

MICROSYSTEMS & NANOTECH (MSNT)

MSNT 3940 Principles and Applications of Nanotechnology 4 Credits

This course is an introduction to nanometer scale aspects of chemistry, physics, and biology, and how these aspects can be combined to provide solutions to engineering problems. Recent applications will be presented as case studies, including sensors, biology medicine, electronics, and new materials. An extensive series of hands-on laboratory activities is a central part of the course. Students will fabricate and characterize nanoscale structures using a variety of techniques from biology, chemistry, and materials science. Principles of operation of several measurement techniques that underpin this field will be presented, as will social, legal, and ethical aspects of nanotechnology. This course is part of the Minor in Microsystems and Nanotechnology.

Components: Laboratory, Class

Prereqs/Coreqs: P. CHEMISTRY 1240 or CHEMISTRY 1450

MSNT 4000 Independent Study in Microsystems & Nanomaterials 1-2 Credits

An opportunity for qualified undergraduates pursue state-of-the-art knowledge in the fields of Microsystems and Nanomaterials, through either research or independent study into advanced current topics. This course will involve a working knowledge of the scientific process and of the fundamentals of microsystems and nanoscience. A written formal report is required for the completion of this course, as is a mid-term update. A student may register for one or two credits in a given semester.

Components: Independent Study

Prereqs/Coreqs: P. Permission of instructor, "C-" or better in MSNT 3940 or MSNT 4230

MSNT 4230 Design, Fabrication, and Simulation of MEMS 3 Credits

This course is an introduction to Microelectromechanical Systems (MEMS) technology. It covers basic microfabrication technologies, the governing physics for MEMS devices in different energy domains (mechanical, electrical, optical, thermal, and fluidic), and the analysis of micromachined miniature sensors and actuators. Fabrication and design of MEMS devices be illustrated using examples of existing research prototypes and commercial products. Students will also learn how to design, lay out, and fabricate MEMS using CAD based design and visualization software. This course is part of the Minor in Microsystems and Nanotechnology.

Components: Laboratory, Class

Prereqs/Coreqs: P. GENENG 2340 or PHYSICS 1450 or PHYSICS 2340