

# Engineering Physics: Electrical Applications Option

## Bachelor of Science (BS)

# Electrical Applications Option

Engineering is the profession in which basic knowledge from the mathematical and natural sciences is applied to develop new ways to utilize the materials and forces of nature for the benefit of society. Physics is perhaps the most fundamental of the sciences. It involves the study of the nature of basic things such as motion, forces, energy, matter, heat, sound, light, and the atom.



Engineering physics is an interdisciplinary degree program combining the study of physics and engineering into one curriculum. Students acquire a deep knowledge of physical and mathematical principles and learn to apply this knowledge to meet the needs of society. The interdisciplinary nature of this program produces graduates who can work in many diversified fields and who can easily adapt their skills to the needs of employers.

The engineering physics program is an engineering program that is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>. This accreditation allows our seniors to take the Fundamentals of Engineering (FE) Exam, which is the first step to becoming a Registered Professional Engineer (PE) in Missouri and across the United States.

### Engineering physics students will...

- Have the ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.
- Have the ability to use the techniques, skills, and modern tools necessary for physics and engineering careers.
- Have the broad education necessary to understand the impact of physics and engineering solutions in a global, economic, environmental and societal context.

### Becoming Career Ready...

/ Faculty-mentored research and guidance will help you develop the professional skills needed for success in a competitive job market and/or advanced study in graduate and professional programs.

/ Electrical Applications graduates work in a wide range of sectors including aerospace, automotive, energy, IT and telecommunications. Examples of job titles include design engineer, electrical engineer, electronics engineer and systems analyst.

/ 100% of Southeast programs offer real-world experience. Electrical Applications students earn this experience through using modern tools used throughout the curriculum that are necessary for physics and engineering careers. Students may also do an internship to gain more experience in the field.

/ The path to a successful career starts with you! You can maximize your career development by working closely with Career Services and Southeast faculty – they are here to help you connect your passions, interests and skills to jobs and opportunities in the field. Career Services provides professional career counseling and coaching, resume critiques, practice interviews, job search strategies, career events, networking opportunities and more.

### Internship and Employment Opportunities of Recent Graduates:

- Century Link Technology Solutions
- National Information Solutions Cooperative
- TG Missouri
- Schaefer's Electrical Enclosures
- Southeast Missouri State University
- Southeast Hospital
- BIS Industrial Services
- Honeywell F M & T
- Lighting Science Group Corporation
- Wright Patterson Air Force Base
- Boeing
- Lockheed Martin
- NASA
- National Geospatial Intelligence Agency
- Raytheon
- Rockwell Collins
- GeoEye, Inc.

### Graduate Schools and Programs of Recent Graduates:

- University of Arkansas – MicroEP Program
- Washington University – Physics
- University of Missouri – Aerospace Engineering
- University of Missouri – Physics
- Boise State University – Biomedical Engineering
- University of Kansas – Biomedical Engineering
- Southern Illinois University at Edwardsville - Comp. Engr.
- University of North Texas – Physics
- Purdue University – Aerospace Engineering
- University of Illinois – Electrical Engineering
- University of Michigan – Biomedical Engineering

### Admission Requirements

A high school student interested in majoring in engineering physics should complete four years of mathematics that include trigonometry and an introduction to calculus. Four years of science, which include both chemistry and physics, is highly recommended. A strong background in English is essential.

### Transfer and Dual Credit Students

If you have dual credit or transfer credit, please visit our transfer course equivalencies guide at [semo.edu/transfercredit](http://semo.edu/transfercredit).



**To learn more**  
 Office of Admissions  
 (573) 651-2590  
[admissions@semo.edu](mailto:admissions@semo.edu)  
[semo.edu](http://semo.edu)

**To explore**  
 the College of Science, Technology,  
 Engineering and Mathematics  
 online, visit  
[semo.edu/stem](http://semo.edu/stem)

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This is a guide based on the 2021-2022 Undergraduate Bulletin and is subject to change. The time it takes to earn a degree will vary based on several factors such as dual enrollment, remediation, and summer enrollment. Students will meet with an academic advisor each semester and use Degree Works to monitor their individual progress.

### CURRICULUM CHECKLIST

*"Critical Courses" are italicized and bolded. Data shows that students who have completed this course in the first two years and have earned the noted grade are most likely to complete this program of study.*

#### Engineering Physics: Electrical Applications Option – 66 Hours

A grade of 'C' or better is required in each course that is a prerequisite course.

##### Required Courses:

- \_\_\_ EP 100 Introduction to Engineering (3)
- \_\_\_ EP 240 Circuit Analysis I (3)
- \_\_\_ EP 242 Circuit Analysis (3)
- \_\_\_ EP 261 Engineering Mech: Statics (3)
- \_\_\_ EP 262 Engineering Mech: Dynamics (3)
- \_\_\_ EP 263 Mechanics of Materials (4)
- \_\_\_ EP 305 Digital System Design (3)
- \_\_\_ EP 310 Microcontroller/Embedded Systems (3)
- \_\_\_ EP 340 Electronic Circuits (3)
- \_\_\_ EP 361 Engineering Thermodynamics (3)
- \_\_\_ ET 365 Industrial Electric Power (3)
- \_\_\_ EP 372 Signals and Systems (3)
- \_\_\_ EP 374 Control Systems (3)
- \_\_\_ EP 462 Materials Science (3)
- \_\_\_ EP 480 Capstone Design I (2)
- \_\_\_ EP 481 Capstone Design II (2)
- \_\_\_ PH 230 General Physics I (5)
- \_\_\_ PH 231 General Physics II (5)
- \_\_\_ PH 345 Experimental Methods I (3)
- \_\_\_ PH 360 Modern Physics (3)
- \_\_\_ PH 371 Electromagnetics (3)

##### Additional Requirements:

A grade of 'C' or better is required in each course that is a prerequisite course.

This sequence of mathematics courses constitutes a minor, but it must be declared.

- \_\_\_ CH 184 General Chemistry I Lab (1)
- \_\_\_ CH 185 General Chemistry (3)
- \_\_\_ **MA 140 Analytic Geometry & Calculus I (5)**
- \_\_\_ MA 145 Analytic Geometry & Calculus II (4)
- \_\_\_ MA 223 Elementary Probability & Statistics (3)
- \_\_\_ MA 244 Analytic Geometry & Calculus III (4)
- \_\_\_ MA 350 Differential Equations (3)
- \_\_\_ MN 120 Fund of Engr Design Processes (3)

##### Choose 3 hours:

- \_\_\_ EC 215 Principles of Microeconomics (3)
- \_\_\_ MN 220 Engineering Economic Analysis (3)

**NOTE: Seniors are required to take the Fundamentals of Engineering Exam in their last semester.**

**General Education Requirements** – some requirements may be fulfilled by coursework in major program

- Social and Behavioral Sciences – 6 hours
- Constitution Requirement – 3 hours
- Written Communication – 6 hours
- Oral Communication – 3 hours
- Natural Sciences – 7 hours (from two disciplines, one to include a lab)
- Mathematics – 3 hours
- Humanities & Fine Arts – 9 hours (from at least two disciplines)
- Additional requirements – 5 hours (to include UI100 for native students)
- Civics examination

\*Many major courses are on a set rotation and dependent on when prerequisites are completed. The actual semester a course is taken may vary based on the rotation.

### SAMPLE FOUR-YEAR PLAN

	Fall Semester		Spring Semester	
	Course #	Hrs	Course #	Hrs
<b>FIRST YEAR</b>	UI100	1	CH184/CH185	4
	EC215/MN220	3	EN100	3
	EP100	3	MA145	4
	<b>MA140</b>	5	PH230/030	5
	General Education	3		
	<b>Total</b>	<b>15</b>	<b>Total</b>	<b>16</b>
<b>SECOND YEAR</b>	EP261	3	EP240	3
	MA244	4	EP262	3
	MN120	3	EP263	4
	PH231/031	5	EP305	3
			MA350	3
	<b>Total</b>	<b>15</b>	<b>Total</b>	<b>16</b>
<i>(Summer courses are encouraged to avoid 18-hour semesters.)</i>				
<b>THIRD YEAR</b>	EP242	3	EP340	3
	EP310	3	EP462	3
	EP361	3	ET365	3
	PH345	3	General Education	3
	PH360	3	General Education	3
	<b>Total</b>	<b>15</b>	<b>Total</b>	<b>15</b>
<b>FOURTH YEAR</b>	EP372	3	EP374	3
	EP480	2	EP481	3
	MA223	3	General Education	3
	PH371	3	General Education	3
	General Education	3	General Education	3
	<b>Total</b>	<b>14</b>	<b>Total</b>	<b>15</b>

**Degree requirements for all students:** a minimum of 120 credit hours, completion of the General Education program, and completion of 39 senior division hours (300-599). Refer to the Undergraduate Bulletin or Degree Works for additional graduation requirements for your program.

Revised  
6/16/2021