

# Pre-Engineering

Department of Physics, College of Arts & Sciences



## Why Engineering?

Engineering is a broad field encompassing many career options that emphasizes the application of our understanding of physical law in the design and development of useful products for society. Engineers must have a solid grasp of the physical laws that describe how the natural world operates. They must be able to work competently with the language that describes these laws—mathematics—and they must have an interest in and an eye for applications and processes that can be of benefit to society. Engineers are truly at the cutting edge in terms of the development of modern technology.

Employment prospects for engineers are good across all disciplines. Interest in students graduating in Engineering remains high among private and government employers. Starting salaries for bachelor's degree holders in engineering fields also remain high, with the highest in electrical and mechanical engineering. Our future economy continues to depend on engineers who can understand the scientific principles behind the technology.

## Engineering vs. Engineering Technology

According to the National Society of Professional Engineers, "Engineering programs are geared toward development of conceptual skills, and consist of a sequence of engineering fundamentals and design courses, built on a foundation of complex mathematics and science courses. Engineering technology programs are oriented toward application, and provide their students introductory mathematics and science courses, and only a qualitative introduction to engineering fundamentals. Thus, engineering programs provide their graduates a breadth and depth of knowledge that allows them to function as designers. Engineering technology programs prepare their graduates to apply others' designs" (*Engineering Technology*, NSPE Issue Brief #4049).

## What is Pre-Engineering?

A Pre-Engineering program is an educational package designed to meet the first requirement for the education of a traditional engineer—a foundation of complex mathematics and science courses. This foundation is common to nearly all types of engineering education and often can be provided more efficiently by a smaller university or college than by the institutions which house the engineering colleges themselves. Additionally, the Pre-Engineering program provides flexibility to the student who is still considering which engineering program and field to enter.

## Why Select WIU-Macomb's Pre-Engineering Program?

The strongly coordinated Pre-Engineering program at the WIU-Macomb campus will qualify students to transfer with little difficulty to the University of Illinois at Urbana-Champaign (UIU-C). Completion of the program with a satisfactory GPA provides an opportunity for students with less than perfect high school transcripts and ACT scores to transfer to one of the best engineering programs in the world. Students who transfer from Western are historically very successful at UIU-C and in their future careers. Although the program was originally designed for students who wish to transfer to UIU-C, Pre-Engineering students are well-prepared to succeed in any top-ranked discipline-specific engineering program around the country.

Western Illinois University provides good economic value; low student-to-faculty ratios in all the core courses; and excellent faculty in the areas of physics, mathematics, and chemistry who are committed to the success of the students both in the classroom and through one-on-one interaction. Students at Western can pursue Engineering studies through our Pre-Engineering, Engineering Physics, and Physics BS/Engineering MS options. The student can also switch from Engineering to Physics, Chemistry, Mathematics, Computer Science, or Engineering Technology majors.

### Pre-Engineering Program at WIU-Macomb

The Pre-Engineering program described below strongly prepares students for a smooth transfer after two years of preparation to the School of Engineering at the WIU-Quad Cities campus, as well as to a number of engineering colleges with discipline-specific programs in the region, including civil, environmental, mechanical, electrical, biomedical, aerospace, nuclear, and computer engineering.

First Year				Second Year			
Fall Semester		Spring Semester		Fall Semester		Spring Semester	
MATH 133	4 SH	MATH 134	4 SH	CHEM 201	4 SH	CHEM 202	4 SH
PHYS 211	4 SH	PHYS 212	4 SH	MATH 231	4 SH	MATH 333	3 SH
ENG 180	3 SH	PHYS 310	3 SH	MATH 183	1 SH	PHYS 214	3 SH
ET 105	3 SH	CS 225	3 SH	PHYS 213	4 SH	PHYS 367	4 SH
Elective*	3 SH	Elective*	3 SH	MATH 311	3 SH	ENG 280	3 SH
<b>17 SH</b>		<b>17 SH</b>		<b>16 SH</b>		<b>17 SH</b>	

\* A language course is recommended to satisfy UIU-C's language requirement.

### Engineering Physics Option at WIU-Macomb

The Department of Physics at WIU-Macomb offers a dual-degree program in Engineering and Physics. This program, in addition to the Pre-Engineering core, requires an additional year at WIU to complete several upper-division courses in Physics as well as the University's General Education curriculum. Students then complete their degree in Engineering—either as a double major at the WIU-Quad Cities campus or as a transfer at one of the engineering schools in the region. Upon completion of their Engineering studies, students receive a Bachelor of Science in Engineering Physics from WIU-Macomb AND a Bachelor of Science in a discipline of Engineering from their second institution.

### Physics BS/Engineering MS Option

This option involves completing your Physics degree at WIU-Macomb and then enrolling in a Master's degree program in Engineering to get your career-specific engineering education. In 2002, Steve Girshick, Director of Graduate Studies at the University of Minnesota, stated, "Contrary to popular belief, an undergraduate degree in mechanical engineering is NOT required for admission to our graduate program. In fact, many of our best graduate students come from science backgrounds at liberal arts colleges."

### Engineering Program at WIU-Quad Cities

Western Illinois University offers a BS degree in General Engineering at the WIU-Quad Cities campus. This program is a 2+2 program that articulates with Pre-Engineering programs at the WIU-Macomb campus and community colleges. The Engineering program focuses on the practice of engineering by providing a broad curriculum which emphasizes basic engineering fundamentals, while allowing students to select an area of emphasis in mechanical/manufacturing engineering or electrical/computer engineering. Students seeking admission to the Engineering program must have an overall grade point average (GPA) of 2.5 and a grade of "C" or better in the Pre-Engineering core courses.

### Illinois Institute of Technology

In the fall of 2011, WIU signed an agreement with the Illinois Institute of Technology to participate in its Presidential Scholars Program for students who transfer into their Engineering Program. This scholarship emphasizes recruitment of underrepresented populations into the discipline of engineering. Recipients of the Presidential Scholarship receive a \$23,500 annual tuition scholarship award, renewable for up to three years at IIT; a \$5,000 annual housing scholarship award to support on-campus residence at the university; and up to a \$5,000 stipend for undergraduate research through IIT's Undergraduate Research Scholars Program.

### University of Iowa

WIU has an articulation agreement with the University of Iowa's College of Engineering. Students from WIU-Macomb are automatically accepted into the Engineering College if they complete the Pre-Engineering option at WIU-Macomb with a 3.0 GPA and no more than one "C" in the Pre-Engineering core courses. The University of Iowa has one of the nation's premier Biomedical Engineering programs.

### University of Illinois

Transfer students to UIU-C are admitted on a competitive basis depending on space available. Transfer students must have a minimum average of a 2.6 GPA (4.0 = A) for consideration. Historically, the cutoff has been a 3.0 GPA (in the Pre-Engineering core courses) for Mechanical Engineering, Electrical and Computer Engineering, and Computer Science, and a 2.8 GPA for other departments. However, this fluctuates according to departmental need.

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