

Student ID: _____
 Student Name: _____
 Adviser Name: _____

Catalog: College Catalog 2018-2019
 Program: Engineering (B.S.)
 Minimum Credits Required: _____

Engineering (B.S.)

Student Learning Outcomes for Engineering:

Students will be able to:

- Apply basic and advanced principles of mathematics, science, and engineering.
- Design and conduct experiments, as well as to analyze and interpret data.
- 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.
- Function on multi-disciplinary teams.
- Identify, formulate, and solve engineering problems.
- Understand and commit to professional and ethical responsibility.
- Communicate effectively orally and in writing.
- Understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- Recognize the need for, and engage in life-long learning and professional growth.
- Understand contemporary issues.
- Use the techniques, skills, and modern engineering tools necessary for engineering practice.

The **Engineering major** is a rigorous program designed to lead to a technical career in industry or graduate school in engineering. The Engineering degree with concentrations in **Biomedical, Civil, Electrical, Environmental, Mechanical; and Industrial and Systems Engineering** is accredited by the Engineering Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone: (410) 347-7700, www.abet.org. Our Engineering program is designed around attention to the needs of individual students and a breadth of engineering knowledge and skills. The Program Education Objectives encapsulate the values and goals of Elizabethtown College within the current and emerging needs of industry and society: 1) Elizabethtown Engineering graduates develop distinguished careers in a wide variety of technical and non-technical fields, utilizing the skills developed through a broad engineering curriculum complemented by strong engagement with the liberal arts. In particular, students are equipped to design, develop, and implement innovative solutions to challenging problems within fields integrating electrical and mechanical systems within the context of sustainable design; 2) Our graduates become industry and civic leaders in a variety of fields as skilled problem solvers. Graduates possess the multidisciplinary background to help shape solutions and define the problems faced by our rapidly changing world and global marketplace; 3) Graduating students embrace and adapt to emerging technologies, supported by the combination of a strong foundation in underlying theory and proficiency with modern engineering tools. Graduates have the necessary knowledge, skills, and motivation to pursue advanced degrees, licensing as a Professional Engineer (PE) or certifications such as Leadership in Energy and Environmental Design (LEED); 4) Our graduates value the opportunity to utilize their professional skills to meet the needs of their local communities and our shared global community, finding fulfillment serving the needs of others with creativity, personal drive and accountability, humility, and unwavering ethics.

Engineering majors may substitute PHY 201 for one of their Natural and Physical Science Core courses. PH 275 is approved to satisfy Humanities Core. Students may take up to 19 credits in up to three semesters at Elizabethtown without paying a credit overload fee. Engineering and Physics students must earn a C- or better in ALL prerequisite Engineering and Physics courses to continue in the major.

Engineering majors are required to take:

First Year Suggested Courses (30 credits):

Course Name	Term Taken	Grade	Core
FYS 100 - First-Year Seminar			
EN 100 - PLE Writing and Language Or			
EN 150 - PLE Advanced Writing and Language			
EGR 191 - Introduction to Engineering I			
EGR 192 - Introduction to Engineering II *Prerequisite(s): EGR 191.			
MA 121 - MA Calculus I			
PHY 120 - Introductory Mathematics for Physics			
PHY 201 - College Physics I *Prerequisite(s): MA 121. Students who have credit for PHY 101 may not enroll in this course for credit.			
• Power of Language: Other Core course (4 credits)			

Second Year Suggested Courses (32 credits):

Course Name	Term Taken	Grade	Core
EGR 210 - Circuit Analysis *Prerequisite(s): PHY 201 and MA 121.			
EGR 260 - Statics *Prerequisite(s): PHY 201 and MA 121.			
EGR 291 - Sophomore Project			
MA 222 - Calculus III *Prerequisite(s): Grade of C- or better in both MA 121 and PHY 120 OR Grade of C- or better in MA 122.			
PHY 202 - College Physics II *Prerequisite(s): PHY 201 and MA 121. Students who have credit for PHY 102 may not enroll in this course for credit.			
MA 251 - MA Probability and Statistics Or			
MA 321 - Differential Equations *Prerequisite(s): Grade of C- or better in both MA 121 and PHY 120 OR Grade of C- or better in MA 122.			
CH 105 - NPS Fundamentals of Chemistry: Introduction to Molecular Science Or *Prerequisite(s): High school chemistry and algebra.			
<ul style="list-style-type: none"> Western Cultural Heritage Core course (4 credits) Two additional Core courses (8 credits total) 			

Third Year Suggested Courses (32 credits):

Course Name	Term Taken	Grade	Core
EGR 360 - Dynamics *Prerequisite(s): PHY 201 and MA 222.			
EGR 391 - Engineering Design and Junior Project			
CH 105 - NPS Fundamentals of Chemistry: Introduction to Molecular Science Or *Prerequisite(s): High school chemistry and algebra.			
<ul style="list-style-type: none"> Social Science Core course (4 credits) Four or five Engineering concentration specific courses (16-20 credits total) 			

Fourth Year Suggested Courses (32 credits)

Course Name	Term Taken	Grade	Core
EGR 255 - Sustainable Resource Engineering and Design *Prerequisite(s): EGR 210.			
EGR 395 - Fall Seminar			
EGR 396 - Spring Seminar			
EGR 491 - Senior Project in Engineering I			
EGR 492 - Senior Project in Engineering II			
<ul style="list-style-type: none"> Three or Four Engineering Concentration courses (12-16 credits total) Mathematic or Science elective course (4 credits) Two additional elective courses (8 credits total) 			

Engineering majors also must either:

(1) Select one of the following concentrations and complete all the courses in it, or (2) Earn the degree without a concentration by completing any five of the engineering courses listed under the three concentrations.

Biomedical Engineering:

Course Name	Term Taken	Grade	Core
EGR 264 - Strength of Materials *Prerequisite(s): EGR 260 and MA 222.			
EGR 310 - Signals and Systems *Prerequisite(s): PHY 202 and MA 222.			
EGR 323 - Biomechanics of Human Movement *Prerequisite(s): EGR 360 and CS 121.			
EGR 324 - Structural Aspects of Biomaterials *Prerequisite(s): EGR 264.			

EGR 328 - Introduction to Biomedical Engineering Design <i>*Prerequisite(s):</i> EGR 291.			
EGR 368 - Fluid Mechanics and Hydrology <i>*Prerequisite(s):</i> EGR 260 and MA 222.			
EGR 410 - Control Systems <i>*Prerequisite(s):</i> EGR 310.			
• Engineering elective course (3-4 credits)			
Civil Engineering:			
Course Name	Term Taken	Grade	Core
EGR 251 - Introduction to Environmental Engineering <i>*Prerequisite(s):</i> CH 105.			
EGR 256 - Environmental Site Engineering and Design <i>*Prerequisite(s):</i> PHY 201.			
EGR 264 - Strength of Materials <i>*Prerequisite(s):</i> EGR 260 and MA 222.			
EGR 310 - Signals and Systems <i>*Prerequisite(s):</i> PHY 202 and MA 222.			
EGR 353 - Green Architectural Engineering			
EGR 364 - Structural Engineering <i>*Prerequisite(s):</i> EGR 264.			
EGR 366 - Civil Engineering Materials <i>*Prerequisite(s):</i> EGR 264.			
• Engineering elective course (3-4 credits)			
Electrical Engineering:			
Course Name	Term Taken	Grade	Core
EGR 310 - Signals and Systems <i>*Prerequisite(s):</i> PHY 202 and MA 222.			
EGR 311 - Electronics <i>*Prerequisite(s):</i> EGR 210.			
EGR 312 - Electromagnetism (PHY 312) <i>*Prerequisite(s):</i> PHY 202 and MA 222.			
EGR 315 - Communication Theory <i>*Prerequisite(s):</i> EGR 310.			
EGR 317 - Physics of Semiconductor Devices <i>*Prerequisite(s):</i> PHY 202.			
EGR 318 - Fiber Optics Communication Systems <i>*Prerequisite(s):</i> EGR 210.			
EGR 410 - Control Systems <i>*Prerequisite(s):</i> EGR 310.			
• Engineering elective course (3-4 credits)			
Environmental Engineering:			
Course Name	Term Taken	Grade	Core
EGR 251 - Introduction to Environmental Engineering <i>*Prerequisite(s):</i> CH 105.			
EGR 256 - Environmental Site Engineering and Design <i>*Prerequisite(s):</i> PHY 201.			
EGR 310 - Signals and Systems <i>*Prerequisite(s):</i> PHY 202 and MA 222.			
EGR 351 - Water and Wastewater Engineering <i>*Prerequisite(s):</i> CH 105.			
EGR 353 - Green Architectural Engineering			
EGR 368 - Fluid Mechanics and Hydrology <i>*Prerequisite(s):</i> EGR 260 and MA 222.			
EGR 467 - Thermodynamics <i>*Prerequisite(s):</i> EGR 260 and MA 222, or permission of the instructor.			
• Engineering elective course (3-4 credits)			
Industrial and Systems Engineering:			
Course Name	Term Taken	Grade	Core

EGR 248 - Quantitative Methods/Operations Management (BA 248) *Prerequisite(s): MA 251.			
EGR 310 - Signals and Systems *Prerequisite(s): PHY 202 and MA 222.			
EGR 341 - Industrial and Systems Engineering Methods *Prerequisite(s): MA 251.			
EGR 345 - Fundamentals of Process Improvement *Prerequisite(s): MA 251.			
EGR 347 - Analytics for Supply Chain Operations (BA 347) *Prerequisite(s): BA 248/EGR 248 or MA 251.			
EGR 348 - Introduction to Manufacturing Processes *Prerequisite(s): PHY 201.			
EGR 410 - Control Systems *Prerequisite(s): EGR 310.			
• Engineering elective course (3-4 credits)			
Mechanical Engineering:			
Course Name	Term Taken	Grade	Core
EGR 264 - Strength of Materials *Prerequisite(s): EGR 260 and MA 222.			
EGR 310 - Signals and Systems *Prerequisite(s): PHY 202 and MA 222.			
EGR 348 - Introduction to Manufacturing Processes *Prerequisite(s): PHY 201.			
EGR 368 - Fluid Mechanics and Hydrology *Prerequisite(s): EGR 260 and MA 222.			
EGR 410 - Control Systems *Prerequisite(s): EGR 310.			
EGR 463 - Analytical Mechanics and Vibrations *Prerequisite(s): EGR 360 and MA 321.			
EGR 467 - Thermodynamics *Prerequisite(s): EGR 260 and MA 222, or permission of the instructor.			
• Engineering elective course (3-4 credits)			
Notes:			