

The Master of Science in Bioelectronics

Department of Electrical and Computer Engineering
Newark College of Engineering

New Jersey Institute of Technology

WHY PURSUE A MASTER'S IN BIOELECTRONICS?

Bioelectronics brings together the best of two worlds: the strengths of biology and biochemical interactions are combined with electronic signal detection, processing and analysis. This leads to new applications in medicine, diagnostics and therapeutics that would never be imaginable within the limitations of each separated domain. Experts say that the healthcare industry and the economy will be transformed by enterprises involved in designing and manufacturing of biomedical sensors and bioelectronic devices and systems, involving micro- and nano-electronic materials, for biomedical imaging (at cellular, molecular and organ levels), diagnostic, therapeutic, and other clinical applications.

WHY STUDY BIOELECTRONICS AT NJIT?

NJIT's Department of Electrical and Computer Engineering is at the hub of New Jersey's electronics (and medical ?) enterprises. The educational and research programs have been evolved through interaction and growing partnership with companies including AT&T, Lucent Technologies-Bell Laboratories, IBM, Intel, Sarnoff, Sun Microsystems, PSE&G, Globix, Telcordia, and Mitre Corp. The department has a nationally-recognized research program in MEMS, as well as in carbon nanotubes and nano-devices. Proximity of major research hospitals, medical equipment and pharmaceutical companies creates opportunities for involvement of the industry in research project as well as supplying a pool candidates for the MS degree.

WHO TEACHES THE COURSES?

In addition to more than 36 full-time faculty members, students are taught by adjunct professors from industry that offer specialty courses in their areas of expertise and serve on thesis and dissertation committees.

IS PART TIME STUDY AVAILABLE?

Evening and weekend courses accommodate the working professional, who may pursue the degree part time.

WHAT ARE THE DEGREE REQUIREMENTS?

Upon entering the program, students select an area of specialization supervised by the Program Advisor. The master's program consists of 30 credits. Students who enter the program but who do not receive departmental or research-based awards have three program options:

24 course credits and 6 credits of master's thesis; or 27 course credits and 3 credits of master's project; or 30 course credits without a master's project or thesis. Students should consult with the Program Advisor or designee before registering for courses to make sure they are meeting department requirements. As a requirement for graduation, students must achieve a 3.0 cumulative GPA in graduate-level courses, not including the master's thesis or project. The project grade must be B or better. All students are required to attend two semesters of ECE 791 Graduate Seminar

WHAT COURSES ARE REQUIRED?

We offer two specialization tracks in bioelectronics:

Track 1- Biosensors and Devices and Track 2 - Bio-imaging and Control Systems.

There is a number of elective courses for each track but the following are common for both:

Project/Thesis:

Thesis is required for all those receiving departmental or research based support. For all others, a project or thesis is optional.

Electrical Engineering Core (6 Credits)

ECE 601 Linear Systems (3 credits)

ECE 673 Random Signal Analysis I (3 credits) or

Area requirements (9 Credits)

ECE 667/BME 669 Physiology For Engineers (3 Credits)

ECE 626 Optoelectronics

BME 683 Microelectronics/MEMS Devices and Systems or

ECE 657 Semiconductor Devices (3 credits)

DO STUDENTS HAVE OPPORTUNITIES FOR RESEARCH?

Students have the opportunity to work, one-on-one, with faculty researchers pursuing projects in cutting edge technologies at such state-of-the-art centers and labs as the Advanced Networking Laboratory; Center for Communications and Signal Processing Research; the Device and Material Characterization Laboratory, Laboratory for Integrated Nanostructures; Electronic Imaging Center, Real Time System Laboratory, and the Microelectronics Research Center. Faculty are involved in research in such areas as:

- Nanotechnology - Nonlinear and Linear Optical Properties of Nanostructured Materials and Devices
- Optical Biosensors
- Deep Sub-Micron CMOS Device Reliability
- Integrated Nanostructures and Nano-Devices
- Ultra High Frame Rate Image Sensor
- Real time signal processing and instrumentation
- Micro-fabricated Microconcentrator for Volatile Organic Compounds

Ongoing research projects are well funded by federal funding agencies such as the National Science Foundation, US Army, Department of Defense, NIH, ONR, and leading industries. Students have opportunities to conduct thesis research with participating industry, hospitals, and university centers and departments.

IS FINANCIAL AID AVAILABLE?

Financial support for full-time students in the MS program is limited (available via research projects conducted by ECE faculty members). Full-time domestic and international students may also be eligible to receive the Provost Fellowship. For further information on financial aid:

www.njit.edu/financialaid/graduate/index.php

FOR FURTHER INFORMATION

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TO APPLY:

Office of Graduate Admissions,
(973) 596-3300, or apply on-line at
www.njit.edu/admissions/graduate/howtoapply.php