

BME 520/RBE 520: Biomechanics and Robotics

This course introduces Biomechanics and Robotics as a unified subject addressing living and man-made “organisms”. It draws deep connections between the natural and the synthetic, showing how the same principles apply to both, starting from sensing, through control, to actuation. Those principles are illustrated in several domains, including locomotion, prosthetics, and medicine. The following topics are addressed: Biological and Artificial sensors, actuators and control, Orthotics Biomechanics and Robotics, Prosthetic Biomechanics and Robotics: Artificial Organs and Limbs, Rehabilitation Robotics and Biomechanics: Therapy, Assistance and Clinical Evaluation, Human-Robot Interaction and Robot Aided Living for Healthier Tomorrow, Sports, Exercise and Games: Biomechanics and Robotics, Robot-aided Surgery, Biologically Inspired Robotics and Micro- (bio) robotics, New Technologies and Methodologies in Medical Robotics and Biomechanics, Neural Control of Movement and Robotics Applications, Applied Musculoskeletal Models and Human Movement Analysis. This course meshes physics, biology, medicine and engineering and introduce students to subject that holds a promise to be one of the most influential innovative research directions defining the 21st century.

Units: 3

Program: Robotics Engineering
Biomedical Engineering

Recommended Background:

foundation of physics, linear algebra and differential equations; basic programming skills e.g. using MATLAB, undergraduate level biomechanics, robotics