POST GRADUATE DIPLOMA

SKILL
Scientific Knowledge for International Learning and Leadership

DEPARTMENT OF SKILL DEVELOPMENT
RAYAT-BAHRA UNIVERSITY
Chandigarh-Ropar NH 205
Greater Mohali, Punjab, India 140103

RAYAT-BAHRA UNIVERSITY

Admissions Hotline
+91-932-414-0446

SEMICONDUCTOR PG DIPLOMA

Eligibility

- Bachelor's degree in
  - Computer Science
  - Computer Engineering
  - Chemistry
  - Electronics
  - Electrical Engineering
  - Material Science
- Fluent English Speaking
- Interview based selection

Program Highlights

- Internationally recognized faculty
- Duration of certification: 1 year
- A high-tech sector with global opportunities
- Hands on practical training
- 3 months in USA at Rochester Institute of Technology, Rochester, New York
- Internship possibilities with leading semiconductor companies

ADMISSION OPEN FOR 2023-2024

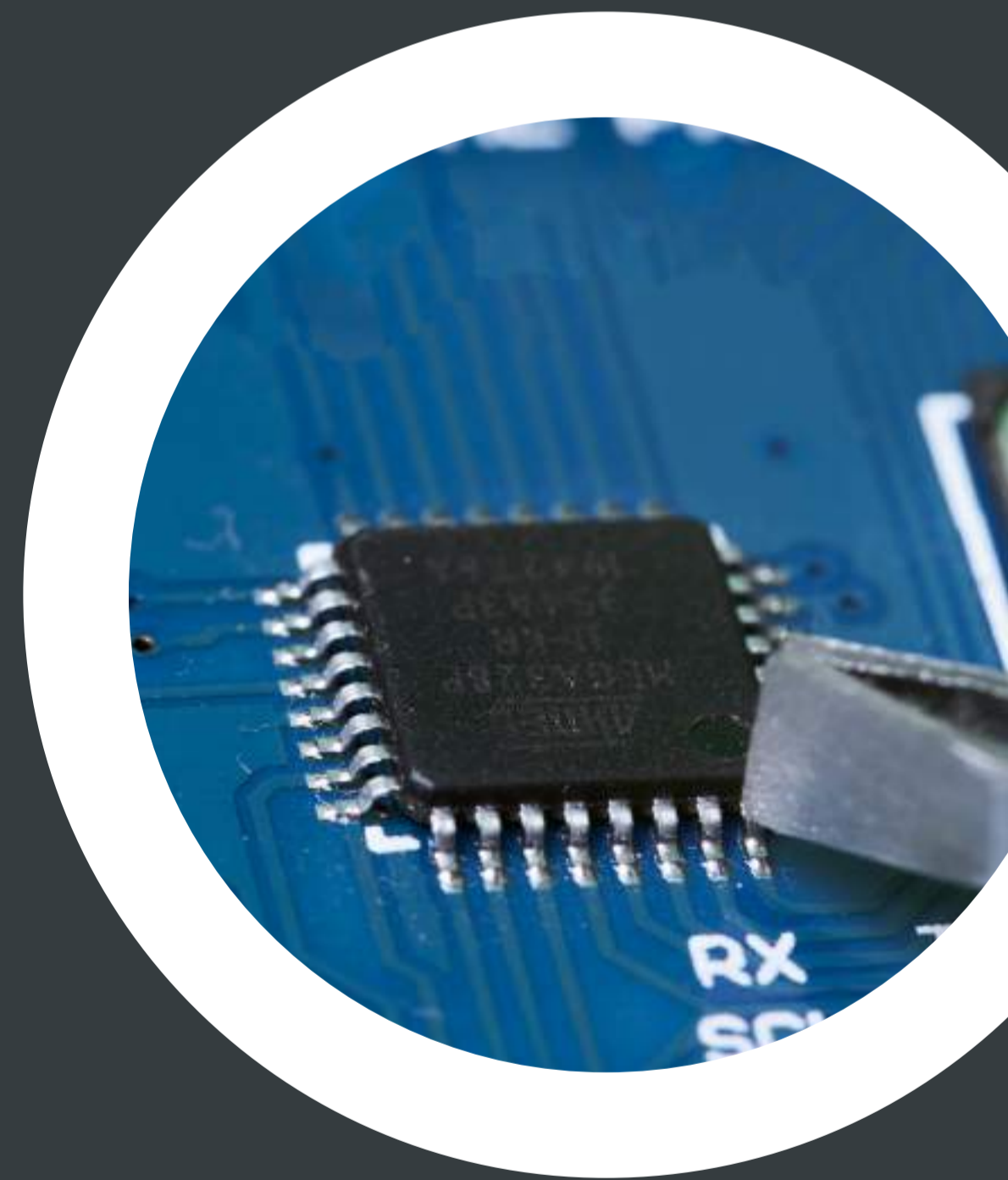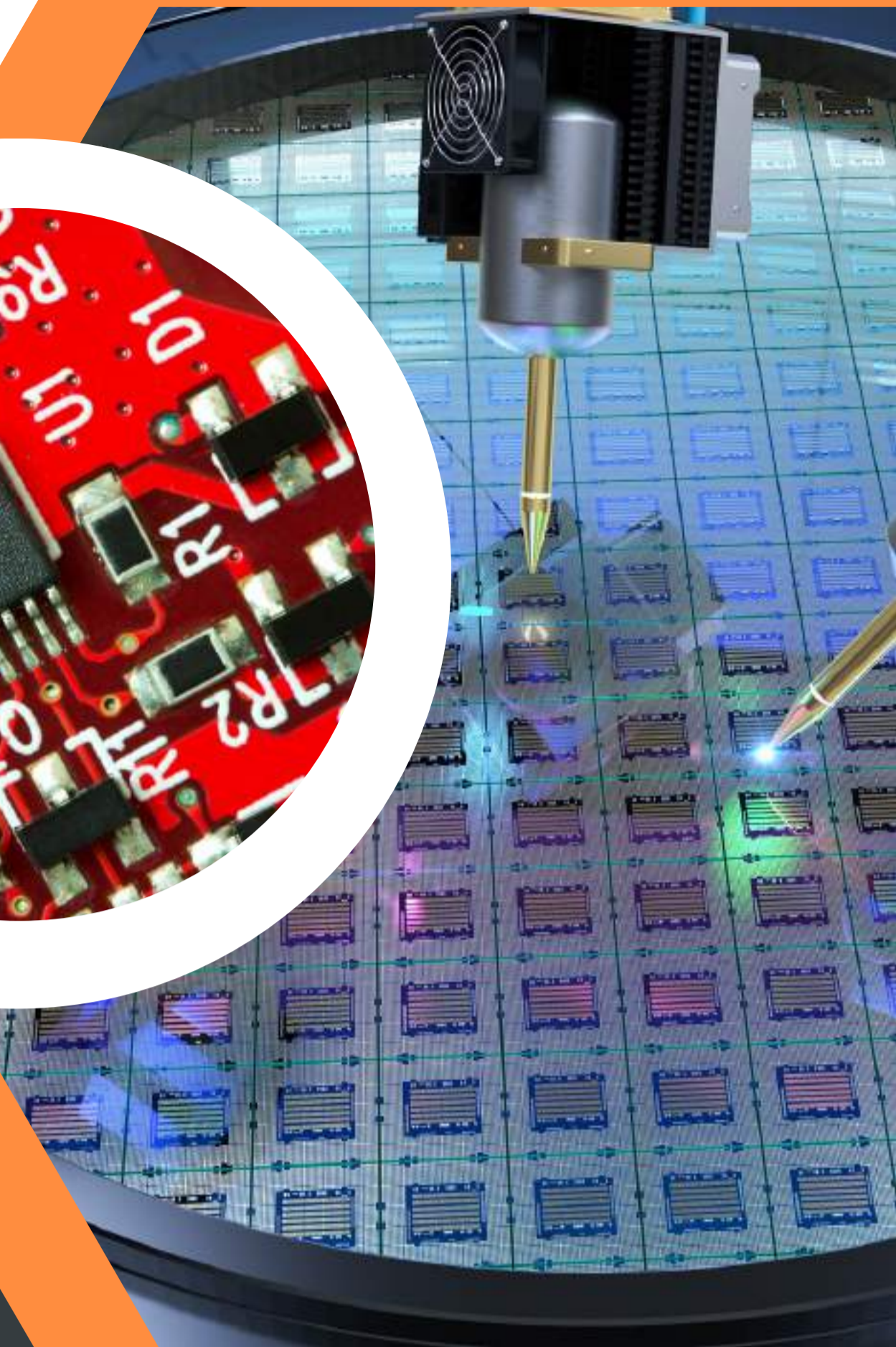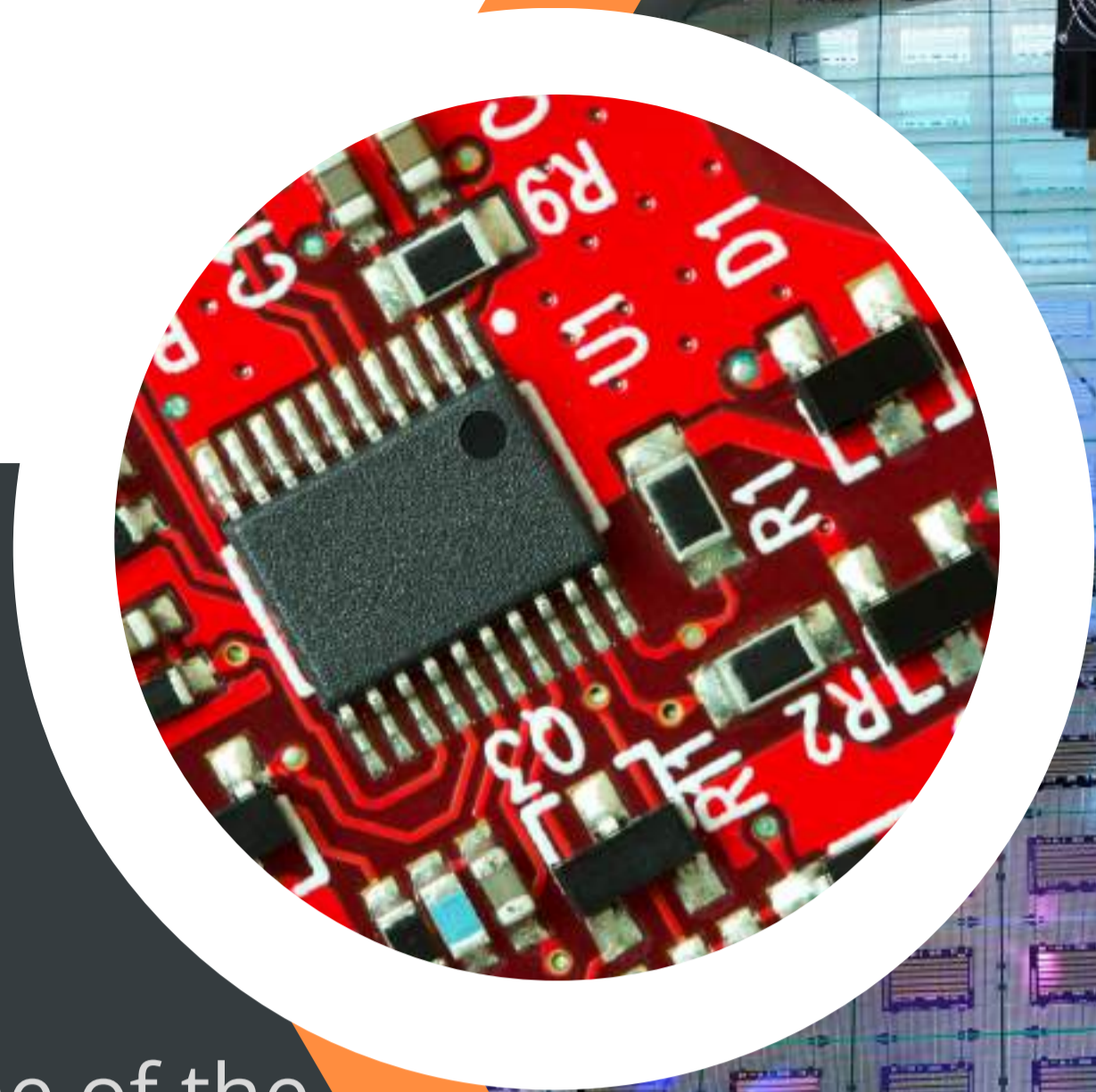## THE ONE-YEAR PG DIPLOMA WILL OFFERS EXCEPTIONAL EDUCATION

The program offers an interactive curriculum, practical learning at our partner university labs of Rochester Institute of Technology with an exceptional teaching faculty.

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SEMICONDUCTOR PG DIPLOMA

Semiconductor PG DIPLOMA is one of the best high-tech program to choose from that offers in-depth learning for the field of Semiconductor. Together our partners, Rochester Institute of Technology in Rochester, New York, USA the certification is one of a kind in India.

BECOME THE NEXT GENERATION OF HIGH-TECH ENGINEER

The one-year PG Diploma will offers exceptional education quality first at Rayat-Bahara campus and then a high-end practical learning at Rochester Institute of Technology and finally ample internship opportunities with leading semiconductor companies globally.

CONTACT US

ajuba

RAYAT-BAHRA UNIVERSITY
Chandigarh

www.ajuba.us

www.rayatbahrauniversity.edu.in

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PROGRAM BENEFITS

The program offers an interactive curriculum, practical learning at the labs of Rochester Institute of Technology with an exceptional teaching faculty.

- **A high-tech certification with opportunities globally with leading semiconductor companies.**

- **A new emerging sector in India with great potential with multinational companies opening their manfucturing plants in India.**

- **Learn from the best faculty members**

- **High-end labs to facilitate learning at Rochester Institute of Technology**

- **Excellent internship followed with job placement after completion.**

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Chandigarh

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IN THE PROGRAM, THE FOCUS IS ON HIGH-TECH ENGINEERS

Exceptional employment possibilities

Exceptional employment possibilities due to semiconductor industry growth and the prevalence of integrated circuits embedded in everything from gaming systems, computing, automobiles, aviation, data science, and encryption to autonomous technologies, advanced computing technologies, and artificial intelligence. An emerging sector in India

A High-Tech Sector

Be part of the high-tech Semiconductor and get employed by the industry leaders

Hands-on learning

Learning in an exclusive, state-of-the-art micro- and nano-fabrication facility with equipment rarely found in a university setting.

Advanced education options after certification

·Join Master's program at RIT which offers high-demand, high-impact degree in the areas such as micro-electro-mechanical systems and sensors, photovoltaics, advanced semiconductor devices, and photonics.

Personalized, high-touch mentoring

Mentoring by dedicated faculty members who know their students and offer individual course, career, and professional advising.

Average Salaries

Field Application Engineer yearly pay in the United States is approximately $97,425, which meets the national average.

Internship

Get Intership possibilities in USA, Canada, Israel, Taiwan, South Korea and India with our partners

TYPICAL JOBS

Semiconductor Engineer   Manufacturing Yield Engineer   Process Integration Engineer

Equipment Engineer   Field Applications Engineer   Photolithography Engineer

Process Engineer   Customer Service Engineer   Device Engineer

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ROCHESTER INSTITUTE OF TECHNOLOGY
R·I·T
1829

Our Partner

ABOUT ROCHESTER INSTITUTE OF TECHNOLOGY

Founded in 1829, Rochester Institute of Technology is a diverse and collaborative community of engaged, socially conscious, and intellectually curious minds. Through creativity and innovation, and an intentional blending of technology, the arts and design, we provide exceptional individuals with a wide range of academic opportunities, including a leading research program and an internationally recognized education for deaf and hard-of-hearing students. With over 19,000 students and more than 135,000 graduates from 50 states and over 100 nations, RIT is driving progress in industries and communities around the world. At RIT, we are always on to something amazing.
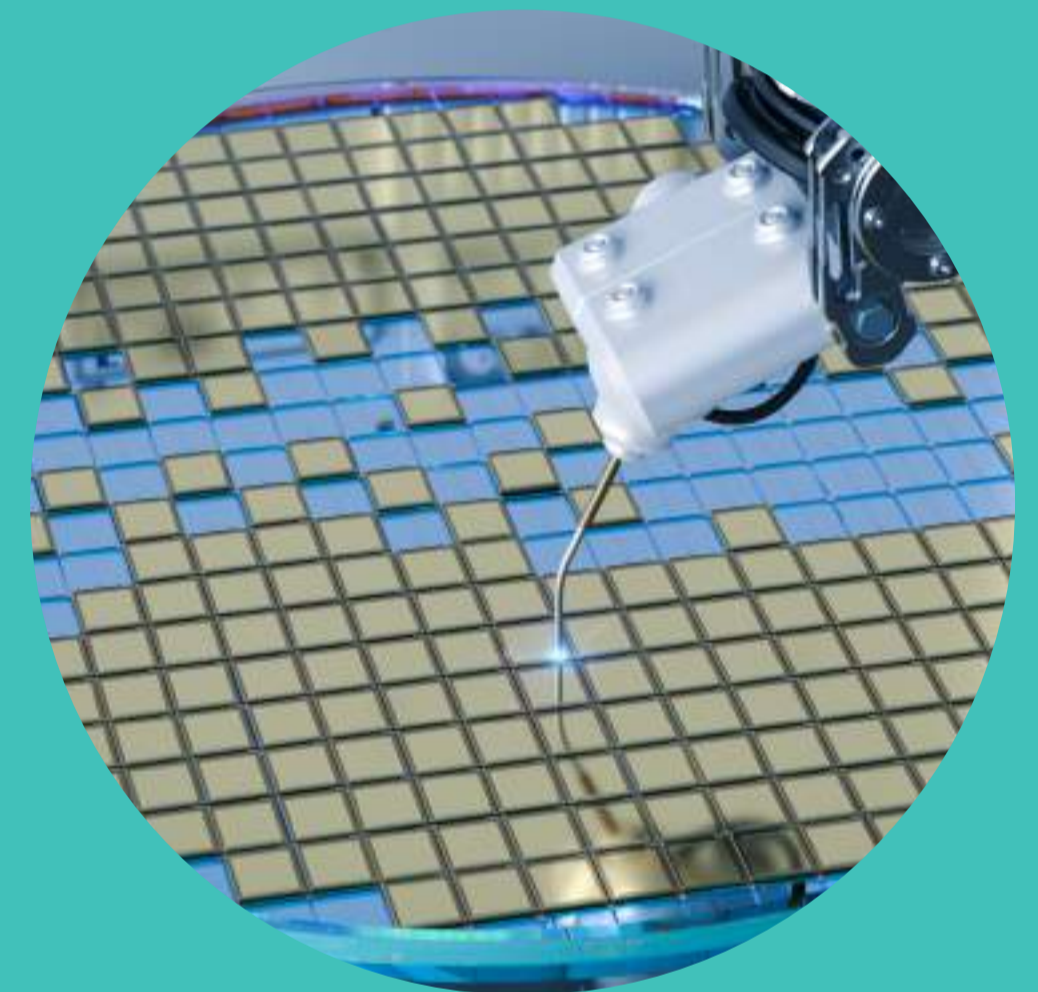
The Microelectronic Engineering program of Rochester Institute of Technology is the only accredited Bachelor of Science degree of its kind in the U.S. and is considered a world leader in the education of semiconductor process engineers.

Program facilities and equipment

Students are exposed to the Semiconductor and Microsystems Fabrication Laboratory (SMFL). A 56,000 sq. ft. the lab opened in 1986—class 10 and class 100 cleanrooms; labs; & classrooms. IC lab includes a CMOS wafer processing facility, mask-making, test & evaluation rooms, chemical & gas storage, gowning & line maintenance. Capabilities include chemical vapor deposition, plasma etching, ion implantation, diffusion, photolithography, metallization, surface analysis & electrical testing. An expansion of the SMFL has been dedicated to applied research & development work in Microsystems; which includes integrated microelectronics, MEMS, and photonic devices.

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PROGRAM OUTLINE

MONTH 1

- SEMI-101: Introduction to Nanoelectronics
- GEN-501: Strength, Weakness and Skill Development
- GEN-503: Communications

MONTH 2

- SEMI-201: IC Technology
- GEN-502: Value and Ethics at Workplace
- GEN-503: Communications

MONTH 3

- SEMI-202: Statistics and Design of Experiments
- GEN-504: Teamwork
- GEN-503: Communications

MONTH 4

- SEMI-301: Digital Electronics
- GEN-505: Positive and Professional Attitude
- INT-604: Visa Preparations

MONTH 5

- SEMI-302: Semiconductor Devices
- GEN-506: Stress Management at Work
- INT-604: Visa Preparations

MONTH 6

- SEMI-401: Thin Films
- GEN-507: Conflict Resolution at Work
- INT-604: Visa Preparations

SKILL PROGRAM OUTLINE

MONTH 7

- SEMI-402: Lithography Materials and Processes
- GEN- 508: SKILL Connections
- INT-603: Resume Builder

MONTH 8

- SEMI-403: Microelectronics Manufacturing
- GEN- 508: SKILL Connections
- INT-603: Resume Builder

MONTH 9

- SEMI-404: Microelectronics Research Methods
- GEN- 508: SKILL Connections
- INT-603: Resume Builder

MONTH 10

- GEN- 508: SKILL Connections
- INT-605: Travel and Trip Prep
- SPEC-701: RIT Short Course (Class and Lab)

MONTH 11

- SPEC-701: RIT Short Course (Class and Lab)
  A 10 week short course at Rochester Institute of Technology, Rochester, New York, USA

MONTH 12

- SPEC-701- RIT Short Course (Class and Lab)
  A 10 week short course at Rochester Institute of Technology, Rochester, New York, USA

MONTH 13 ONWARDS

- A paid six month internship

PROGRAM OUTLINE

SEMI-101 INTRODUCTION TO NANOELECTRONICS

- An overview of semiconductor technology history and future trends is presented.
- The course introduces the fabrication and operation of silicon-based integrated circuit devices including resistors, diodes, transistors and their current-voltage (I-V) characteristics.
- The course also introduces the fundamentals of nanolithography, with topics such as IC masking, sensitometry, radiometry, resolution, photoresist materials and processing. Laboratory teaches the basics of IC fabrication, photolithography and I-V measurements.

SEMI-201 IC TECHNOLOGY

- An introduction to the basics of integrated circuit fabrication.
- The electronic properties of semiconductor materials and basic device structures are discussed, along with fabrication topics including photolithography diffusion and oxidation, ion implantation, and metallization.
- Students will understand the basic interaction between process design, device design and device layout.

SEMI-202 STATISTICS AND DESIGN OF EXPERIMENTS

- Statistics and Design of Experiments will study descriptive statistics, measurement techniques, SPC, Process Capability Analysis, experimental design, analysis of variance, regression and response surface methodology, and design robustness.
- The application of the normal distribution and the central limit theorem will be applied to confidence intervals and statistical inference as well as control charts used in SPC.
- Students will utilize software to implement experimental design concepts, analyze case studies and design efficient experiments.

SKILL PROGRAM OUTLINE

SEMI-301 DIGITAL ELECTRONICS

- This is an introductory course in digital MOS circuit analysis and design.
- The course covers the following topics:
  - (1) MOSFET I-U behavior in aggressively scaled devices;
  - (2) Static and dynamic characteristics of NMOS and CMOS inverters;
  - (3) Combinational and sequential logic networks using CMOS technology;
  - (4) Dynamic CMOS logic networks, including precharge-evaluate, domino and transmission gate circuits;
  - (5) Special topics, including static and dynamic MOS memory, and i interconnect RLC behavior.

SEMI-302 SEMICONDUCTOR DEVICES

- An extensive study of semiconductor physics, principles and device operation tied to realistic device structures and fabrication techniques.
- Topics include semiconductor fundamentals, pn junction diodes, metal-semiconductor junctions, metal-oxide-semiconductor field-effect transistors (MOSFETs), and bipolar junction transistors (BJT).

SEMI-401 THIN FILMS

- This course focuses on the deposition and etching of thin films of conductive and insulating materials for IC fabrication.
- A thorough overview of vacuum technology is presented to familiarize the student with the challenges of creating and operating in a controlled environment.
- Physical and Chemical Uapor Deposition (PUD & CUD) are discussed as methods of film deposition. Plasma etching and Chemical Mechanical Planarization (CMP) are studied as methods for selective removal of materials. Applications of these fundamental thin film processes to IC manufacturing are presented.

PROGRAM OUTLINE

SEMI-402 LITHOGRAPHY MATERIALS AND PROCESSES

- Microlithography Materials and Processes covers the chemical aspects of microlithography and resist processes.
- Fundamentals of polymer technology will be addressed and the chemistry of various resist platforms including novolac, styrene, and acrylate systems will be covered. Double patterning materials will also be studied.
- Topics include the principles of photoresist materials, including polymer synthesis, photochemistry, processing technologies and methods of process optimization.
- Also advanced lithographic techniques and materials, including multi-layer techniques for BARC, double patterning, TARC, and next generation materials and processes are applied to optical lithography.

SEMI-403 MICROELECTRONICS MANUFACTURING

- This course focuses on CMOS manufacturing. Topics include CMOS process technology, work in progress tracking, CMOS calculations, process technology, long channel and short channel MOSFET, isolation technologies, back-end processing and packaging.
- Topics include Lot tracking, query processing, data collection, lot history, cycle time, turns, CPK and statistical process control, measuring factory performance, factory modeling and scheduling, cycle time management, cost of ownership, defect reduction and yield enhancement, reliability, process modeling and RIT's advanced CMOS process.

SEMI-404 MICROELECTRONICS RESEARCH METHODS

- Research-related topics will be presented such as library search techniques, contemporary issues, ethics, patent considerations, small business opportunities, technical writing, technical reviews, effective presentations, etc.

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GEN-501: STRENGTH, WEAKNESS AND SKILL DEVELOPMENT

- Do you currently know your own strengths? Do you know how to cultivate your positive traits?
- Who we are as individuals and the unique skills we possess can change and grow throughout our lives, making us better people and employees.
- The first step in this growth process includes identifying traits and qualities about us and others.
- To improve, we must first understand ourselves and then consider how best to make change.

GEN-502: VALUE AND ETHICS AT WORKPLACE

- What connection do values and ethics have with business?
- What part do you as an employee play in a company's ethical practice? The straightforward truth in any business: if a company doesn't earn money, it won't stay open.
- Being able to make the right choices, whether in an easy circumstance or a difficult one, is a great soft skill to build. This is called being ethical.

GEN-503: COMMUNICATIONS

- Research-related topics will be presented such as library search techniques, contemporary issues, ethics, patent considerations, small business.
- Individuals who communicate well open the door for opportunities in both their career and personal life.
- Communication is an important soft skill that helps people get and maintain employment. Managers around the country look for employees who communicate well with others to positively grow their work environments.
- This course is designed to build your understanding of what it takes to be a good communicator, and to supply you with the knowledge to practice and use these skills in the workforce.
- s opportunities, technical writing, technical reviews, effective presentations, etc.

PROGRAM OUTLINE

GEN-504: TEAMWORK

- Teamwork is necessary for success in the workforce. Very few jobs exist where a person works entirely alone.
- In almost all careers, people work alongside others to accomplish a shared goal. Since most jobs require many types of interaction, teamwork is a crucial soft skill to possess. If a person works well with others, that tells an employer that the employee is valuable, and many employers work hard to retain valuable employees.

GEN-505: -POSITIVE AND PROFESSIONAL ATTITUDE

- Your internal thoughts and attitudes can impact your work environment. Employees who are motivated and have positive attitudes can make a bigger impact on company goals and provide better experiences for customers.
- Having a positive professional attitude makes you the type of person employers want to keep, as they know employees with healthy attitudes tend to be more dependable, helpful, and driven.

GEN-506: STRESS MANAGEMENT AT WORK

- Being able to manage stress in a healthy and productive way is an important skill that helps you navigate struggles in both your personal and professional life.
- By managing stress effectively, you show employers and customers that even though things can be tough, you know how to handle the situation without making things worse in the process.

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PROGRAM OUTLINE

GEN- 508: SKILL CONNECTIONS

- Students participate in experiential learning opportunities designed to launch them into their career.
- Speakers from various sectors will present their journey and sectors opportunities.

INT-601: INTERNSHIP PREPARATION

- This course will prepare students for both the job search and employment.
- Students will learn strategies for conducting a successful job search, including the preparation of resumes and cover letters; behavioral interviewing techniques and effective use of social media in the application process.

INT-602: INTERVIEWING SKILLS

- End-To-End Understanding of The Interview Process. the Goal Is the Perfect Your Interviewing Skills in An Effort to Secure a New Job.
- Learn how To Sell Your Knowledge, Skills, Experience, and Character to Demonstrate that You Are the Right Person for The Job.
- Soft-Skills that Will Help Them Stand out In an Interview. You Will Learn how To Create a Narrative that Will Help Sell Yourself for The Job.
- A Mastery of All Basis Interviewing Skills Including how To Develop a Power Presence for Your Interview.

PROGRAM OUTLINE

INT-603: RESUME BUILDER

- Understand the true purpose of a resume
- Understand how to eliminate "fluff" from a resume
- Develop the ability to analyze the needs of an employer, and match your resume to those needs
- Learn how to appropriately format a resume and create a visually impressive document
- Feel confident about the resume you have written! That confidence goes a LONG way in an interview

INT-604: VISA PREPARATIONS

- There is no shortcut to passing your visa interview and putting an effort for applying.
- Preparation for the visa application and practice answering for answering to the embassy interview questions.

SPEC-701 RIT SHORT COURSE

- This 10-week course provides a comprehensive, hands-on educational experience in integrated circuit process engineering through a combination of lectures and cleanroom based laboratories.
- Participants not only learn about semiconductor device structures and the processing steps to fabricate them, but are also exposed to CAD layout, mask making basics, IC testing, and SPC methodology as well. A four-level metal gate PMOS process is used to fabricate the student designs on Si wafers.