UAV + UGV DRONES LAB

Unmanned Aerial & Ground Vehicles

MCK-DRLB-MR2

MINDS-i STEM INTEGRATED ROBOTICS: UAV + UGV DRONES LAB

Take STEM learning to new heights with cutting-edge, drones and rovers. Students explore programming, electromechanical systems, and aerodynamics with the UAV + UGV Drones Lab.

UAVs: Design, build, and program drones for aerial search and rescues, GPS-guided crop dusting, autonomous deliveries to remote locations, and other compelling industry-related challenges.

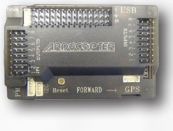
UGVs: Build and configure rugged rovers to manually and autonomously navigate challenging outdoor terrain, avoid obstacles, and perform complex tasks.

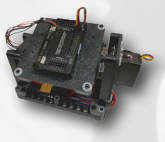
SPARK AND SUSTAIN STUDENTS' INTEREST IN STEM

MINDS-i Robotics engages students in an energizing STEM learning environment with easy to build, program, and modify robots. Technologically advanced rovers and drones perform impressive real-world tasks that build excitement for STEM careers. The curriculum encourages collaborative problem-solving and the open-source Arduino® C++ programming language fosters endless creativity. With outstanding technical support, teachers are empowered and students are inspired to build whatever they envision in their "mind's eye."

COURSE DESIGN

Each lab is one semester (90 Hours) and designed for 3-5 students. Foundations is the recommended prerequisite to the Drones Lab + Curriculum.





GPS & COMPASS | ENCODER | DASHBOARD | DRONE MODULE | RC CONTROL | FLIGHT SIMULATOR | GIMBAL KIT

FIND YOUR MINDS-i SALES REPRESENTATIVE AT:

mindsieducation.com »

info@mymindsi.com »

CURRICULUM OUTLINE - 90 HOURS

Unit 1: Introduction to MINDS-i
- 1.1 Introduction to MINDS-i
- 1.2 Student Performance Development Process
- 1.3 What is a Drone?

Unit 2: UGV - Unmanned Ground Vehicles
- 2.1 Unmanned Ground Vehicles
- 2.2 UGV Chassis Build

Unit 3: Electrical Engineering & Energy Transfer
- 3.1 Energy Types & Transfer
- 3.2 Parts & Purposes
- 3.3 Electric Motors
- 3.4 Volts, Amps & Watts
- 3.5 Batteries

Unit 4: Drone Code & Sensors
- 4.1 Testing the Micro-Controller
- 4.2 Parts & Purposes
- 4.3 Core Syntax Review
- 4.4 Drone Technologies - Part 1
  - 4.4.2 Compass Heading
  - 4.4.3 Gyro & Accelerometer
  - 4.4.4 UGV Drone Build
  - 4.4.5 Power Level Monitoring
- 4.5 Drone Technologies - Part 2
- 4.6 Waves & Information Transfer

Unit 5: Applied Systems Thinking
- 5.1 Systems Thinking
- 5.2 Interrelationship Diagram

Unit 6: Physics of Flight
- 6.1 Physics of Flight
- 6.2 UAV Build

Unit 7: UAV - Unmanned Aerial Vehicles
- 7.1 Unmanned Aerial Vehicles
- 7.2 Flight Dynamics
- 7.3 Simulated Flight
- 7.4 Autopilot & PID Tuning
- 7.5 Manual Flight
- 7.6 FAA Pilot Certification

Unit 8: Culminating Project
- 8.1 Preparing for the Challenge
- 8.2 Cleanup / Organization

STEM INTEGRATED ROBOTICS DRONES

This curriculum covers a multitude of engineering concepts including

- Programming
- Physics
- Mechanical Systems
- Electrical and Electronic Systems
- Hands on Activities and Capstone Projects in each Semester

MINDS-i DASHBOARD SOFTWARE & MEGA 2560 HARDWARE

- Open Source Software / Windows 10, OS X & Linux Ready
- Easy to use Graphical Interface
- Drag and Drop Installation (w/Radio Driver)
- Save and Load GPS Paths
- Live Location Tracking
- Wirelessly Adjust Settings
- Capable of Navigating to 100 Waypoints
- Customizable Graphs: Latitude, Longitude, Yaw/Direction, Pitch, Roll, Ground Speed, Voltage, Amperage and Altitude
- Full Telemetry Logging
- Inclinometer Gauges