

# Engineering Physics: Mechanical Applications Option

## Bachelor of Science (BS)

# Mechanical Applications Option

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 is the profession in which basic knowledge from mathematical and natural sciences is applied to develop new ways to utilize the materials and forces of nature for the benefit of society.



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

The engineering physics program is an engineering program that is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>, which is the agency that accredits all engineering programs in the United States. Our seniors take the Fundamentals of Engineering (FE) Exam, which is the first step to becoming a Registered Professional Engineer (PE). About 85% of our seniors pass this exam, which is well above the national average.

### Engineering Physics students will...

- Obtain a thorough understanding of the fundamental principles of science and mathematics underlying engineering and be able to apply them to meet the needs of society.
- Have the ability to design a system, component or process to meet needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- Use the techniques, skills, and modern tools necessary for physics and engineering careers.
- Have the broad education to understand the impact of physics and engineering solutions in a global, economic, environmental, and societal context.
- Be prepared to pass the FE Exam.

### Career Planning

Career preparation is part of the mission of Southeast. In fact, more than 90% of Southeast students participate in internships, clinical opportunities, student teaching, research assistantships, and study abroad. All graduates find employment in their field or start the graduate programs of their choice within a few months of graduation.

Professional career counselors are available for all students. The Office of Career Services in Academic Hall 057 can provide students with professional career counseling, resume critiques, practice interviews, job search strategies, career events, networking opportunities, and more.

| Demonstrated Career Proficiency is a Requirement of all Southeast Students |                |                                                                                                                                                                                                                                     |
|----------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CL001/CL002                                                                | First Semester | Complete the FOCUS2 assessment and develop a Career Action Plan.                                                                                                                                                                    |
| CL003                                                                      | Junior Year    | Students gain information about career planning and job searching resources.                                                                                                                                                        |
| CL004                                                                      | Senior Year    | Students demonstrate advanced proficiency by identifying a position in their field, developing a cover letter, and tailoring a resume for the position. Materials are critiqued to ensure preparedness for a successful job search. |

### 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 includes trigonometry and an introduction to calculus. Four years of science, which includes both chemistry and physics is highly recommended. A strong background in English is essential.

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

**To explore the College of Science, Technology, and Agriculture online, visit**  
[www.semo.edu/costa](http://www.semo.edu/costa)

**For advising**  
College of Science, Technology, and Agriculture  
Advising Center  
(573) 651-5930  
[costaadvising@semo.edu](mailto:costaadvising@semo.edu)  
[www.semo.edu/costa/advising](http://www.semo.edu/costa/advising)

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This is a guide based on the 2015-2016 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 DegreeWorks to monitor their individual progress.

### CURRICULUM CHECKLIST

#### Engineering Physics: Mechanical Applications – 61 hours

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

- \_\_\_ EP100 Physics and Engineering Concepts (1)
- \_\_\_ EP240 Circuit Analysis (4)
- \_\_\_ EP261 Engineering Mechanics - Statics (3)
- \_\_\_ EP262 Engineering Mechanics - Dynamics (3)
- \_\_\_ EP263 Mechanics of Materials (4)
- \_\_\_ EP340 Electronic Circuits (4)
- \_\_\_ EP361 Thermal Analysis (3)
- \_\_\_ EP363 Thermal Fluid Engineering (3)
- \_\_\_ EP372 Signals and Systems (3)
- \_\_\_ EP374 Control Systems (3)
- \_\_\_ EP380 Engineering Design and Research (1)
- \_\_\_ EP462 Materials Science (3)
- \_\_\_ EP480 Capstone Design (1)
- \_\_\_ MN350 Machine Design (3)
- \_\_\_ PH230/030 General Physics I (5)
- \_\_\_ PH231/031 General Physics II (5)
- \_\_\_ PH360 Modern Physics (3)
- \_\_\_ PH371 Electromagnetics (3)
- \_\_\_ UI330 Experimental Methods (3)
- \_\_\_ UI450 Capstone Experience (3)

#### Support Courses:

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.

- \_\_\_ CH185/085/005 General Chemistry (5)
- \_\_\_ CS177 Programming for Scientists and Engineers (3)
- \_\_\_ **MA140 Analytic Geometry and Calculus I (5)**
- \_\_\_ MA145 Analytic Geometry and Calculus II (4)
- \_\_\_ MA244 Analytic Geometry and Calculus III (4)
- \_\_\_ MA345 Linear Algebra (3)
- \_\_\_ MA350 Differential Equations (3)
- \_\_\_ MN120 Fundamentals of the Engineering Design Process (3)

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

#### University Studies Requirements (not already listed above):

UI100 First Year Seminar, EN100 English Composition, Artistic Expression, Written Expression, Oral Expression, Literary Expression, Behavioral Systems, Living Systems, Development of a Major Civilization, Economic Systems, Political Systems, Social Systems, and one IU/UI3XX

### SAMPLE FOUR-YEAR PLAN

|                                                            | Fall Semester       |              | Spring Semester        |     |
|------------------------------------------------------------|---------------------|--------------|------------------------|-----|
|                                                            | Course #            | Hrs          | Course #               | Hrs |
| <b>FIRST YEAR</b>                                          | UI100               | 3            | EN100                  | 3   |
|                                                            | CH185/085/005       | 5            | MA145                  | 4   |
|                                                            | CS177               | 3            | MN120                  | 3   |
|                                                            | EP100               | 1            | PH230/030              | 5   |
|                                                            | <b>MA140</b>        | 5            |                        |     |
| <b>Total</b>                                               | <b>17</b>           | <b>Total</b> | <b>15</b>              |     |
| Milestone: maintain 2.0 cumulative GPA                     |                     |              |                        |     |
| <b>SECOND YEAR</b>                                         | EP261               | 3            | EP240                  | 4   |
|                                                            | MA244               | 4            | EP262                  | 3   |
|                                                            | MA345               | 3            | EP263                  | 4   |
|                                                            | PH231/031           | 5            | MA350                  | 3   |
|                                                            |                     |              | Written Expression     | 3   |
| <b>Total</b>                                               | <b>15</b>           | <b>Total</b> | <b>17</b>              |     |
| Milestone: maintain 2.0 cumulative GPA                     |                     |              |                        |     |
| (summer courses are encouraged to avoid 18 hour semesters) |                     |              |                        |     |
| <b>THIRD YEAR</b>                                          | EP361               | 3            | EP340                  | 4   |
|                                                            | PH360               | 3            | EP363                  | 3   |
|                                                            | UI330               | 3            | EP380                  | 1   |
|                                                            | Artistic Expression | 3            | EP462                  | 3   |
|                                                            | Literary Expression | 3            | MN350                  | 3   |
|                                                            | Oral Expression*    | 3            | Behavioral Systems     | 3   |
| <b>Total</b>                                               | <b>18</b>           | <b>Total</b> | <b>17</b>              |     |
| Milestone: maintain 2.0 cumulative GPA                     |                     |              |                        |     |
| <b>FOURTH YEAR</b>                                         | EP372               | 3            | EP374                  | 3   |
|                                                            | EP480               | 1            | UI450                  | 3   |
|                                                            | PH371               | 3            | Develop of a Major Civ | 3   |
|                                                            | Economic Systems    | 3            | Political Systems      | 3   |
|                                                            | Living Systems      | 3            | Social Systems         | 3   |
|                                                            | IU/UI3XX            | 3            |                        |     |
| <b>Total</b>                                               | <b>16</b>           | <b>Total</b> | <b>15</b>              |     |
| Milestone: maintain 2.0 cumulative GPA                     |                     |              |                        |     |

A "Milestone" signifies a significant stage for a student in the completion of a degree.

\*SC105 highly recommended by department

**Degree requirements for all students:** a minimum of 120 credit hours, completion of University Studies program, career proficiencies (CL001-004), Writing Proficiency Exam (WP003), and completion of the Measure of Academic Proficiency and Progress (MAPP) at the senior level.

Refer to the Undergraduate Bulletin or DegreeWorks for additional graduation requirements (i.e. minimum GPA and coursework) for your program of study.

Revised  
3/19/2015