**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 **Wichita State University**

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 WSU 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; BC103 must be taken rather than EC101; 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 below and 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: AE, Aerospace Engineering; BE, Biomedical Engineering; EE, Electrical and Computer Engineering; IE, Industrial Engineering; ME, Mechanical Engineering; Mf, Manufacturing Engineering.**

 **AE BE EE IE ME Mf**

PS100 Intro to Engineering\*\* 2 --- --- --- Elec Elec Elec

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

PH315 Statics 3 Req Req Req Elec Req Req

PH316 Dynamics 3 Req Elec Elec Elec Req Elec

PH410/411 Elect Circuit Anal & Lab 4 Req Req Req Elec Req Req

PH530 Heat and Thermodynamics 3 Req Req Req Elec Req Elec

PH540 Modern Physics 3 --- --- Elec --- --- ---

CH370/371 Gen Organic Chem & Lab 5 --- Req --- --- --- ---

*\*Technical electives are courses offered at ESU that will meet certain engineering requirements at WSU.*

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

**WSU General Education Requirements:**

All students transferring to WSU will be expected to meet the WSU general education requirements. These requirements include several foundation courses, as well as two – three courses in the three divisions (Fine Arts and Humanities, Social and Behavioral Sciences, and Mathematics and Natural Sciences), and three additional courses from any of the three divisions that meet the Further Study (FS) or Issues and Perspectives (I&P) requirements. For mor details about the WSU general education requirements visit - <http://catalog.wichita.edu/undergraduate/general-education-program/>. There are additional 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://www.wichita.edu/academics/engineering/engineering.php>), the course catalog (<http://catalog.wichita.edu/undergraduate/>), as well as the WSU Transfer Equivalency tool <https://webapps.wichita.edu/TransferEquiv/>.

**Engineer of 2020/Engineering+ Requirements:**

In addition, all engineering majors must meet the Engineer of 2020/Engineering+ Requirements (<https://www.wichita.edu/academics/engineering/2020/index.php>). Students must complete three of the following six categories: (1) Undergraduate Research, (2) Cooperative Education/Internship, (3) Global Learning/Study Abroad, (4) Service Learning, (5) Leadership, and (6) Multi-Disciplinary.

