

RAET 210C : Robotics and Automation I

Introduces fixed and flexible automation equipment. An emphasis is placed on flexible equipment components such as the industrial robot. Robot topics include history, geometric configuration, component subsystems, robot safety, basic programming and operation, and end effector design. Lab work includes the use of industrial robot arms to perform various independent functions such as assembly and material handling processes. Other equipment studied includes motion control devices, such as motors and sensors, conveyors and parts feeder mechanisms, and use of vision systems and other automation equipment used in manufacturing. Students enrolled in this course will be charged a \$50 materials fee.

Credits 4

Lab/Practicum/Clinical Hours 4

Lecture Hours 2

Prerequisite Courses

MATH 140C

MFET 111C

CPET 107C

Learning Outcomes

- Briefly trace the historical evolution of the industrial robot.
- Define the term industrial robot.
- Describe the characteristics of robots that make them an important part of industrial automation.
- Describe the following robotic system components: controller, manipulator, power supply, and end effector.
- List and describe the basic robot motion configurations.
- Define the term degrees of freedom as applied to industrial robots.
- Describe the most common robotic work envelope configurations and match these work envelopes with specific robot applications.
- Describe basic programming methods used with industrial robots.
- Program an industrial robot to perform a prescribed task and demonstrate.
- List industrial applications where teach pendant programming and off-line programming are most commonly used.
- Describe pneumatics as used with industrial robots.
- Design and build an end effector.
- Describe machine vision systems and give examples of their uses with robots.
- Describe these applications of industrial robots: die casting, spray painting, welding, assembly, finishing, inspection, loading and unloading, service applications, and automated guided vehicles.
- Describe important safety considerations when applying robots in industry.
- List factors to consider when selecting robots for industrial applications.
- Describe and demonstrate a pneumatic and hydraulic fluid power system.
- List the advantages and disadvantages of preventive maintenance.
- Discuss the implications of robotics technology on society to include job displacement, retraining of workers, and the need for computer literacy.