MINDS-i DRONES CURRICULUM

Unmanned Aerial Vehicles + Unmanned Ground Vehicles

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

The MINDS-i Drones Lab and Curriculum is an introduction into the world of Drones and Robotics. It is designed as an interactive approach to applied science, technology, engineering and math. In this course students will become familiar with the basics of Drone robotics and programming in a team based environment.

STEM as a System

MINDS-i is rocking the Robotics Education world with a high-technology platform that is simple to use, extraordinarily durable, infinitely modifiable, and will prepare students with the skills they need to excel in the 21st century.

Continuous Learning and Improvement

We inspire a rigorous college and career relevant experience through STEM Robotics in the everyday classroom in a format that can impact each and every student.

Course Design

Each lab is one semester (**90 Hours**), designed for three to five students. Foundations is the recommended prerequisite to the Drones Lab + Curriculum.

GPS & Compass

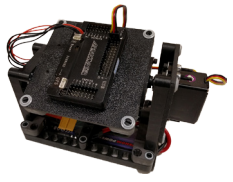
Encoder

Dashboard

Drone Module

RC Control

Flight Simulator


Gimbal Kit

Allegheny Educational Systems, Inc.

REPRESENTED BY:
Allegheny Educational Systems, Inc.
320 East 3rd Avenue
Tarentum, PA 15084
Phone: 800-232-7600
www.alleghenyedusys.com

MINDS-i®

MCK-DRLB-MR2

Curriculum Outline - 90 Hour

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

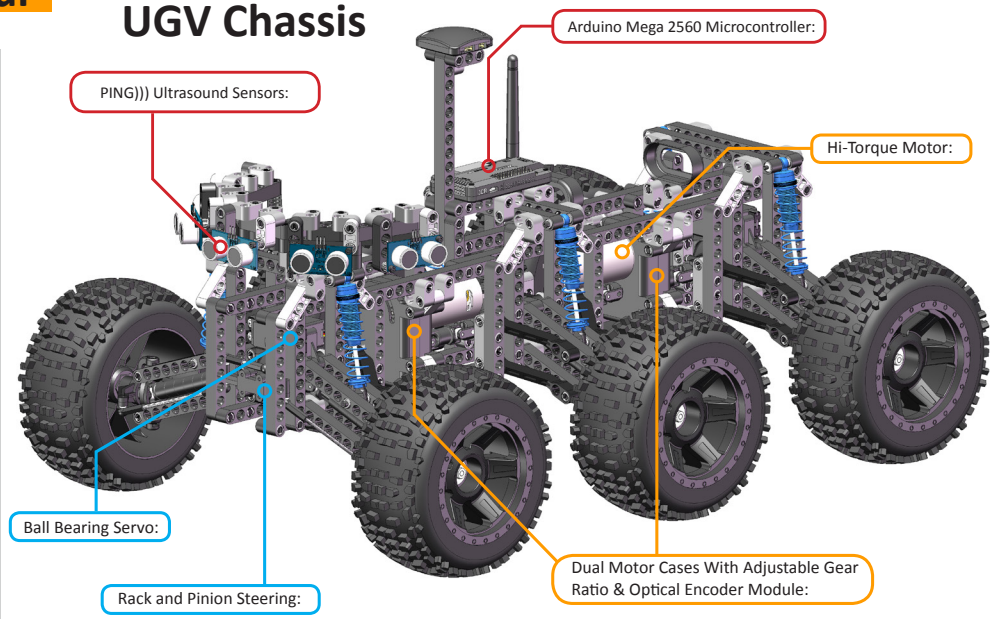
Unit 5: Applied Systems Thinking
- 5.1 Systems Thinking
- 5.2 Interrelationship Diagram

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

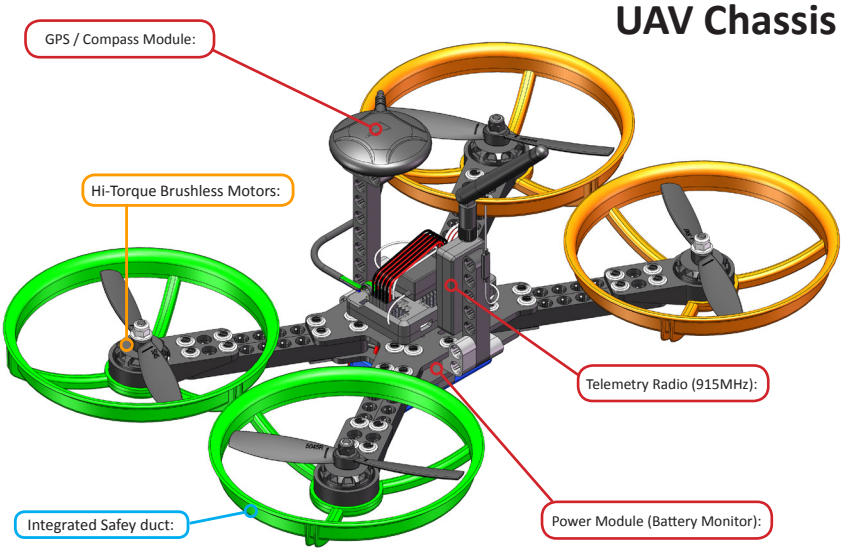
Unit 7: UAV - Unmanned Aerial Vehicles
- 7.1 Unmanned Aerial Vehicles
- 7.2 Flight Dynamics
- 7.3 Simulated Flight
- 7.4 Autopilot & PID Tuning
- 7.5 Manual Flight
- 7.6 FAA Pilot Certification

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

UGV Chassis



UAV Chassis



STEM Integrated Robotics Drones 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
- 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
- Windows 10, OS X & Linux Ready