

# ELECTRICAL ENGINEERING: SEMICONDUCTOR ENGINEERING, BS

The Semiconductor Engineering named option in Electrical Engineering prepares students for a career in electrical engineering with an emphasis on engineering semiconductor-based devices and systems. This named option provides guidance and recognition for students pursuing this career path. The option uses 20 of the elective credits within the 120-credit Electrical Engineering BS degree program to focus on the science, tools, and practices associated with semiconductor engineering. Students selecting this option must submit an option declaration form (<https://engineering.wisc.edu/programs/named-options/declaration/>) to the dean's office in Engineering Hall.

## REQUIREMENTS

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Code	Title	Credits
<b>Required Courses</b>		
Complete all:		
E C E 305	Semiconductor Properties Laboratory <sup>1</sup>	1
E C E 335	Microelectronic Devices <sup>2</sup>	3
E C E 548	Integrated Circuit Design <sup>2</sup>	3
E C E 549	Integrated Circuit Fabrication Laboratory <sup>2</sup>	4
Complete one:		3
E C E 445	Semiconductor Physics and Devices <sup>3</sup>	
E C E 466	Electronics of Solids <sup>3</sup>	
<b>Electives</b>		
Complete two courses:		6
E C E 342	Electronic Circuits II <sup>3</sup>	
M S & E 351	Materials Science-Structure and Property Relations in Solids (offered in Fall) <sup>3</sup>	
E C E 434	Photonics <sup>3, 4</sup>	
M S & E 434	Introduction to Thin-Film Deposition Processes (offered in Spring) <sup>3, 5</sup>	
E C E 445	Semiconductor Physics and Devices <sup>2, 3</sup>	
M S & E 456	Electronic, Optical, and Magnetic Properties of Materials (offered in Fall) <sup>3, 5</sup>	
E C E 466	Electronics of Solids <sup>2, 3</sup>	
E C E 535	Introduction to Quantum Sensing <sup>3</sup>	
E C E 536	Integrated Optics and Optoelectronics <sup>4, 5</sup>	

E C E 541	Analog MOS Integrated Circuit Design <sup>2, 3</sup>
E C E 542	Introduction to Microelectromechanical Systems <sup>2, 3</sup>
PHYSICS 551	Solid State Physics <sup>3</sup>
M S & E 553	Nanomaterials & Nanotechnology (offered in Spring) <sup>3, 5</sup>
E C E 555	Digital Circuits and Components <sup>2, 3</sup>

**Total Credits** **20**

<sup>1</sup> This course can be taken as an Advanced Elective - Laboratory.

<sup>2</sup> This course can be taken as an Advanced Elective in Circuits & Devices.

<sup>3</sup> This course can be taken as a Professional Elective.

<sup>4</sup> This course can be taken as an Advanced Elective in Fields and Waves.

<sup>5</sup> This course has additional requisites not required for the BS in Electrical Engineering.

## FOUR-YEAR PLAN

### FOUR-YEAR PLAN SAMPLE FOUR-YEAR PLAN

#### First Year

Fall	Credits Spring	Credits
MATH 221	5 E C E/COMP SCI 252	3
CHEM 103, 104, or 109	4-5 PHYSICS 201	5
E C E 210	2 MATH 222	4
or Communications A	Communications A or	3
Liberal Studies Elective	3 E C E 210	
<b>14-15</b>		<b>15</b>

#### Second Year

Fall	Credits Spring	Credits
PHYSICS 202	5 E C E 222	4
MATH 234	4 COMP SCI 300	3
E C E 203	3 E C E 230	4
Liberal Studies Elective	3 E C E 270	1
<b>15</b>		<b>12</b>

#### Third Year

Fall	Credits Spring	Credits
E C E/PHYSICS 235	3 ECE Advanced Elective	3
Statistics/Probability Elective	3 INTEREGR 397	3
E C E 340	3 E C E 305	1
E C E 271	1 E C E 335	3
E C E 330	3 Liberal Studies Elective	3
E C E/COMP SCI 352	3 Professional Elective (Adv Math)	3
<b>16</b>		<b>16</b>

#### Fourth Year

Fall	Credits Spring	Credits
Liberal Studies Elective	3 Professional Elective <sup>1</sup>	3
E C E 548	3 E C E 466 or 445	3
E C E 549	4 ECE Advanced Elective (4XX) <sup>1</sup>	3

EE Advanced Lab (3XX)	1 ECE Capstone Design	4
E C E 370	2 Liberal Studies Elective	3
Professional Elective <sup>1</sup>	3	
	<b>16</b>	<b>16</b>

**Total Credits 120-121**

<sup>1</sup> Replace at least two of these professional electives or advanced electives with courses from the Semiconductors electives list. Elective courses may have additional requisites.