

Mechanical Engineering

What does a Mechanical Engineer do?

Mechanical engineers deal with the design, analysis, testing, production, and utilization of all types of mechanical equipment. They are also involved in solving problems brought about by ever-increasing demands from a growing world population. For example, mechanical engineers are looking for ways to control air pollution from combustion products and thermal pollution resulting from power plants (nuclear or fossil-fueled). They study noise pollution and how to suppress it; and develop urban vehicles for efficient, safe pollution-free transportation. They design medical implants and aids such as stints and artificial knees.

Three related areas make up mechanical engineering:

1. ***Mechanics/Machine Design:*** This area is what most people think of when they think of Mechanical engineering. It includes the design of automobile mechanical systems, industrial robots, and the many mechanical devices of modern life. Mechanical engineers create new devices, machines, automatic systems and robots, and refine existing designs of equipment or components.
2. ***Thermodynamics/Fluid Mechanics:*** Mechanical engineers also study how fluids and energy flow. Because of the need for energy conservation, they are concerned with developing alternative energy sources such as solar and wind, and modifying conventional energy systems to reduce energy consumption. Examples of systems involved include the internal combustion engine, rocket engine, and heating/air-conditioning systems.
3. ***Robotics/Control:*** This area overlaps with the above areas because all mechanical, fluid and/or energy systems need to be controlled. This may be controlling the speed in a car, the temperature in a building, the pressure in a boiler or the control of a mechanical arm in an industrial robot. Mechanical Engineers often partner with electrical or computer engineers to design systems that can control a device.

Job Outlook: Mechanical engineering employment will see modest continued growth nationally according to Occupational Outlook Handbook. It also notes, “Additional opportunities for mechanical engineers will arise because the skills acquired through earning a degree in mechanical engineering often can be applied in other engineering specialties.”

Mechanical engineering jobs are expected to hold steady in Indiana. According to the National Association of Colleges and Employers, the average starting offer nationally to mechanical engineering graduates in 2020 was over \$69,000.

Mechanical Engineering Curriculum: In addition to the common first-year engineering curriculum, the Mechanical Engineering Program includes courses in mathematics (e.g., Differential Equations, Linear Algebra), basic engineering (Statics, Dynamics, Strengths of Materials), materials of construction, machine design, thermodynamics, fluid mechanics and control.

Related Majors at PFW: Civil Engineering, Mechanical Engineering Technology, Industrial Engineering Technology

PFW Engineering Majors: PFW currently has four undergraduate engineering majors: Civil, Computer, Electrical and Mechanical Engineering. IPFW also has a range of engineering technology programs.

All mechanical engineering majors at PFW culminate with a senior design project. These projects are completed by small groups under the supervision of a faculty advisor and generally require students to design, build and test a complete system. Projects are often sponsored by local industry.

Common First-Year Engineering Curriculum: All engineering majors have the following common first year curriculum for students who are ready to begin Calculus.

First Semester			Second Semester		
Course #	Course Title	Credits	Course #	Course Title	Credits
MA 165	Analytic Geometry and Calculus I	4	MA 166	Analytic Geometry and Calculus II	4
CHM 115	General Chemistry I	4	PHYS 152	Mechanics	5
ENGR 127	Engineering Fundamentals I	4	ENGR 128	Engineering Fundamentals I	4
ENG W131	Elementary Composition	3	COM 114	Fundamentals of Speech	3
Total		15	Total		16

The standard engineering program begins with MA 165: Analytic Geometry and Calculus I. Students who need to complete other mathematics courses before they will be ready for calculus can pursue an engineering major at PFW. However, it will take them more than four years to complete an engineering degree.

High School Preparation: The ideal preparation for any of the engineering majors includes four years of high school mathematics, one year of physics, one year of chemistry and four years of english. Students should reach the level of mathematics so that they are “calculus ready” (i.e. have sufficient algebra, geometry and trigonometry that they will be ready to begin calculus their first semester.)

For additional information: see the Civil & Mechanical Engineering Department’s website at: <https://www.pfw.edu/departments/etcs/depts/cme/undergraduate/mechanical.html>