This unique master degree programme 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 nanosciences. 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 nanoscopic techniques has become available to study molecules directly at their own length scale and to understand their complex properties.

The master programme offers a strong foundation in all fundamental scientific aspects and provides, in addition, 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, and the working principles of medical devices like neurochips and pacemakers.

The curriculum of this programme was jointly developed by physicists, chemists, clinical and biomedical researchers, and engineers specialized in medical instrumentation. 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.

CAREER PROSPECTS
In view of the international profile of this degree programme, English language syllabi and textbooks are being used throughout. The intensive block courses are based on lectures, exercises, laboratory training, and “guided self study” focusing on recent publications in leading scientific journals (journal clubs). The educational team has an international and multidisciplinary profile and consists of professors and senior scientists of both Hasselt University and Maastricht University, complemented by experts from companies and independent research institutions.

EDUCATIONAL CONCEPT
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LOCATION
Located in the heart of the EU-region, Hasselt and its university are truly international. Hasselt is situated at a stone’s throw from cities such as Brussels, Liège (French speaking part of Belgium), Aachen (Germany) and Maastricht (the Netherlands), while Paris and London are within a couple of hundred kilometres.
ST YEAR: COURSES

| Week 1 - 8 | All students: Structure and transport of biomolecules
|            | Seminars and literature study on biomaterials
|            | Students with a medical, biomedical or biological background: Electronics and data acquisition
|            | Students with a background in physics or chemistry: Immunology and genetics
|            | Students with other backgrounds: please contact the coordinator for an adapted study track |
| Week 9 - 16 | Biosensors |
|            | Chemistry of surfaces |
|            | Nano- and Microsystems technology |
| Week 17 - 26 | Junior practical training: intensive practical training blocks in chemistry, biomedical sciences, materials physics |
| Week 27 - 36 | Electrophysiology and imaging |
|            | Functional molecular modeling |
|            | Optional courses: |
|            | • Complexity in biological systems |
|            | • Nanomedicine |
|            | • Electrical diagnosis techniques & active implants |
|            | • Nanobiotechnology |
|            | • Process lines in microsystem technology |
|            | • ... |
| Week 37 - 38 | Integrity, communication and marketing in science |

TOTAL ECTS CREDIT POINTS 60

ND YEAR: COURSES

| Week 1 - 8 | Molecular bio-analytical methods |
|            | Soft matter theory |
|            | Introduction to Nano(bio)chemistry and development of a research project proposal |
| Week 9 - 38 | Senior practical training (Master’s project) + master’s dissertation |

TOTAL ECTS CREDIT POINTS 60

MASTER’ S PROJECT AND THESIS CAN BE DONE AT:

- Hasselt University: Institute for Materials Research IMO and Biomedical Research Institute BIOMED;
- Maastricht University: Cardiovascular Research Institute CARIM, Nutrition and Toxicology Research Institute NUTRIM;
- Medtronic – Bakken Research Center, DSM, Maastricht Instruments BV (The Netherlands);
- Interuniversity Microelectronics Center IMEC, Leuven (Belgium);
- Aachen University of Applied Sciences and Research Center Jülich (Germany) [1];
- Czech Technical University, Prague (Czech Republic) [1];
- UNESCO International Center of Biodynamics, Bucharest (Romania) [1];

[1] Students exchange in the framework of the ERASMUS programme of the European Union.

[2] Double-degree programme, allows obtaining an additional degree as Master of Science at the partner university.

SUBJECTS AVAILABLE FOR MASTER PROJECT AND THESIS:

- synthesis of smart materials like nanoparticles and biofunctional coatings based on polymers, synthetic diamond, and other
- biocompatible compounds;
- development of biosensors and sensor arrays for proteins, drugs, metabolites, 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.

ADMISSION REQUIREMENTS

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), at the start of the master programme in half September. Applicants should hold a bachelor degree or diploma in biomedical sciences, biology, medicine or chemistry. Applicants with a different educational background such as electronic- and medical engineering should contact the 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 an intake interview or by presenting a sufficient score on a language test such as TOEFL or IELTS.

Online pre-registration is compulsory. The Examination Board will only consider duly completed application files.

Deadline for submission:
- for EEA students: 15th of August
- for non-EEA students: 1st of May

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.

GENERAL INFO:
www.uhasselt.be/admission

CAMPUS DIEPENBEEK
Agoralaan Building D - BE-3590 Diepenbeek - Belgium

CAMPUS HASSELT
Martelarenlaan 42 - BE-3500 Hasselt - Belgium

SPECIFIC INFO:
www.uhasselt.be/bioelectronics-and-nanotechnology

PROGRAMME COORDINATOR:
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