

ENGINEERING TRANSFER PROGRAM

Department of Physics and Astronomy

Website: <https://www.washburn.edu/academics/college-schools/arts-sciences/departments/physics-astronomy/degree-engineering.html>

Engineering courses allow engineering transfer students to complete most of the program common to the first two years at most recognized schools of engineering. They also provide a background of application to theory for students majoring in mathematics and the physical sciences.

Faculty

Senior Lecturer Keith Mazachek, PhD

Student Learning Outcomes

Students participating in the engineering transfer program at Washburn University, upon graduation, are expected to have:

- Acquired an understanding of the different engineering disciplines and functions.
- Acquired a solid foundation in mathematics, the sciences, and basic engineering necessary to further their engineering education; and develop the ability to progress from observations to logical conclusions, applying analytical and critical thinking.

A joint “3-2” dual degree program with Kansas State University, the University of Kansas, and the University of Missouri-Kansas City enables a student to earn both a Bachelor of Science in Physics, Mathematics, Chemistry, or Computer Information Sciences at Washburn University, and a Bachelor of Science in Engineering at one of the other universities. Three years are spent at Washburn University pursuing the BS in one of the majors above. Upon satisfactory completion of this work, the student will be eligible for transfer to KSU, KU, or UMKC. Upon satisfactory completion of additional work as agreed upon by the student, the advisory committee, and the chairperson of the department involved, the student will receive the appropriate BS from Washburn University. Upon satisfactory completion of the requirements of the engineering school, the student will be awarded a BS in Engineering from that school. This program will normally take five years, but depending upon the particular field of engineering, the time may vary.

Due to the complexities of transferring to engineering schools with different major requirements and to avoid taking courses not fulfilling engineering degree requirements, it is imperative that the engineering student be advised in their course of study by a faculty member in the department.

Programs

- Engineering-Physics, AS (<https://catalog.washburn.edu/undergraduate/college-arts-sciences/engineering-transfer-program/engineering-physics/>)

Course Offerings

EG 103 Physics & Engineering Seminar I (1)

An overview of the fields and practice of physics and engineering. Students will participate in weekly readings and discussions, and complete at least one written piece and at least one presentation. Specific content will change each time the course is offered.

EG 105 Introduction to Engineering (3)

Introduction to the professional role of an engineer with an orientation to the academic requirements of engineering studies, responsibilities of engineering students and professionals, discussion of various engineering careers, job site duties, professional development and registration and engineering ethics. Included are problem definition and solution, engineering design and terminology and the role of technology and its influence on society.

EG 116 Engineering Graphics (3)

Elements of geometry of engineering drawing with emphasis on spatial visualization and applications. Freehand sketching, dimensioning, and graphs. Computer aided design and engineering analysis.

EG 250 Engineering Mechanics: Statics (3)

Vector notation; resultants of force systems; analysis of force systems in equilibrium including beams, frames and trusses; analysis of systems involving friction forces; determination of centroids, centers of gravity, second moments of areas, moments of inertia. Prerequisites: MA 151 and PS 281.

EG 303 Physics & Engineering Seminar II (1)

An overview of the fields and practice of physics and engineering. Students will participate in weekly readings and discussions, and complete at least one written piece and at least one presentation. Specific content will change each time the course is offered. Prerequisite: upper-division standing

EG 320 Engineering for STEM Educators (3)

Designed to introduce concepts and applications of engineering to STEM educators. Course will explore various experimental, analysis, and design situations to develop knowledge about how objects work together to perform a function. Experiments will develop an understanding of basic engineering concepts such as motion, solid mechanics, fluid mechanics, thermodynamics, electricity, and magnetism. Analysis of experiments will provide recognition of experimental variables and their relationships to mathematical equations. Significant emphasis is on conceptual understanding of how mathematics and physics work together to solve engineering problems. This course does not satisfy any engineering prerequisite/requirement outside of the STEM education program. Prerequisite: BI 319 Biology for STEM Educators with a “C” or better; concurrent enrollment in MA 320 Mathematics for Middle School Teachers.

EG 351 Engineering Mechanics: Dynamics (3)

Displacement, velocity, and acceleration of a particle; relation between forces acting on rigid bodies and the changes in motion produced; translation; rotation; motion in a plane; solutions using the principles of force, mass and acceleration, work and energy, and impulse and momentum. Prerequisites: EG 250 and MA 152.

EG 360 Mechanics of Materials (3)

Elementary theories of stress and strain, behavior of materials, and applications of these theories and their generalizations to the study of stress distribution, deformation, and instability in the simple structural forms that occur most frequently in engineering practice. Prerequisites: EG 250 and MA 253.