MS Degree Programs in Mechanical Engineering

## MS degree specializing in Robotics and Control

Jump start your career with a MS degree at Northwestern, with an emphasis in robotics and control. This program is for students finishing a BS in engineering or a related field with a desire to move into the cutting-edge field of robotics and control. Dedicated, intensive and hands-on courses provide thorough training and preparation for exciting jobs.

This specialization is broadly related to robotics, and includes traditional areas of automatic control theory and practice, dynamics, and mechanical design and construction of novel robotic devices.

Example project areas include haptic interfaces, human-robot interaction, multi-robot systems, robotic manipulation, simulation and control of multi-body systems, swarm robotics and bio-inspired sensing and control.
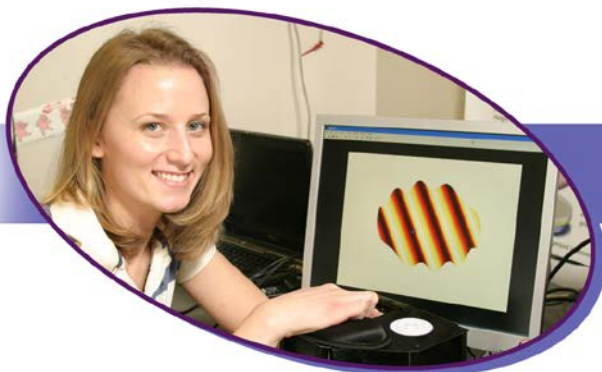
Program Features

- Hands-on courses and projects

- Combined intensive ME and EECS training

- Focused advanced study in Robotics and Control

- Optional "mini-MBA" certificate program

- Fast-paced course-only MS option in as short at 9-months or course plus thesis option.

- Starting salaries with MS are $10k higher than with only a BS

- Students are able to perform research in the Laboratory for Intelligent Mechanical Systems, a world leader in robotics and haptic interfaces

The thesis option requires nine classes at the 300-level (upper division level) or above, of which at least five must be ME courses, and at least five must be 400-level (graduate level), plus three project units (ME 590) culminating in a thesis. The course-only option requires eleven classes at the 300-level or above, of which at least seven must be ME courses, and at least five must be 400-level, plus one project unit (ME 499). To satisfy the breadth requirement, one course must be taken from three of the following seven areas: Solids, Fluids, Biomedical/Biology, Design/Manufacturing/Tribology, MEMS/Nanotechnology, Mathematics/Sciences, and Engineering Management.

Students pursuing this specialization are encouraged, but not required, to have taken EECS 230 or have obtained equivalent proficiency in C or C++ prior to enrolling for the MS, to permit enrollment in 300-level EECS courses with this as a prerequisite.

Sample courses available in Robotics and Control:

Fall Quarter	**Winter Quarter**	**Spring Quarter**
ME 499/590 Project/Thesis	ME 499/590 Project/Thesis	ME 499/590 Project/Thesis
ME 314 Theory of Machines–Dynamics	ME 333 Intro to Mechatronics	ME 433 Advanced Mechatronics
ME 390 Intro to Dynamic Systems	EECS 336 Design and Analysis of Algorithms	ME 449 Robotic Manipulation
EECS 311 Data Structures and Data Management	EECS 360 Intro to Feedback Systems	ME 495 Optimal Control
EECS 325 Artificial Intelligence Programming	EECS 479 Nonlinear Optimization	EECS 348 Intro to Artificial Intelligence
EECS 332 Digital Image Analysis		EECS 374 Intro to Digital Control
EECS 410 System Theory		EECS 390 Intro to Robotics
		EECS 457 Advanced Algorithms

Additional course information available at these webpages:

ME courses: http://www.mech.northwestern.edu/web/courses/
EECS courses:
http://www.eecs.northwestern.edu/academics/course-descriptions.html
Engineering Science Applied Math courses:
http://www.esam.northwestern.edu/courses/course_listing.html

Faculty active in Robotics and Control: *J. E. Colgate, K. M. Lynch, T. Murphey, and M. Peshkin.*
These faculty undertake many collaborative projects with the Rehabilitation Institute of Chicago
and neural engineering researchers M. Hartmann and M. MacIver.

In addition to Robotics and Control, MS degrees with other specialization options are available.

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