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			
ECE 304	Photonic Devices		
ECE 441	Physcs & Modeling Semicond Dev		
ECE 442	Silicon Photonics		
ECE 460	Optical Imaging		
ECE 481	Nanotechnology		

Το	Fotal Hours 16				
	Independent Study towards this requir	- Students may apply up to 3 credit hours ement, once approved.			
	PHYS 487	Quantum Physics II			
	PHYS 486	Quantum Physics I			
	PHYS 460	Condensed Matter Physics			
	PHYS 427	Thermal & Statistical Physics			
	PHYS 404	Electronic Circuits			
	PHYS 402	Light			
	PHYS 370	Introduction to Quantum Information and Computing			
	NPRE 423	Plasma Laboratory			
	NPRE 321	Introduction to Plasmas and Applications			
	ME 455	Micromanufacturing Process & Automation			
	ME 453	Data Science in Manufacturing Quality Control			
	MSE 488	Optical Materials			
	MSE 487	Materials for Nanotechnology			
	MSE 485	Atomic Scale Simulations			
	MSE 461	Electronic Materials II			
	SE 411	Reliability Engineering			
	IE 431	Design for Six Sigma			
	IE 412	OR Models for Mfg Systems			
	IE 360	Facilities Planning and Design			
	ECE 495	Photonic Device Laboratory			
	ECE 488	Compound Semicond & Devices			

Total Hours

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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).