MS degree specializing in Biology and Bio-inspired Engineering

Enhance your resume with a Northwestern MS degree specializing in Biology and Bio-inspired Engineering.

This research area reflects the increasingly tight relationship between engineering and the study of biological systems. Techniques from engineering often provide substantial insight into biological problems, while biology simultaneously inspires new engineering developments. Faculty in this research area work on both sides of this duality. For example, several labs are developing artificial sensors that model vertebrate hair-cells, whiskers, and electrosensors. These sensors are then used to study basic biological questions and to advance engineering capabilities.

There are several possible themes within the biological and bio-inspired engineering specialization: Neurobiology, Biomechanics, Biomaterials, Robotics for Rehabilitation and Surgical Assistance, Nanoscale Biotic-Abiotic Systems, Biologically-inspired sensors and sensing.

Faculty active in Biological and Bio-inspired Engineering:

Neural engineering: M. MacIver and M. Hartmann

Human Movement and Neurorehabilitation: J. Patton

Nanomedicine, Bionanotechnology, Drug Delivery, Biosensing:
D. Ho, S. Ghosal and N. Pantankar


Implant Materials: C. Brinson

Bio-inspired Materials: H. Espinoza

- Hands-on courses and projects
- State-of-the-art labs
- Focused advanced study in Biological Applications
- 3-quarter course only, or 5-quarter with project programs
- Optional “mini-MBA” certificate Program
- Starting salaries with MS $10k higher than with BS (2007, National Association of Colleges and Employers)
For the thesis option, all nine of the required courses must be 300-level or above, at least five must be ME courses, and at least five must be 400-level. For the course-only option, 11 courses are required of which at least seven must be ME courses. To satisfy the breadth requirement, one course must be taken from three of the following six areas: Solids, Fluids, Biomedical/Biology, Design/Manufacturing/Tribology, Robotics/Controls, and Mathematics/Sciences.

**Biological and Bio-inspired Engineering ME courses:**
- ME 389 Molecular Machines in Biology
- ME 420 Micro and Nano Scale Fluid Dynamics
- ME 462 Sensory Acquisition
- ME 489 Selected Topics in Cellular-Level Transport
- ME 495 Neuromechatronics
- ME 495 Computational neuromechanics and neuroethology

**Selected Nanotechnology courses in other departments:**
- BME 317 Biochemical Sensors
- BME 380 Biomedical Transducers and Instrumentation
- CEE 411 Micromechanics
- CHEM 448 Computational Chemistry
- ChBE 367 Fabrication of Microelectronic Devices
- ChBE 379 Intro to Computational Biology
- EECS 388 Microelectronic Technology
- EECS 381 Electronic Properties of Materials
- EECS 384 Solid State Electronic Devices
- EECS 401 Fundamentals of Electronic Devices
- ESAM 495 Interdisciplinary Nonlinear Dynamics
- ESAM 346 Modeling and Computation in Science and Engineering
- MSc 340 Ceramic Processing
- MSc 355 Electronic Materials
- MSc 361 Crystallography and Diffraction
- MSc 376 Nanomaterials
- MSc 380 Surface Science
- MSc 415 Fundamentals of Thin Film Materials
- MSc 434 Fracture of Materials
- MSc 455 Solid State Physics of Nanomaterials
- PHYS 422-1,2,3 Solid-State Physics

Additional course information available at these webpages:
- ME courses: [http://www.mech.northwestern.edu/web/courses/index.php](http://www.mech.northwestern.edu/web/courses/index.php)
- BME courses: [http://www.bme.northwestern.edu/current/graduate/course_descriptions.html](http://www.bme.northwestern.edu/current/graduate/course_descriptions.html)
- ChBE courses: [http://www.chem-biol-eng.northwestern.edu/gradpgm/courses/](http://www.chem-biol-eng.northwestern.edu/gradpgm/courses/)
- EECS courses: [http://www.eecs.northwestern.edu/academics/course/](http://www.eecs.northwestern.edu/academics/course/)
- ESAM courses: [http://www.esam.northwestern.edu/courses/course_listing.html](http://www.esam.northwestern.edu/courses/course_listing.html)

In addition to Biology and Bio-inspired Engineering, MS degrees with other specialization options are available.

For more information contact:
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