

Catalog Description: The goal of this course is to explore the use of haptic feedback provided through robotics to enhance understanding of human sensorimotor control, surgical simulators, and physical rehabilitation. Students will examine the physiology of sensation, admittance/impedance control, and the implementation of haptic feedback to perturb or enhance the human-robot task performance. Practical experiments with a haptic device will complement lectures and reviews of key publications.

Topics Covered: Human sensory physiology, robot dynamics, feedback control, sensorimotor learning

Prerequisites: BME 355 and BME 385

Textbook: *Haptics* (Lynette A. Jones) - optional
Papers selected from the literature

Software: Arduino IDE

Student Learning Outcomes

1. Develop understanding of human sensory processing
2. Create haptic device
3. Analyze impedance/admittance control
4. Evaluate published studies examining sensorimotor learning through haptics
5. Explore integration of haptics with virtual/augmented reality

The course format will mix lectures with discussions of relevant journal articles. Students will be expected to participate in presentation of these articles. They will also create a haptic device that they will use to explore facets of haptic feedback.