Master of Biomedical Sciences: Bioelectronics and Nanotechnology

HASSELT UNIVERSITY:

IS LOCATED IN THE HEART OF THE EU-REGION NEAR BRUSSELS, AACHEN (GERMANY) & MAASTRICHT (THE NETHERLANDS)

IS THE 15th BEST SMALL UNIVERSITY IN THE WORLD

HAS 13% INTERNATIONAL STUDENTS FROM 75 DIFFERENT COUNTRIES

HAS 550 PHD STUDENTS, OF WHICH 36% INTERNATIONAL STUDENTS

UHASSELT

KNOWLEDGE IN ACTION
BIOELECTRONICS AND NANOTECHNOLOGY

- The programme is strongly research-oriented with focus on fundamental research and dissemination of scientific findings.
- You are trained in several specialized research domains with focus on scientific English.
- The programme offers two internships for a total of 60 ECTS credits.
- Topics for internships are available at top-level research groups at Hasselt University, Maastricht University or at other locations in Belgium and abroad (within ERASMUS programme together with universities in e.g. Italy, Finland, Spain, England and Germany).
- You are trained in writing a grant proposal as a preparation of the senior internship.
- The programme strongly emphasizes lifelong learning and employability skills such as communication (writing and presenting), critical attitude, working in team.
- The programme is based on student-centered education: small groups, individual guidance and feedback, ‘face-to-face’ education.
- You have the opportunity to present your research findings in an international conference environment.
- The programme has an international and multidisciplinary orientation.

CAREER PROSPECTS

- Applied and fundamental research at universities, hospitals, and research centers in scientific and biomedical disciplines (PhD, research associate...).
- Research and development in companies specialized in pharmaceutics, diagnostics, biotechnology, semiconductor and biomedical devices, and medical engineering (product specialist, process analyst, product engineer, service engineer...).
- Governmental authorities and centers focusing on public health, environmental conservation, genetics, and information services (project manager, business developer, investment manager...).
- Independent consultant and entrepreneur.
- Education (teaching assistant…).
STRENGTHS OF THE PROGRAMME @UHASSELT

This unique master degree programme in Belgium focuses on a novel and interdisciplinary scientific domain at the boundaries between physics, chemistry, electronics, and biomedical sciences.

Fifty years ago, shortly after J. Watson and F. Crick successfully solved the structure of DNA using X-ray diffraction, R. Feynman made his visionary statement: “There’s plenty of room at the bottom”, with which he effectively heralded the new era of nanoscience and nanotechnology. Since that time, research into “functional” molecules and nanomaterials has developed into one of the most important scientific disciplines of today. This is triggered by the fact that a broad range of advanced techniques with high precision has become available to study molecules directly at their own length scale and to understand their complex properties.

The interdisciplinary master programme offers a strong foundation in all fundamental scientific aspects and covers several applied concepts in materials science. This specialization provides an introduction to various advanced physical and chemical techniques in addition to an in-depth introduction into several important application areas. Topics range from integrated detection and characterization techniques for molecules (biosensors) to the nanoscale engineering of implant materials, the working principles of medical devices like neurochips and pacemakers, and the development of nano(bio) materials for diagnosis and therapy (nanomedicine).

The curriculum of this programme was jointly developed by physicists, chemists, clinical and biomedical researchers, and engineers specialized in biomedical fields. The programme ensures therefore a broad overview of the domain of bioelectronics and nanotechnology and enables the graduates to develop their individual skills for a successful career in interdisciplinary research- and development environments.
# STUDY PROGRAMME

## PROGRAMME
International master programme  
Master of Biomedical Sciences

## SPECIALIZATION
Bioelectronics and Nanotechnology

## DURATION
2 years, full time study programme, 120 ECTS  
Teaching periods of 10 weeks (quartiles)

## EDUCATIONAL CONCEPT
In this master programme there is a strong emphasis on competence-based learning in which the employability skills of Hasselt University are very important. The educational team has an international and multidisciplinary profile and consists of professors and senior scientists, complemented by experts in the field. In lectures, assignments and ‘guided self-study’, recent publications in leading scientific journals are used. During the two internships, the student is individually supervised in experimental work, research skills and writing of a report.

### FIRST MASTER YEAR (60 ECTS)

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<tr>
<th>QUARTILE 1</th>
<th>QUARTILE 2</th>
<th>QUARTILE 3</th>
<th>QUARTILE 4</th>
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<tbody>
<tr>
<td>Experimental design in BEN (8 ECTS)</td>
<td>Biosensors (5 ECTS)</td>
<td>Junior internship (15 ECTS)</td>
<td>Nanomedicine (4 ECTS)</td>
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<td>Electronics and data acquisition and molecular biology (4 ECTS)</td>
<td>Chemistry of surfaces (5 ECTS)</td>
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<td>Bioanalytical methods (4 ECTS)</td>
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<td>Liquids, solids and biological matter (4 ECTS)</td>
<td>Nano- and microsystems technology (4 ECTS)</td>
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<td>Elective (4 ECTS)</td>
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### SECOND MASTER YEAR (60 ECTS)

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<th>QUARTILE 1</th>
<th>QUARTILE 2 &amp; SEMESTER 2</th>
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<tr>
<td>Grant writing (10 ECTS)</td>
<td>Senior Internship &amp; Master Thesis (44 ECTS)</td>
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<td>Quality management (4 ECTS)</td>
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<td>Soft matter theory (3 ECTS)</td>
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*In common with all specializations*  
*In common with some specializations*  
*Master specific*
Many possible subjects for short and long (master thesis) internship projects:

- synthesis of smart materials based on organic and inorganic materials, biofunctional coatings based on polymers, synthetic diamond, biomimetic materials and other biocompatible compounds;
- design, development and application of nano(bio-)materials for advanced drug delivery, imaging, and diagnosis and therapy (theranostics);
- design and development of biosensors and sensor arrays for proteins, drugs, metabolites, hormones, and genetic material;
- surface analytics, spectroscopy, and molecular electronics;
- design of synthetic receptors such as aptamers and molecular imprints;
- electrophysiology, cytosensors, neurochips, and active implants.

Master thesis can be done at e.g.:

1. Hasselt University: Institute for Materials Research IMO and Biomedical Research Institute BIOMED
2. Maastricht University: Cardiovascular Research Institute CARIM, Nutrition and Toxicology Research Institute NUTRIM, MERLN Institute
3. Medtronic – Bakken Research Center, DSM, Maastricht Instruments BV (The Netherlands)
4. Interuniversity Microelectronics Center IMEC, Leuven (Belgium)
5. Max-Planck Institute for Polymer Research, MPI-P, Mainz (Germany)
6. Aachen University of Applied Sciences and Research Center Jülich (Germany)
7. University of Applied Sciences Kaiserslautern (Germany)
8. Czech Technical University, Prague (Czech Republic)

[1] Students exchange in the framework of the ERASMUS programme of the European Union.
All applicants should hold at least a university diploma or degree certificate or a diploma of higher education equivalent to a bachelor degree (180 ECTS credit points) in biomedical sciences, biology or chemistry, at the start of the master programme (mid-September).

Applicants with a different educational background should contact the programme coordinator for specific regulations. The Examination Board of the programme evaluates each application individually concerning the applicant’s academic record. Sufficient knowledge of English is required and is to be confirmed by presenting a sufficient score on a language test (TOEFL or IELTS) and by an intake interview at request of the programme coordinator.

Online pre-registration is compulsory. The Examination Board will only consider duly completed application files. Deadline for submission: 15th of August (EEA students) / 1st of May (non-EEA students)
For support in the admission procedure: admissionformaster@uhasselt.be

Applicants will be notified of the Examination Board’s decision as soon as possible. The registration becomes active after payment of the tuition fee, augmented with a premium for health insurance for non-EEA students.
Please consult www.uhasselt.be/admission for fees, regulations, and online pre-registration.