ROB-UY 2004 Robotic Manipulation and Locomotion
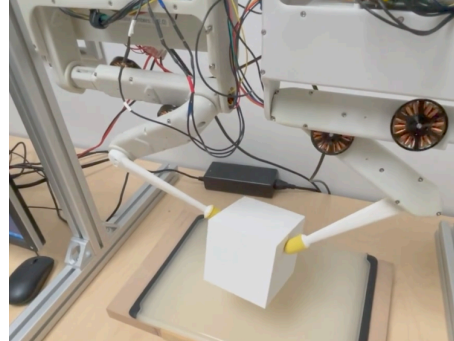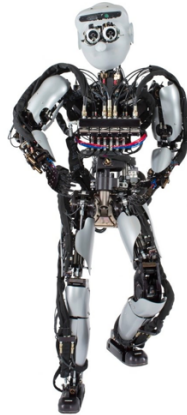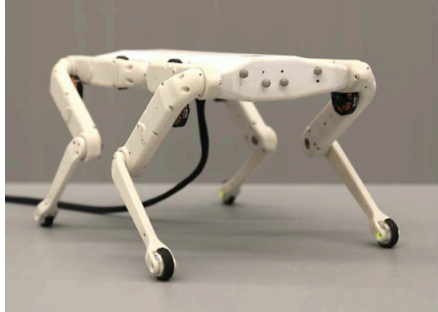Syllabus

Description This class introduces fundamental notions of robotics, from sensors and actuators to kinematics, dynamics and control with a focus on applications for object manipulation and legged locomotion. Concepts and algorithms necessary to the robotic practitioner, such as forward and inverse kinematics, force and impedance control, grasping and manipulation and legged locomotion, will be studied in the class. Further, a special emphasis will be put on providing practical experience in robotics. In the laboratory, the learned concepts will be implemented on a real 3 degree of freedom robotic finger (right picture). Students will learn how to use state of the art robotics software to solve problems seen in class.

Topics Covered
1. What is robotics? Sensors, actuators, algorithms.
2. The geometry of articulated robots / forward and inverse kinematics
3. Position, force and impedance control of robots
4. Legged locomotion
5. Grasping and manipulation
6. Robotic simulation and real robot control
7. Ethical questions in robotics

Prerequisites The class is open to students from any major with sufficient mathematics, physics and programming background: CS-UY 1114, MA-UY 2034 and PH-UY 1013 or equivalents (see Minor in Robotics)