Biomedical Engineering
TODAY’S PROGRAMME

1. CORE VALUES
2. BME PROGRAMME
3. CAREER PROSPECTS
4. DISCUSSION WITH MASTER TRACKS/ STUDY ADVISOR
1. Core values
Core values

• Societal impact: making a real difference
• Solution-driven research
• Synergy: interdisciplinary research
• Participation in research
• Internationalization
2. The programme
Curriculum Master Biomedical Engineering

• Two years programme: 120 EC.
  • First year: courses (5 EC x12) 60 EC
  • Second year: Internship 15 EC and Master Assignment 45 EC

• First Year:
  • Choice of one out of three tracks
  • Choice of research group
  • Four compulsory courses
  • Individual programme ( 8 elective courses), you will work in close contact with the chosen research groups
  • Relevant courses to prepare for the MSc Assignment and that reflect your interest.
Bionanotech & Advanced Biomanufacturing

- Technologies that restore the function of diseased organs or damaged tissues

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**BIMATERIALS SCIENCE AND TECHNOLOGY**
The Biomaterials Science and Technology group (BST) focuses on polymer synthesis, structure-properties relationships in polymeric materials and their application in medicine.

**DEVELOPMENTAL BIOENGINEERING**
The mission of the department of Developmental BioEngineering is to translate the principles of developmental biology into new technology-based therapeutic strategies for the replacement of lost or worn out tissues in chronic diseases.

**BIOS LAB-ON-A-CHIP**
The BIOS Lab-on-a-Chip chair (“Miniaturized systems for biomedical and environmental applications”) aims at the research and development of Lab-on-a-Chip (LOC) systems.

**APPLIED STEM CELL TECHNOLOGIES**
The department of Applied Stem Cell Technologies is a multidisciplinary team of biologists and engineers who collaborate on cutting-edge technology and stem cell biology to develop novel applications for biomedical science, toxicology, pharmacology and clinical diagnostics.
Imaging & Diagnostics

- Techniques to image a patient’s body, based on acoustics, photo-acoustics, biomagnetism and ultrasound.

**MEDICAL CELL BIOPHYSICS**
The investigations of the Medical Cell Biophysics (MCBP) group are aimed at gaining a better understanding of the properties of diseased cells. It is a basis for the development of technologies to optimize the diagnosis and treatment of illnesses. MCBP works mainly on various forms of cancer.

**NANOBIOPHYSICS**
Within Nanobiophysics (NBP) one of the research areas is the development and application of nano-techniques that allow controlled manipulation of cells and structures within them.

**NEUROIMAGING**
The research focus of the NeuroImaging group is on developing novel methods for imaging neurosciences.

**PHYSICS OF FLUIDS**
MIRA’s Physics of Fluids group (PoF) conducts research into various topics revolving around the physical description of the dynamic behaviour of liquids and gases. The group specializes particularly in the use of microscopic bubbles and droplets for medical imaging. It also develops new methods of medical diagnosis and therapy using ultrasound.

**BIOMEDICAL PHOTONIC IMAGING**
The Biomedical Photonic Imaging (BMPI) research group studies the interaction between light and biological material. It uses the insights gained in a search for non-invasive diagnostic methods.
Robotica (Neural & Motor Systems)

• Restoration of function of nervous and motor systems

APPLIED ANALYSIS
MiRA’s Applied Analysis group (AA) models neural activity in various parts of the brain, an example being research into the brain areas involved in Parkinson’s disease. AA also analyses models of the cortex, the outermost layer of the cerebrum, in order to gain a better understanding of epilepsy.

BIOMECHANICAL ENGINEERING
The Biomechanical Engineering group carries out research concerning the treatment of impaired interaction between nerves and skeletal muscles. The group tries to gain insights into the mechanical operation of the body’s motor system and to represent these insights in the form of models. The researchers also study the effect of operations on the skeleton.

BIOMEDICAL SIGNALS & SYSTEMS
The research carried out in the Biomedical Signals & Systems (BSS) group is aimed at supporting the central nervous system in conditions like Parkinson’s disease or strokes. BSS studies how electrical stimuli applied to the nervous system can restore impaired body functions.

CLINICAL NEUROPHYSIOLOGY
The research of this group is performed at the interface of neuroscience and neurophysiology. Strongly driven by clinical needs, we focus on central nervous system disorders, aiming to develop improved diagnostics and guide novel treatments for clinical neurology.

ROBOTICS AND MECHATRONICS
The research carried out within the Robotics and Mechatronics group is centered around the theme of robotics in inspection and medical applications. Medical-related projects focus on tele-operated robotic surgery, and hand and lower-limb prostheses.
Pre master programme

• Required for Dutch UAS continuants and some university continuants (dependent on bachelor programme).

• Contents UAS premaster:
  • 15 EC mathematics. Calculus and LinAlgebra
  • Individual programme based on your chosen master track

• Internship and or final assignment at UT recommended!
3. Career prospects
Biomedical engineers work in:

• Healthcare
• Industry
• Research institutions (including PhD positions)
Some examples of typical duties:

• Design systems and products such as artificial organs, body parts and machines for diagnosing medical problems
• Work with medical professionals to research the engineering aspect of biological systems
• Deal with technical queries, train and advise clinicians on the proper use of advanced medical equipment.
4. Discussion with master tracks/ study advisor