



Mobile Robotics 5-6 Syllabus

Course Goals

1 Understand Basic Principles of Mechanical Engineering

Students learn about basic engineering principles such as torque, force, mechanical advantage, and gear ratios using the Lego EV3 Robotics platform. They apply these to designing and modifying Lego robots.

2 Understand Introductory Programming Logic with the EV3 Software

Students learn basic programming to control mobile robots using the EV3 programming language and how to utilize sensor feedback systems for conditional logic.

3 Develop Engineering and Problem-Solving Skills

Students apply measurement and geometry to optimize robot navigation and path planning and work in teams to develop creative solutions for challenges. They integrate what they learn about sensors, programming, and robot design to create complex robot behaviors.

Course Topics

1 Engineering Principles

Students learn about force and torque, leverage, mechanical advantage, electricity and energy, and electrical motors.

2 Robotics Design Principles

Students discover gear ratios, stability and center of gravity, articulation and motorized limbs, optimum sensor placement, and the relative advantages of wheels and treads.

3 EV3 Programming

Students use the EV3 programming language, custom programming blocks, control loops and datawires, programming sequences, and logic.

4 Sensors and Feedback

Students incorporate sound, light, color, ultrasonic, and touch sensors. They program sensor input, feedback, and sensor programming blocks.

5 Geometry and Navigation

Students use measurement and course planning, angles and turn calculation, types of turns, obstacle avoidance, and line following to navigate mazes.

6 Team Problem Solving

Students gain problem solving skills through assessing the challenge, brainstorming solutions, cooperative planning, trial and error, and delegating team member responsibilities.

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