

MTRE 4710L: Instruments and Controls Laboratory

1 Credit Hours

Concurrent: MTRE 4710

This is a laboratory course designed to complement the instruments and controls topics also covered in MTRE 4710. Laboratory exercises illustrating the use of pertinent instrumentation for determining the performance of mechanical equipment are conducted. Hands-on instruments are used in mechanical systems for determining parameters such as temperature, pressure, and flow. The use of these devices in automated systems is covered

MTRE 4810: Robotics Analysis and Synthesis

3 Credit Hours

Prerequisite: ((MTRE 3610 and MTRE 3610L) or EE 4201 or (ME 3501 and ME 4501 and ME 1311)) and (MATH 2203 or MATH 3260) and Engineering Standing

This course introduces the basic principles of robotic manipulators. Students will learn how to derive mathematical models, plan trajectories, and design controllers for robot applications. Software tools, such as MATLAB, are employed to analyze and simulate the robot system.

MTRE 4810L: Robotics Analysis and Synthesis Laboratory

1 Credit Hours

Concurrent: MTRE 4810

This is a laboratory course designed to complement the modeling and feedback controls topics also covered in MTRE4810.

MTRE 4820: Machine Learning for Robot Perception

3 Credit Hours

Prerequisite: MTRE 2710 and MATH 2202 and MATH 3260 and Engineering Standing

This course introduces the most important topics in the areas of machine learning and computer vision and their specific applications in robotics and mechatronics. The machine learning and computer vision algorithms are extensively verified with simulated and physical robots in the mechatronics lab. Students are trained for developing physical or virtual intelligent robot systems through integrating robot control and machine learning algorithms. Significant programming effort and lab hardware experience are expected.