

Biomedical Engineering

MSc Programme



As medical science has advanced, physicians and patients have relied on increasingly sophisticated medical devices for diagnosis, treatment, and long term health care. Biomedical engineers are key players in the development, design, and continuing refinement of devices such as joint replacement prostheses, biosensors, imaging and pattern recognition, as well as advanced instruments for use in such domains as minimally invasive surgery and the diagnosis of movement disorders.

Degree	Master of Science in Biomedical Engineering
Starts	September
Credits	120 ECTS, 24 months
Language	English
Application deadline	April 1st: international students July 1st: Dutch degree
Tuition fee	€ 18.750 (non EU) € 2.083 (EU)
Scholarships	scholarships.tudelft.nl

Programme

The TU Delft Master's Programme in Biomedical Engineering is a multidisciplinary programme which aims to provide you with both an understanding of biology and medical theory and with highly specialised technical training in such fields as electrical, physics, material and mechanical engineering. You will take courses from three TU Delft faculties - Applied Sciences; Electrical Engineering, Mathematics and Computer Sciences; and Mechanical, Maritime and Materials Engineering. The programme also benefits from the clinical input provided by Leiden University Medical Center,

and Erasmus Medical Center in Rotterdam. You will learn how to develop conceptual models from a technical perspective and you will work in close collaboration with physicians, researchers and other healthcare professionals, including on site at the collaborating academic institutions. The MSc programme in Biomedical Engineering is a two-year programme.

Tracks

The three tracks offered by the Master programme in Biomedical Engineering are: Neuromusculoskeletal Biomechanics, Medical Devices and Medical Physics.

First year Courses 60 EC			Second year Graduation 60 EC
Track I Neuromusculoskeletal Biomechanics	Track II Medical Devices	Track III Medical Physics	1. Internship/Joint Interdisciplinary Project/Electives (15 EC) 2. Literature Study (10 EC) 3. Master Thesis Project (35 EC)
Obligatory courses all tracks (1a or 1b + 2 = 9 EC)			
1a. Anatomy & Physiology (only for students with technical background) (4 EC) 1b. Bio-inspired Design (only for students with biomedical/medical background) (4 EC) 2. Ethics of Healthcare Technologies (5 EC)			
First list of track-specific obligatory courses (24-25 EC)*			
Second list of track-specific obligatory courses (3 courses for Tracks I & II and at least 10 EC for Track III)*			
Free elective courses The number of ECTS depends on the courses chosen from the second list of obligatory courses			

*visit tudelft.nl/msc/bme for a list of courses

Track I: Neuromusculoskeletal Biomechanics

This track is focused on understanding the biomechanics of the neuromusculoskeletal system with the aim to improve the vitality of healthy people, enhance the performance of sports professionals and to treat the patients suffering from neuromusculoskeletal disorders and diseases.

Track II: Medical Devices

This track provides an integrated platform to enable development of advanced medical devices including biomaterials, design models and fabrication processes for implantable devices, biosensors, medical instruments, external prostheses, orthoses, as well as diagnosis and disease monitoring systems.

Track III: Medical Physics

Medical Physics is aimed at the application of physical methods in health care. Medical physicists are responsible for the standardization, calibration, and purchase of medical instruments, in close cooperation with medical and paramedical professionals. Furthermore, they are responsible for the accuracy and safety of physical methods applied in hospitals for diagnosis and therapy.

Examples of graduation projects

- Augmented reality for laparoscopic surgery
- The rational design of meta-implants using a combination of auxetic and conventional microstructures
- Effect of series versus parallel electrical configuration on self-sensing in a structure of twisted and coiled polymer muscles

- Osteogenic and antibacterial activity of strontium and silver containing additively manufactured titanium implants
- Wireless power transfer and optogenetic stimulation of freely moving rodents
- Puncturing chronic total occlusions using hydraulic pressure waves
- MRI prostate cancer radiomics: assessment of effectiveness and perspectives
- Inertial Sensor Motion Tracking: a method development and validation study on measurement of baseball pitching
- Energy saving pneumatically actuated autonomous systems
- Heartbeat detection using infrared thermometry in the ear

Career prospects

Career opportunities for biomedical engineers are excellent. To develop the innovative technologies that drive the biomedical industry, it requires personnel with the unique combination of skills, knowledge and experience in biology, medicine and engineering that graduates of the MSc programme in Biomedical Engineering can offer. Graduates find employment in hospitals, private firms producing equipment, medical devices and instruments, and in research institutions.

 **101**
students

 **25%**
international students

 **50%**

 **50%**

Career perspective

 **100%**
within 6 months

 **31%**
job as PhD

 **54%**
permanent job