

REC Semester 1 Outline

REC Unit 1: Introduction to Robotics

Welcome to REC

- 1.1 (Core): Introduction to Robotics
- 1.2 (Core): Engineering Notebook
- 1.3 (Activity): Engineering Notebook
- 1.4 (Core): Safety
- 1.5 (Core): The VEX Robot
- 1.6 (Activity): Vex Components
- 1.8 (Activity): Chassis Construction
- 1.9 (Core): Drive Train
- 1.10 (Activity): Drive Train Construction
- 1.11 (Core): Robot Controller
- 1.12 (Activity): Wiring the Vex Controller and Battery
- 1.13 (Core): Radio Control
- 1.14 (Activity): Using Radio Control
- 1.15 (Core): Dual Joystick Control (Tank)
- 1.16 (Activity): Tank Control
- 1.17 (Core): Single Joystick Control (Arcade)
- 1.18 (Activity): Arcade Control Operation
- 1.19 (Core): Robot Systems Design
- 1.20 (Activity): Adding Components to the BaseBot
- 1.21 (Project): Motion Path Challenge

REC Unit 2: Introduction to Vex Programming

- 2.1 (Core): Process Control
- 2.2 (Core): Block Programming, Syntax, Motor Control
- 2.4 (Activity): Open-Loop Driving Exercises; Optimization
- 2.5 (Core): Variables and Constants
- 2.6 (Activity): Apply Constants, Variables, and Comments
- 2.7 (Core): Precedence, Tests and Loops
- 2.8 (Activity): Tests and Loops
- 2.9 (Core): Simplified Symbols, Logical Operators, and Integer Math
- 2.10 (Activity): Fine Motor Control
- 2.11 (Core): Pseudocode and Turns
- 2.12 (Activity): Make a Square
- 2.13 (Core): Dead Reckoning and User Functions
- 2.14 (Activity): Simple Shapes with User Functions
- 2.15 (Project): Follow a Complex Path

REC Unit 3: Physics and Robotics

- 3.1 (Core): Motors and Motor Speed
- 3.2 (Activity): Angular Velocity
- 3.3 (Core): DC Motors: Types and Uses
- 3.4 (Core): Gears and Gear Trains
- 3.5 (Activity): Gear Trains
- 3.6 (Core): Fundamentals of Linear Motion
- 3.7 (Activity): Linear Motion
- 3.8 (Core): Rotational Dynamics
- 3.9 (Activity): Linear and Angular Velocity
- 3.10 (Core): Newton's Laws
- 3.11 (Activity): Weight
- 3.12 (Core): Friction and Traction
- 3.13 (Activity): Coefficients of Friction
- 3.14 (Core): Torque
- 3.15 (Activity): Test Motor Torque
- 3.16 (Core): Gear Ratios and Torque
- 3.17 (Activity): Hill Climb
- 3.18 (Core): Power
- 3.19 (Project): Tractor Pull

REC Unit 4: Sensors

- 4.1 (Core): Introduction to Sensors
- 4.2 (Activity): Open-Loop vs. Closed-Loop Navigation
- 4.3 (Core): Open-Loop vs. Closed-Loop Systems
- 4.4 (Core): Introduction to Vex Kit Sensors
- 4.5 (Activity): Bumper Car
- 4.6 (Core): Ultrasonic Sensors
- 4.7 (Activity): Ultrasonic Rangefinder
- 4.8 (Core): Following Lines
- 4.9 (Activity): The Line-Following Sensor
- 4.10 (Core): Advanced Driving Techniques
- 4.11 (Activity): Advanced Driving Exercises
- 4.12 (Activity): Line Following
- 4.13 (Unit Project): Bumper Books

REC Unit 5: Arms and End Effectors

- 5.1 (Core): Introduction to Robotic Arms, Degrees of Freedom
- 5.2 (Activity): Robotic Arm Construction
- 5.3 (Core): Mass, Weight, Center of Weight and Torque
- 5.4 (Activity): Center of Weight of BaseBot
- 5.5 (Core): Relationship of Torque, Gear Ratio and Weight of Payload
- 5.6 (Activity): Stall Torque
- 5.7 (Core): Remote Control; Limit Switches
- 5.8 (Activity): Windshield Wiper
- 5.9 (Core): End Effectors
- 5.10 (Activity): End Effector

REC Unit 6: First Semester Project

This is two-week project that reinforces all the materials covered in Units 1-5.