**BACHELOR OF SCIENCE Advising Guide**

**Dual-Degree Mathematics**

<https://www.emporia.edu/department-liberal-arts-sciences/physical-sciences-department/academics-programs/undergraduate-programs-minors/physics-dual-degree-engineering/>

Dual-Degree Engineering

Offered in Conjunction with the **University of Kansas**

The dual-degree program in engineering allows the student to complete all the requirements for the degree of Bachelor of Science in mathematics, 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 at least 120 semester hours to graduate. 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 120-hour requirement, and suspends the residency rule that requires a 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 KU after the fifth year.

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| **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; and a Life Science (4 hrs) and Applied Science (3 hrs) courses are not required. MA161 (Calculus I) should be substituted for the basic skills mathematics requirement, and CH123/124 (Chemistry I/Lab) for the physical science requirement. |

This is a **recommended** schedule of classes. This schedule can be modified as necessary. Any changes need to be discussed with your academic advisor or a physics faculty member.

# First Year – Fall: 18 hours

**Courses Hours**

MA161 Calculus I 5

EG101 English Composition I 3

SP101 Public Speaking 3

PE100 Active Living 1

PS100 Intro to Engineering 3

Social/Behavioral Science Elective 3

**See summer courses on next page**

# Second Year- Fall: 16 hours

PH393 Physics II 3

PH394 Physics II Lab 1

PH395 Physics II Recitation 1

PH315 Statics 3

MA363 Calculus III 3

EC101 Basic Economics 3

Creative Arts Elective 2

# First Year – Spring: 16 hours

**Courses Hours**

MA240 Discrete Math 3

MA262 Calculus II 5

EG102 English Composition II 3

PH190 Physics I 3

PH191 Physics I Lab 1

PH192 Physics I Recitation 1

# Second Year – Spring: 18 hours

MA335 Differential Equations I 3

MA425 Abstract Algebra 3

MA322 Linear Algebra 3

Multicultural Perspectives Elective 3

CS260 Programming (C++) 3

PH316 Dynamics 3

**SUMMER**

CH123 Chemistry I\* 3

CH124 Chemistry I Lab\* 2

CH126 Chemistry II\* 3

CH127 Chemistry II Lab\* 2

\*Chemistry is offered only in alternate, odd-numbered summers, so this session may be shifted to the summer between the first and second year. Not all engineering programs at KU require Chemistry II. Please refer to the table below.

# Third Year – Fall: 18 hours

**Courses Hours**

MA735 Advanced Calculus I 3

Mathematics Elective 6

Technical Elective 3

Humanities Elective 3

Multicultural Perspectives Elective 3

**Third Year – Spring: 18 hours**

**Courses Hours**

MA380 Probability & Statistics 3

Mathematics Electives 6

Technical Elective 3

Social/Behavioral Science Elective 3

Humanities Elective 3

Technical electives are courses offered at Emporia State University, which will meet certain engineering requirements at Kansas State University. Please refer to the table below for a list of possible technical electives. The proper selection of technical electives that align with your engineering field of interest should be discussed with your advisor.

 **Engineering Field Codes: Ag, Agricultural/Biological Engineering; Ar, Architectural Engineering; Ch, Chemical Engineering; CE, Civil Engineering; EE, Electrical/Computer Engineering; IM, Industrial/Manufacturing Systems Engineering; and ME, Mechanical/Nuclear Engineering.**

**Technical Elective Courses**† **Ag Ar Ch CE EE IM ME**

PS100 Intro to Engineering‡ 3 Elec Elec Elec Elec Elec Elec Elec

PS200 Engineering Graphics 1-2 Elec Elec Elec Elec Elec Elec Elec

PH315 Statics 3 Req Req Elec Req Req Req Req

PH316 Dynamics 3 Req Req --- Req Req Req Req

PH410/411 Elect Circuits & Lab 4 Req Req --- Elec Req Req Req

PH530 Heat & Thermodynamics 3 Req Req --- Req Req Req Req
ES110/111 Intro to Earth Science/Lab 3 Elec Req --- Req --- --- ---

GB140/141 Principles of Bio. & Lab 4 Req Req Elec Elec Elec --- ---

CH370/371 Gen Org. Chem. & Lab 5 Req --- --- Elec --- --- ---

CH560 Biochemistry 5 Elec --- Elec --- --- --- ---

CH720 Physical Chemistry I 3 --- --- Req --- --- --- ---

CH721 Physical Chemistry Lab 2 --- --- Req --- --- --- ---

CH722 Physical Chemistry II 3 --- --- Req --- --- --- ---

†*Technical electives are courses offered at ESU that meet certain engineering requirements at KSU. The total number of elective course transfer credits is limited in some engineering fields.*

‡*PS 100 is recommended for all pre-engineering students.*

**K-State 8 Requirements:**

Students transferring to KSU will have to complete the K-State 8, which establishes eight educational areas. These educational areas are met through a wide range of courses. Each of these goals will usually require 2 -3 courses necessary to meet the specific learning outcomes. Some courses may address multiple areas. Engineering disciplines may have specific courses that are required to meet these educational areas. For more details about the K-State 8 visit <https://www.k-state.edu/kstate8/index.html>. There are certain ESU courses that pre-engineering students can use to satisfy these areas. To determine available ESU courses that satisfy these areas, see your advisor; check the requirements for your chosen engineering discipline (<https://engg.ksu.edu/departments/>), as well as the KSU Transfer Equivalency tool <https://go.k-state.edu/equiv>.

