ENGINEERING

Physics Department

Faculty
Viktor Martisovits (chair), Elizabeth Golovatski, Alexey Pronin, Puneet Vishwakarma

Statement of philosophy
Students can earn a Bachelor of Science degree in Engineering which broadly prepares them for a career at the interface of mechanical and electrical engineering. Building on the liberal arts ethos of the institution, this degree incorporates substantial coursework in physics and other sciences with the application of engineering principles. This education provides each student the fundamentals to enter the workforce immediately after graduation or attend graduate school and the skills to quickly adapt and learn for a quickly evolving society. In addition to the requirements below, students are strongly encouraged and supported to complete internships in engineering at local, national and international locations. Through the completion of this work students will achieve the following general outcomes in alignment with the Accreditation Board for Engineering and Technology (ABET):

- an ability to apply knowledge of mathematics, science, and engineering
- an ability to design and conduct experiments, as well as to analyze and interpret data
- an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- an ability to function on multidisciplinary teams
- an ability to identify, formulate, and solve engineering problems
- an understanding of professional and ethical responsibility
- an ability to communicate effectively
- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- a recognition of the need for, and an ability to engage in life-long learning
- a knowledge of contemporary issues
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Study abroad opportunities
Students majoring in engineering are able to study abroad around the globe with careful planning, especially during the summer. International internships might be available at some study abroad sites. Students are encouraged to consult with an academic advisor while planning to go abroad.

Major Communication Skills
The department believes that it is important that students in engineering are able to listen, speak, read, and write within the discipline. Many courses throughout the major include activities evaluating students’ communication skills. The final evaluation will occur in ENGR 431 Capstone Design I and ENGR 432 Capstone Design II.

Technology Skills
Students must achieve competency in Matlab and engineering graphics prior to the second semester of their sophomore year and the first semester of their junior year, respectively. This work can be completed external to Central College or completed via the following two courses: ENGR 111 Engineering Graphics and ENGR 112 Matlab for Engineers.

Engineering Major Requirements (97 s.h.)

1. Complete all of the following:
   - ENGR 111 Engineering Graphics (2)
   - ENGR 112 Matlab for Engineers (2)
   - ENGR 211 Statics (3)
   - ENGR 212 Dynamics (3)
   - ENGR 213 Strength of Materials (3)
   - ENGR 214 Engineering Materials with Lab (3)
   - ENGR 221 Electric Circuits (3)
   - ENGR 222 Electronic Devices with Lab (4)
   - ENGR 311 Thermodynamics (3)
   - ENGR 312 Fluid Mechanics (3)
   - ENGR 313 Theory of Machines (3)
   - ENGR 314 Heat Transfer with Lab (4)
ENGR 321 Electromagnetism (3)
ENGR 322 Signals and Systems with Lab (4)
ENGR 411 Dynamic Systems and Control (Mechanical) (3) (offered as ENGR-490 in 2017-2018)
ENGR 421 Digital Control Systems (3) (offered as ENGR-490 in 2017-2018)
ENGR 431 Capstone Design I (1) (offered as ENGR-490 in 2017-2018)
ENGR 432 Capstone Design II (3) (offered as ENGR-490 in 2017-2018)
PHYS 111 General Physics I with Lab (5)
PHYS 112 General Physics II with Lab (5)
PHYS 215 Theoretical and Experimental Methods (2)
PHYS 216 Waves (2)
PHYS 225 Modern Physics I (3)
MATH 131 Calculus I (4)
MATH 132 Calculus II (4)
MATH 231 Multivariable Calculus (3)
MATH 250 Differential Equations (3)
CHEM 131 General Chemistry with Lab (4)

2. Complete an additional 6 s.h. of ENGR courses numbered 311 or above.

3. Complete an additional 3 s.h. of PHYS courses numbered 211 or above.