

# Engineering (Engr)

<http://www.engineering.und.edu>

## Minor in Engineering Science

The Engineering Science minor is available to non-engineering students, and requires the completion of 20 credit hours of approved coursework, as detailed below with a cumulative GPA of 2.0 or above.

### Required Courses

ENGR 101	Graphical Communication	3
ENGR 202	Dynamics	3
or ENGR 203	Mechanics of Materials	
ENGR 206	Fundamentals of Electrical Engineering	3
CE 306	Fluid Mechanics	3
or ME 306	Fluid Mechanics	
or ME 341	Thermodynamics	
Electives Courses *		8
Total Credits		20

\* Any regularly offered course at the 200 or higher level with the prefix Engr, ChE, CE, EE, GE, ME or PE may be used as elective.

The minor program is administered through the CEM Dean's Office.

## Courses

### ENGR 100. Introduction to Engineering. 1 Credit.

This course has been developed to provide undecided freshman in engineering with an introduction to the different engineering disciplines offered at the College of Engineering and Mines. The goal of this course is to enable undecided freshmen to make a more informed choice when choosing an engineering degree program. The course covers challenges and opportunities for emerging engineers. The overview is followed by discipline specific presentations and activities. Information about advising, career planning and placement, and information on student organizations will also be presented. S/U grading. F.

### ENGR 101. Graphical Communication. 3 Credits.

Development of visualization, technical communication, and documentation skills. 3-D geometric modeling as applied to CADD applications using current methods and techniques commonly found in industry. Introduction to engineering, design and team problem solving. F,S.

### ENGR 102. Professional Assessment and Evaluation. 1 Credit.

This course is designed for students with industrial experience. Students complete a portfolio documenting educational and work experiences for evaluation, and individualized curriculum plans are developed. Various academic programs in engineering are also introduced. Based on the assessment and evaluation, some engineering requirements may be waived. Prerequisites: Work experience and/or technician school training plus completion of Chemistry I, Physics I and II, and Calculus I, II, and III (see dept for approval). S/U grading.

### ENGR 200. Computer Applications in Engineering. 2 Credits.

The fundamentals of digital computer programming are presented with special emphasis on a high-level language and engineering applications. The fundamentals of PC-based software applications and operating systems are also presented. F,S.

### ENGR 201. Statics. 3 Credits.

Vector approach to principles of statics. Concepts of free body diagrams. Applications to simple trusses, frames, and machines. Distributed loads. Shear and moment diagrams. Properties of areas, second moments. Laws of friction. Prerequisite: MATH 165 with a grade of C or better. F,S.

### ENGR 202. Dynamics. 3 Credits.

Simple particle and rigid body kinematics/kinetics. Vector approach to principles of dynamics. Newton's laws of motion, work-energy, and impulse-momentum principles for particle and rigid body motion. Prerequisite: ENGR 201 with a grade of C or better and MATH 166 with a grade of C or better. F,S,SS.

### ENGR 203. Mechanics of Materials. 3 Credits.

Simple stress and strain, mechanical properties of materials, axial load, torsion, shear and bending moment, flexure and shear stresses in beams, combined stresses, stress transformation, statically indeterminate members and columns. Prerequisite: ENGR 201 with a grade of C or better or permission of the College of Engineering. F,S.

### ENGR 206. Fundamentals of Electrical Engineering. 3 Credits.

The course introduces fundamental electrical engineering concepts, such as passive and active components (resistor, capacitor, inductor, operational amplifier, digital gates), circuit analysis (Ohm's Law, KCL, KVL, phasors), energy, power and three-phase systems. The course includes laboratory experiments and computer simulations. Prerequisite: MATH 165; not open to Electrical Engineering majors. F,S.

### ENGR 301. Technology and Innovation Case Studies. 3 Credits.

The qualities and attributes that lead to the successful development of new and innovative technologies will be presented in the form of case studies. This course will provide a basic understanding of the entrepreneurial process of innovation and technology-based venture creation. Effective leadership and entrepreneurial skills will be demonstrated. F.

### ENGR 401. Engineering Leadership Seminar. 1 Credit.

This seminar course is taken by students participating in the CEM Leadership Development Program. Students will meet 4-6 times per semester to take part in workshops and activities conducted by the Jodsaas Center for Engineering Leadership and Entrepreneurship staff and invited speakers from industry. Topics will include leadership, management, business and entrepreneurship presented in an engineering context. Repeatable to 4 credits. F,S.

### ENGR 410. Technology Ventures. 3 Credits.

The primary focus will be on developing techniques to formulate the strategic framework required to develop high-tech ventures. Successful techniques to take technology-intensive opportunities from concept to commercialization will be explored. S.

### ENGR 460. Engineering Economy. 3 Credits.

Simple evaluation of the economic merits of alternative solutions to engineering problems. Evaluations emphasize the time value of money. F,S.

### ENGR 490. Topics in Engineering. 1-3 Credits.

This course covers current engineering topics based on student and faculty interest. Student should check with their home department to determine whether it can be used to satisfy specific degree requirements. Prerequisite: Permission of Instructor. Repeatable to 9 credits. On demand.