

6.095 Humanoid Robotics Competition
Massachusetts Institute of Technology

Syllabus

The class meets every day for four hours. All the days include workshops in which the teams work with their robots. When needed, lectures are also included to introduce supporting material for the class. Some of these lectures are given by professors or grad students from diverse research groups at MIT.

Day 1	<u>Lecture:</u> Introduction to legged locomotion. <u>Workshop:</u> First part of the robot assembly.
Day 2	<u>Workshop:</u> Construction of the voltage regulator for the onboard CPU board; assembly of the hardware; installation of the software; test of the hardware and servos.
Day 3	<u>Workshop:</u> Finish the assembly of the robot.
Day 4	<u>Lecture:</u> Working with a simulator. <u>Workshop:</u> Calibration of the robot's standing position; motion capturing.
Day 5	Optional, to catch up or to do additional preparations for the competition
Day 6	<u>Lecture:</u> Kinematics <u>Workshop:</u> Implementing inverse kinematics for the arms (inverse kinematics for the legs is given).
Day 7	<u>Lecture:</u> C language and usage of the libraries. <u>Workshop:</u> Assigning punches (using arm's inverse kinematics) and recorded motions to buttons on the controller.
Day 8	<u>Lecture:</u> Walking manners <u>Workshop:</u> Coding a gait for walking on the flat using inverse kinematics for the legs.
Day 9	<u>Workshop:</u> Finish gait for walking on the flat.
Day 10	Optional, to catch up or to do additional preparations for the competition
Day 11	<u>Lecture:</u> Feedback <u>Workshop:</u> Implementation of feedback to improve the equilibrium of the robot using the sensory information from the IMU.
Day 12	<u>Lecture:</u> Incorporating sensory information. <u>Workshop:</u> Finish the implementation of the feedback; start the implementation of the gait to walk up the stairs.
Day 13	<u>Lecture:</u> Solving complex problems. <u>Workshop:</u> Finish implementation of the gait to walk up the stairs.
Day 14	Optional, to catch up or to do additional preparations for the competition
Day 15	Competition rehearsal. Teams work with their code or record more motions in preparation for the competition.
Day 16	
Day 17	Day of the competition