation
dr. R.J.H. (Ronald) Borra	UMCG - Imaging/MRI
prof. dr. S. (Stefan) Both	UMCG - Radiology Oncology
dr. ir. C.L. (Charlotte) Brouwer	UMCG - Radiation Oncology, Medical Physics
prof. dr. R. (Raffaella) Carloni	UG - Robotics Lab
prof. dr. E.C.J. (Esther) Esther Consten	UMCG - Robotic and computer assisted surgery
dr. Bart Cornelissen	UMCG - Basic and translational Research and Imaging methodology Development
prof. dr. F.W. (Frans) Cornelissen	UMCG - Ophthalmology, Neurosciences, Neuroimaging
dr. B. (Branislava) Curcic-Blake	UMCG - Neuroimaging
dr. K. (Kevin) Damman	UMCG - Cardiology
dr. P.R. (Peter) van Dijk	UMCG - Endocrinologist
dr. M. (Marlies) van Dijk	UMCG - Department of Pulmonary Diseases
prof. dr. P.U. (Pieter) Dijkstra	UMCG - Rehabilitation
Prof. Dr. J.N. Doornberg	UMCG - Orthopaedic / Trauma Department
dr. J.M. (Menno)) Douwes	UMCG - Pediatric cardiology
dr. ir. N. (Nikos) Efthymiou	UMCG - Radiology, Nuclear Medicine & Medical Imaging
dr. M. (Michiel) Eramus	UMCG - Cardiothoracic surgery, ex vivo lung and heart perfusion, mechanical heart support, lung surgery and mediastinal surgery
dr. F. (Federica) Fontanella	UMCG - AI in prenatal echography
dr. E.P.C. (Etienne) Gaudrain	UMCG - Auditory research: Auditory Scene Analysis in Cochlear-Implant users
dr. B.N.G. (Ben) Giepmans	UMCG - (Advanced) Microscopy, Molecular biochemistry, Cell Biology
dr. M.C.M. (Marijke) Gordijn	Human Chronobiology, Chronobiology and sleep

dr. C. (Christian) Greve	UMCG - Movement science/Beatrixoord
dr. J.M. (Juha) Hijmans	UMCG - Rehabilitation
dr. R.F. (Roland) Hoffmann	UMCG - cholesteatoma care, cochlear implantation, bone conduction implantation, stapes surgery, tinnitus
dr. M. (Mike) Hogervorst	UMCG - Trauma surgery and spinal surgery
dr. W.M.H. (Willem) Hoogaars	UMCG - (Advanced) Microscopy, Molecular biochemistry, Cell Biology
dr. A. (Anouk) van der Hoorn	UMCG - Radiology, Nuclear Medicine & Medical Imaging
prof. J.H.P. (Han) Houdijk	UMCG - Clinical Movement Sciences
dr. C.V. (Christian) Hulzebos	UMCG - Pediatrics, neonatology
prof. dr. P.C. (Paul) Jutte	UMCG - Orthopedics
prof. dr. M.A.J. (Marina) de Koning-Tijssen	UMCG - Neurologists Movement Disorders http://movementdisordersgroningen.com/en
dr. ir. E.W. (Erik) Korevaar	UMCG - Medical Physicist Radiation oncology
dr. J. (Joep) Kraeima	UMCG - 3D Lab/Imaging
dr. A.O. (Anastasiia) Krushynska	UG - Mechanics, Mechanical Engineering, Acoustics
prof. dr. J.D. (Jon) Laman	UMCG - Chronic inflammation, immunology of ageing, MS, EAE animal models, innate immunity, brain, skin, microbial antigens, peptidoglycan, evolutionary medicine
dr. R. (Roald) Lambrechts	UMCG - Molecular and Cellular Biology
prof. dr. C.J.C. (Claudine) Lamoth	UMCG - Movement Analysis and Smart Technology in Aging
prof. dr. H.G.D. (Henri) Leuvenink	UMCG - Groningen Institute for Organ Transplantation
dr. K. (Kailai) Li	UG - Mobile robotic systems, embodied AI, full-stack autonomy.
dr. P. (Peter) van Luijk	UMCG - Damage and Repair in Cancer Development and Cancer Treatment (DARE)
dr. A.M.L. (Anne) Meesters	UMCG - 3D Lab/Imaging/Trauma Surgery
dr. V.E. (Vincent) de Meijer	UMCG - HPB and Liver Transplant Surgeon
dr. A. (Adéla) Melcrová	UMCG: Ways to fight resistant bacteria and cancer with the use of physics and biology combined
dr. S.K. (Sanne) Meles	UMCG - Neuroimaging
dr. ing. B.J. (Bram) Merema	UMCG - Mechanical Engineer and 3D Design Expert (3D Lab UMCG)
prof. dr. S. (Sarthak) Misra	UMCG - BME/UT Twente - Surgical Robotics Lab
dr. C. (Cyril) Moers	UMCG -Transplantation, Organ preservation
dr. T. (Taraneh) Mokabber	UG - Biomaterials Materials Science
dr. A. (Alessio) Murgia	UMCG - Rehabilitation, Neurosciences, BME
prof. dr. W.N. (Maarten) Nijsten	UMCG - Critical Care
prof. dr. P. (Peter) Olinga	UG - Translational Biopharmaceutics
dr. R. (Ramon) Ortiz Catalan	UMCG - Radiation Therapy, Particle Therapy Research Center
dr. A.R. (Rob) den Otter	UMCG - Neurosciences, Rehabilitation
dr. D. (Daniele) Parisi	UG - Rheology, rheo-spectroscopy, polymer and colloid physics, polymer processing
dr. P. (Peter) Pijpker	UMCG - 3D lab - development and application of 3D technology
dr. P. (Pietro) Pisciotta	UMCG - Medical Physicist
dr. S.J. (Sonja) van Tuinen-Pyott	UMCG - Peripheral auditory system, Hearing loss and tinnitus, Neuroscience
dr. L. (Laurens) Reinke	UMCG - Simulation Center UMCG
prof. dr. M.F. (Michiel) Reneman	UMCG - Pain Rehabilitation and Work Participation
prof. H.A. (Hélder) Santos	UMCG - Biomedical Engineering
dr. A. (Alina) Sigaeva	UMCG - Bioimaging and Bioanalysis group
dr. J. (Joyce) van Sluis	UMCG - Imaging (PET)
prof. dr. C.K. (Corry) van der Sluis	UMCG - Rehabilitation Medicine

dr. D. (Dominika) Suchá	UMC Utrecht - Radiology: Cardiothoracic imaging
dr. I. (Ignace) Tielliu	UMCG - Endovascular repair of peripheral artery aneurysms, Diagnosis and treatment of vascular graft and endograft infections
dr. H. (Hans) Timmerman	UMCG - Anesthesiology
dr. H.C. (Hugo) van der Veen	UMCG - Orthopaedic surgery
dr. R.J.K. (Riemer) Vegter	UMCG - Human Movement Science
dr. T. (Ton) Velleman	UMCG - Radiology
dr. A.R. (Alain) Viddeleer	UMCG - Radiology
prof. dr. R. (Rozemarijn) Vliegenthart	UMCG - Radiology, Nuclear Medicine & Medical Imaging
dr. M. (Marina) Volkova	UMCG - Molecular Biology
prof. dr. J.P.P.M. (Jean-Paul) de Vries	UMCG - (Vascular) surgery
dr. M.K. (Marieke) van Vugt	UG - Artificial Intelligence, mind-wandering, decision making, EEG, cognitive modelling; mindfulness, attention, social neuroscience, brain decoding, computational psychiatry, depression
dr. C.W.J. (Kars) van der Weijden	UMCG - Neuroimaging, Radiology, Nuclear Medicine & Medical Imaging Neurosciences
dr. A.R. (Arthur) Wijsmuller	UMCG - Consultant surgeon
dr. T.P. (Tineke) Willems	UMCG - Cardiovascular Centre
dr. P.J. (Pieter) van der Zaag	UG - Microscopy, Nanoscience & Nanotechnology, Radiology, Nuclear Medicine & Medical Imaging
prof. dr. J.A.M. (Clark) Zeebregts	UMCG - Applied endovascular techniques, Carotid surgery, Vascular anastomotic techniques, Vascular prosthetic graft infections, Translational research after atherosclerotic plaque morphology, new molecular imaging techniques

5. Relationship between course units and details of the learning outcomes

Table 5.1. Relationship between course units and learning outcomes of the programme, given per year, divided into periods. Note that the learning outcomes are presented here, are shorter than those presented on page 2 and 3. An X in the table indicates that the learning outcome is explicitly assessed in the course. Courses indicated in Italics are compulsory elective courses (E) or deepening minor courses (M).

Year 1		**Learning outcomes**											
		A. Knowledge			**B. Application of knowledge**			**C. Decision making**		**D. Communication**			
	Course per period	A1: math, biology, physics, (bio)chem, anatomy, physiology, engineering	A2: models and methods used in these fields, including computer-aided methods	A3: learning methods necessary to follow developments. Prepare for lifelong learning and Masters.	B1: apply knowledge for design of new solutions to biomedical problems	B2: perform measurements on biological systems and are able to interpret the data	B3: critically formulate the relevant questions, choose or propose appropriate methods, procedures and/or systems.	C1: key aspects of professional, ethical and societal responsibilities	C2: reflect on professional, ethical and social responsibilities	D1: understanding of functioning methods of multidisciplinary teams	D2: familiar with the established methods/tools of communication and their limitations	D3: effectively, clearly and unambiguously communicate their findings/results in a multidisciplinary setting
1a	Calculus 1 (for BME)	X										
	Principles of Design Engineering		X		X					X		
	Mammalian Cell Biology	X										
1b	Anatomy and Physiology	X			X							
	Biomechanics	X	X							X		
	Material Science	X										
2a	Molecules of Life for BME	X										
	Physics Lab for BME	X	X			X	X					
	Statistics 1 for BME	X	X				X					
	Ethics 1: Philosophy of Science and Scientific Integrity							X	X			
2b	Biomaterials 1	X		X	X							
	Linear Algebra for BME	X										
	Microbiology	X		X								X
	Safe Microbiological Techniques					X		X				

Table 6.1. Continued

Year 2		**Learning outcomes**											
		A. Knowledge			**B. Application of knowledge**			**C. Decision making**		**D. Communication**		
	Course per period	A1: math, biology, physics, (bio)chem, anatomy, physiology, engineering	A2: models and methods used in these fields, including computer-aided methods	A3: learning methods necessary to follow developments. Prepare for lifelong learning and Masters.	B1: apply knowledge for design of new solutions to biomedical problems	B2: perform measurements on biological systems and are able to interpret the data	B3: critically formulate the relevant questions, choose or propose appropriate methods, procedures and/or systems.	C1: key aspects of professional, ethical and societal responsibilities	C2: reflect on professional, ethical and social responsibilities	D1: understanding of functioning methods of multidisciplinary teams	D2: familiar with the established methods/tools of communication and their limitations	D3: effectively, clearly and unambiguously communicate their findings/results in a multidisciplinary setting
1a	Mathematical Tools for BME	X		X								
	Python and Numerical Methods		X			X						
	Dynamics and Vibrations	X	X									
1b	Designing Biomedical Products		X		X					X		
	Electricity and Magnetism	X										X
	Ethics 2: Biomedical Ethics							X	X			
	Thermodynamics	X		X	X	X						
2a	Physics and Technology of Medical Imaging	X	X									
	Signals and Systems	X	X				X					
	Waves and Optics for BME	X		X		X	X			X		X
2b	Biological Physics	X	X									
	Electronics		X	X								
	Biomedical Image Processing		X				X					

Table 6.1. Continued

Year 3		**Learning outcomes**											
		A. Knowledge			**B. Application of knowledge**			**C. Decision making**		**D. Communication**		
	Course per period	A1: math, biology, physics, (bio)chem, anatomy, physiology, engineering	A2: models and methods used in these fields, including computer-aided methods	A3: learning methods necessary to follow developments. Prepare for lifelong learning and Masters.	B1: apply knowledge for design of new solutions to biomedical problems	B2: perform measurements on biological systems and are able to interpret the data	B3: critically formulate the relevant questions, choose or propose appropriate methods, procedures and/or systems.	C1: key aspects of professional, ethical and societal responsibilities	C2: reflect on professional, ethical and social responsibilities	D1: understanding of functioning methods of multidisciplinary teams	D2: familiar with the established methods/tools of communication and their limitations	D3: effectively, clearly and unambiguously communicate their findings/results in a multidisciplinary setting
1a	*Lab Course Biomaterials (M)*			X			X					X
	Biofabrication (M)						X					X
	Biomedical Instrumentation (M)		X		X	X						
	Smart Biomedical Prototyping (M)				X		X	X		X	X	X
	Microscopy and Imaging (M)		X	X		X					X	X
	Teach like a Scientist (M)							X	X		X	X
1b	*Surface characterization (M)*	X			X	X						X
	Imaging Laboratory 1 (M)						X					
	Cell Biology and Immunology (M)	X							X			X
	Polymeric Materials for Biomedical Applications (M)	X			X							
	Biomedical Sensors (M)	X	X							X		
	Transport in Biological Systems (M)	X										
2a	Research course Biomedical Engineering			X			X			X		X
	Ethics 3: Research Ethics							X	X			
	Computational Methods	X	X		X	X	X					
	Tissue Engineering and Regenerative Medicine (E)				*X*					*X*		
	Imaging Laboratory 2 (E)		X									
2b	Bachelor's Project Biomedical Engineering				X	X	X	X	X	X		X