

# BACHELOR OF SCIENCE

## Dual-Degree Physics

[www.emporia.edu/physics](http://www.emporia.edu/physics)

### Dual Degree Engineering (DDP)

Offered in conjunction with the University of Kansas & Kansas State University (Biological and Agricultural, Civil, Electrical and Computer, Industrial and Manufacturing Systems, & Mechanical Engineering)

The dual-degree program in engineering allows a student to complete all of the requirements for the degree of bachelor of science in physics, including all major requirements as well as those in general education, in three years and a summer of residence at Emporia State University. All that remains after the third year is to meet the requirement of 124 semester hours to graduate from ESU. The dual-degree program permits the student to transfer back to Emporia State as many hours of engineering courses as are necessary to fulfill the 124-hour requirement, and suspends the residency rule that requires the student to be currently enrolled at the time of graduation. A student can normally expect to graduate from ESU after his or her fourth year in college (and the first at the engineering school), and to receive the BS in engineering from either KSU or KU after the fifth year.

#### General Education

Students in the dual-degree engineering program must meet the LAS general education requirements with the following exceptions: SP101 must be taken rather than SP100; BC103 must be taken rather than EC101; Life Science (4 hrs) and Applied Science (3 hrs) are not required. Substitute MA161 (Calculus I) for the basic skills mathematics requirement; and CH123/124 (Chemistry I/Lab) for the physical science requirement.

#### Recommended Schedule of Classes

##### First Year – Fall: 17-18 hours

Courses	Hours
PH100 Orientation to Physics .....	2
PS200 Intro to Engineering Graphics.....	1-2
MA161 Calculus I.....	5
CH123 Chemistry I .....	3
CH124 Chemistry I Lab .....	2
EG101 English Composition I .....	3
PE100 Lifetime Fitness .....	1

##### First Year – Spring: 17 hours

Courses	Hours
MA262 Calculus II .....	5
CH126 Chemistry II.....	3
CH127 Chemistry II Lab.....	2
PH190 Physics I.....	3
PH191 Physics I Lab.....	1
PH192 Physics I Recitation.....	1
Fine Arts Elective .....	2

See summer courses, next page

##### Second Year – Fall: 17 hours

MA363 Calculus III .....	3
PH393 Physics II.....	3
PH394 Physics II Lab.....	1
PH395 Physics II Recitation.....	1
PH315 Statics.....	3
EG102 English Composition II .....	3
Technical Elective .....	3

##### Second Year – Spring: 17 hours

MA335 Differential Equations I .....	3
PH540 Modern Physics.....	3
Fine Arts Elective .....	2
PH316 Dynamics .....	3
CS260 Programming (C++).....	3
Technical Elective.....	3

**SUMMER**

SP101 Public Speaking .....	3
PE Activity Course.....	1
Social/Behavioral Science Elective .....	3

**Third Year – Fall: 18 hours**

Courses	Hours
PH741 Advanced Physics Lab I.....	3
PH760 Mechanics I.....	3
PH762 Electricity & Magnetism I.....	3
BC103 Principles of Economics I .....	3
Literature/Ideas Elective.....	3
MA 322 Linear Algebra .....	3

**Third Year – Spring: 18 hours**

Courses	Hours
Physics Elective .....	3
History (Multicult Inten) Elective .....	3
Technical Elective.....	3
Social/Behavioral Science Elective.....	3
Cultural Diversity Elective.....	3

Technical electives are courses offered at Emporia State University which will meet certain engineering requirements at either Kansas State University or the University of Kansas. Please refer to the table below.

**KEY:**

**Engineering Field Codes: EE=Electrical Engineering, ME=Mechanical Engineering, NE=Nuclear Engineering, EP=Engineering Physics**

**Elec=Elective Courses, Req=Required Courses**

**TECHNICAL ELECTIVES**

	KSU			KU		
	EE	ME	(NE)	EE	EP	ME
PS100 Intro to Engineering .....	2	Elec	Elec	Elec	----	----
PS200 Intro to Engineering Graphics . . . .	1-2	Elec	Req	----	----	Req
PH316 Dynamics .....	3	Req	Req	Req	----	----
PH410/411 Elect Circuit Analysis & Lab .....	4	Req	Req	Req	Elec	Req
MA322 Linear Algebra .....	3	Elec	Elec	----	Elec	Elec
MA380 Probability & Statistics .....	3	Req	Elec	Elec	Req	----