

# ENGINEERING MECHANICS, MINOR

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

## Program Description

The Engineering Mechanics minor helps students prepare to analyze and/or design simple structures that are efficient and safe under foreseen loading conditions.

Contemporary engineering design of mechanical components requires precise information and modern analysis techniques to determine material response to anticipated loading. Designers must have the analytical and experimental tools to accurately define deformation under load to characterize dynamic response and to prevent mechanical failure. In the event of failure the cause(s) must be ascertained to prevent future failure through redesign and/or material substitution. Thus, industry has a real need for those with a sound foundation in Engineering Mechanics, the engineering science that deals with the effects of forces and torques on rigid and deformable bodies. Engineering Mechanics consists of Statics (bodies in equilibrium), Dynamics (bodies in unsteady motion such as vibration, moving on curvilinear paths) and the Mechanics of Deformable Media. The latter topic covers the change in dimensions of bodies of various shapes under the influence of forces, torques, temperature, and dynamic motion. Further failure criteria under such loadings are introduced and utilized in examples of engineering design. Some twenty undergraduate courses covering the above topics are available at two levels, i.e. sophomore introductory and senior (400) courses.

## What is Engineering Mechanics?

Engineering mechanics is the engineering science that deals with the effects of forces and torques on particles, rigid bodies, or deformable media. Mechanics is typically subdivided into statics, dynamics, and mechanics of deformable bodies. The Engineering Mechanics minor is for undergraduates who wish to supplement their engineering backgrounds with extensive study in mechanics. The high-tech industry has a significant need for individuals with a sound background in engineering mechanics. Industries such as aerospace, automotive, power, structures, and appliance regularly hire graduates who are competent in engineering mechanics.

### You Might Like This Program If...

- You wish to supplement your engineering background with extensive study in mechanics.
- You enjoyed your introductory courses in Statics, Dynamics, and Mechanics of Materials and would like to learn more.

## Program Requirements

Requirement	Credits
Requirements for the Minor	18

### Requirements for the Minor

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (<https://senate.psu.edu/policies-and-rules->

[for-undergraduate-students/59-00-minors-and-certificates/#59-10](https://senate.psu.edu/policies-and-rules-#59-10)). In addition, at least six credits of the minor must be unique from the prescribed courses required by a student's major(s).

Code	Title	Credits
<b>Supporting Courses and Related Areas</b>		
<i>Supporting Courses and Related Areas: Require a grade of C or better</i>		
Select 12 credits of EMCH courses, which may include the following:		12
EMCH 211	Statics	
EMCH 212	Dynamics	
EMCH 213	Strength of Materials	
EMCH 315	Mechanical Response of Engineering Materials	
EMCH 316	Experimental Determination of Mechanical Response of Materials	
Select 6 credits from 400-level EMCH courses		6

## Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information needed to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (<https://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy/>)

## University Park

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## Career Paths

The high-tech industry has a significant need for individuals with a sound background in engineering mechanics. Industries such as aerospace, automotive, power, structures, and appliance regularly hire graduates who are competent in engineering mechanics. Graduate students in engineering science and mechanics conduct innovative research with a diverse, award-winning faculty on interdisciplinary programs that address society's grand challenges.

## Careers

Penn State engineering science and mechanics alumni are successful entrepreneurs, business executives, captains of industry, leaders in national laboratories, startup founders, physicians, professors, and academic officials. Starting salaries for engineering science graduates in past years have been among the highest for all graduates in the College of Engineering.

MORE INFORMATION ABOUT POTENTIAL CAREER OPTIONS FOR GRADUATES WITH A MINOR IN ENGINEERING MECHANICS (<http://www.esm.psu.edu/academics/resources/career-resources.aspx>)

## Opportunities for Graduate Studies

The ESM department offers the following graduate degree options:

- Master of Engineering (M.Eng.) in Engineering Mechanics
- Master of Engineering (M.Eng.) in Additive Manufacturing
- Master of Science (M.S.) in Engineering at the Nano-scale
- Master of Science (M.S.) in Engineering Science and Mechanics
- Master of Science (M.S.) in Additive Manufacturing
- Doctor of Philosophy (Ph.D.) in Engineering Science and Mechanics
- Doctor of Medicine and Doctor of Philosophy in Engineering Science and Mechanics (M.D./Ph.D.)
- Graduate Certificate in Laser-Materials Processing and Laser-Based Manufacturing

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (<http://www.esm.psu.edu/academics/graduate/prospective-students.aspx>)

## Contact

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