

MICROELECTRONIC ENGINEERING

PROGRAM OVERVIEW FOR EMPLOYERS

RIT is pleased to offer the nation's oldest undergraduate degree program in Microelectronic Engineering. This ABET accredited program was initiated in 1982 in response to the growing shortage of engineers in semiconductor processing and design. The program provides a broad interdisciplinary background in device physics, material science, chemistry, computer science, electrical engineering, optics, imaging science, statistics, and semiconductor manufacturing. The Master of Engineering program graduated the first class in 1988 and the Master of Science program began in 1995. A five year dual degree program (BS Microelectronic Engineering/MS Material Science) is also available. This program also prepares students to work in emerging technologies such as nanotechnology, microelectromechanical (MEM) devices and Microsystems. The co-op requirement enhances student knowledge acquired in the classroom and the laboratory.

Minor in Microelectronics and Nanofabrication

This minor is designed to provide basic knowledge to non-microelectronic engineering students from math & statistics, science, and other engineering disciplines whose career plans involve the semiconductor industry. This minor also prepares students to pursue graduate studies in Microsystems Engineering, research in semiconductor applications, and nanotechnology. Students take at least five courses that include microlithography, IC technology and thin film processes.

Degree(s) Awarded

Bachelor of Science, Master of Science, Master of Engineering, Bachelor of Science/Master of Science (Microelectronic Engineering/Material Science), Doctor of Philosophy in Microsystems.

Enrollment

Approximately: 100 students enrolled in Bachelor of Science; 20 students enrolled in Master of Science or Master of Engineering; 10 enrolled in BS/MS, 35 students enrolled in Doctor of Philosophy.

Cooperative Education Component

All undergraduate students are required to complete 5 co-op work assignments. BS/MS students complete 4 co-op work periods. Students typically co-op for 6 months; 3 month assignments are available. Students pursuing a ME degree are required to complete an internship.

Salary Information Average/Range

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|--------|------------------|---------------------|
| Co-op: | Average: \$19.50 | \$11.00 - \$26.00 |
| BS: | | \$61,000 - \$75,000 |
| MS/ME: | | \$60,000 - \$90,000 |

Equipment & Facilities

Semiconductor and Microsystems Fabrication Laboratory (SMFL). A 56,000 square foot laboratory opened in 1986 – class 10 and class 100 clean rooms; labs; and classrooms. IC lab includes 4&6" wafer processing facility, maskmaking, test and evaluation rooms, chemical and gas storage, gowning and line maintenance.

Capabilities include electron beam lithography, chemical vapor deposition, plasma etching, ion implantation, diffusion, photolithography, metallization, surface analysis and electrical testing. An expansion of the SMFL has been dedicated to applied research and development work in Microsystems; which includes integrated microelectronics, MEMS, and photonic devices.

Accreditation

The microelectronic engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, Telephone (410) 347-7700.

Student Skills & Capabilities

End of Second Year: Clean room experience (approximately 200 hours). Understanding of semiconductor and IC fabrication and design of experiments. Useful to a process engineer in assisting with projects.

Middle of Third Year: Understand basic diode and transistor circuits. Enhanced understanding of ion implant, physical vapor deposition and plasma etch.

End of Third Year: Understand the inner workings of MOS devices and analog and digital integrated circuits.

Middle of Fourth Year: Able to work independently on projects in diffusion, oxidation or ion-implant areas.

End of Fourth Year: Well prepared to work independently on projects in diffusion, oxidation, ion-implant, chemical vapor deposition or lithography areas. Understand design of microchips and operation of semiconductor devices. Understand the interaction of light with materials including reflections from multilayer substrates.

Middle of Fifth Year: Understand and prepared to work independently in the manufacture of today's IC's.

End of Fifth Year: Prepared for engineering positions in process, process development, device, test, product, quality assurance, applications, etc. Students develop skills to carry out independent design/research and communicate in a technical forum. Students are ready to go on to top graduate schools.

Microelectronic Engineering

Course Sequence BS degree

First Year

Intro to Microelectronics
Intro to Microlithography
College Chemistry
Calculus I - III
University Physics I, II with Labs
Digital Systems
Liberal Arts
First Year Enrichment
Writing

Second Year

Circuit I with Lab
Design of Experiments
I.C. Technology
Semiconductor Devices I
Differential Equations
Engineering Mathematics
Statistics for Engineers
University Physics III & Lab
Modern Physics
Free Elective
Intro to Programming
Multivariable Calculus

Third Year

Circuits II
Electronics I, II with Labs
Semiconductor Devices II
Linear Systems
Electromagnetic Fields
Liberal Arts

Fourth Year

VLSI Design
Microlithography Systems with Lab
Silicon Process
Thin Film Processes
Optics
Liberal Arts
Free Elective

Fifth Year

Senior Design Project I & II
Microlithography Materials and Processes with Lab
CMOS Processing
Free Elective
Professional Electives I & II
Liberal Arts

Selected Employers of Microelectronic Engineering Co-op and Graduating Students:

Analog Devices, ASML, BAE, Eastman Kodak, Fairchild Semiconductor, Freescale, GE, Global Foundries, IBM, Smart System Technology Commercialization Center, Intel Corporation, KLA, L-3 Communications, Microchip, Micron Technology, National Semiconductor, Northrop Grumman, Samsung, Sandia National Labs, Texas Instruments.

Contact Us:

We appreciate your interest in hiring RIT co-op, graduating students or alumni. We will make every effort to make your recruiting endeavor a success. Call our office and ask to speak with Maria Pagani Wiegand or Maureen Arquette, the program coordinators who work with the Microelectronic Engineering program. For your convenience, you can access information and services through our web site at <http://www.rit.edu/recruit>.

Maria Pagani Wiegand/Maureen P. Arquette

Program Coordinators

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