SEMICONDUCTOR ENGINEERING

for the Undergraduate minor in Semiconductor Engineering

Semiconductor engineering is a broad field which encompasses many areas of science and technology. The semiconductor industry relies on scientists and engineers having a broad swath of knowledge that spans multiple disciplines. Correspondingly, there are many possible directions in industry and research which share the same fundamentals but branch out into an extraordinarily diverse range of applications. The minor in Semiconductor Engineering brings together courses from across different academic departments to provide students with additional breadth and depth in the field that they would not be able to obtain through completion of their respective majors alone. Completion of the minor allows students to develop expertise in diverse areas of semiconductor design, manufacturing, and applications in order to meet the growing demands and expectations from the semiconductor industry.

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Students may fulfill the requirements for a minor in Semiconductor Engineering by completing the following course sequence with a minimum of 16 credit hours. At least six hours of coursework for the minor should be advanced (300-level or 400-level courses) and must be distinct from credit earned for the student's major or another minor. A minimum of two courses should be 400-level.

Students may apply up to 3 credit hours of independent study towards the "semiconductor elective courses" requirement of the minor, to enable them to pursue advanced topics under the guidance of a faculty member. Topics for the independent study must be approved by the minor's faculty oversight committee in order to apply towards the minor requirements. Students can contact the program advisor to learn how to get an independent study course approved.

Code	Title	Hours
Semiconductor Core Courses. Select 9 hours from list below.		**9**
ECE 340	Semiconductor Electronics	
or MSE 304	Electronic Properties of Matls	
IE 330	Industrial Quality Control	
or IE 361	Production Planning & Control	
ECE 444	IC Device Theory & Fabrication	
or ME 487	MEMS-NEMS Theory & Fabrication	
MSE 460	Electronic Materials I	
NPRE 429	Plasma Engineering	
ME 432	Fundamentals of Photovoltaics	
or ECE 443	LEDs and Solar Cells	
Semiconductor Elective courses. Select 7 hours from list below.		**7**
ECE 304	Photonic Devices	
ECE 441	Physcs & Modeling Semicond Dev	
ECE 442	Silicon Photonics	
ECE 460	Optical Imaging	
ECE 481	Nanotechnology	
ECE 488	Compound Semicond & Devices	
ECE 495	Photonic Device Laboratory	
IE 360	Facilities Planning and Design	
IE 412	OR Models for Mfg Systems	
IE 431	Design for Six Sigma	
SE 411	Reliability Engineering	
MSE 461	Electronic Materials II	
MSE 485	Atomic Scale Simulations	
MSE 487	Materials for Nanotechnology	
MSE 488	Optical Materials	
ME 453	Data Science in Manufacturing Quality Control	
ME 455	Micromanufacturing Process & Automation	
NPRE 321	Introduction to Plasmas and Applications	
NPRE 423	Plasma Laboratory	
PHYS 370	Introduction to Quantum Information and Computing	
PHYS 402	Light	
PHYS 404	Electronic Circuits	
PHYS 427	Thermal & Statistical Physics	
PHYS 460	Condensed Matter Physics	
PHYS 486	Quantum Physics I	
PHYS 487	Quantum Physics II	
Independent Study - Students may apply up to 3 credit hours towards this requirement, once approved.		
Total Hours		**16**

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Students earning the minor in Semiconductor Engineering will have:

1. A holistic view of the semiconductor industry from both a technical point of view and in the global societal context and how different engineering disciplines contribute to the field;
2. A rigorous foundation and broad competency in the field of semiconductors based on an understanding of the underlying physics, material properties, and manufacturability of semiconductor devices; and
3. A depth of knowledge in one area of semiconductor design, manufacturing, or applications to prepare them to meet the growing demands and expectations from the semiconductor industry.

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The Grainger College of Engineering **(**https://grainger.illinois.edu/**)**

Semiconductor Minor in Engineering **(**https://grainger.illinois.edu/academics/undergraduate/majors-and-minors/**)**

For more information regarding the Undergraduate minor in Semiconductor Engineering, contact Grainger Academic Advising Center (https://advising.grainger.illinois.edu/advising/college/) or by email (semiconductorminor@illinois.edu).