

SELF-DRIVING TRACTOR LAB

Autonomous Self-Driving Farming

MCK-AFTR-BLU MCK-AFTR-RED MCK-AFTR-ORN MCK-AFTR-GRN



MINDS-i STEM INTEGRATED ROBOTICS: AUTONOMOUS SELF-DRIVING FARMING

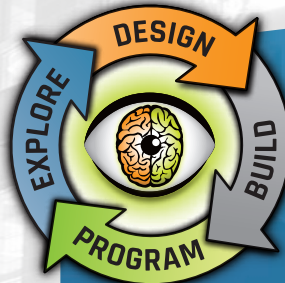
Take STEM learning to new heights with this cutting edge GPS-IMU powered tractor. Students explore programming, electromechanical systems, and autonomous navigation. Students design, build, and program the tractor for ground-based crop evaluation, spraying, spreading, crop monitoring, and other compelling farming related challenges.

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 farm vehicles perform impressive real-world tasks that build excitement for STEM careers. The curriculum encourages collaborative problem-solving and the open-source C++, Python, or ROS compatible 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."

I COURSE DESIGN

This lab is a half semester (45 Hours) and designed for 2-4 students.



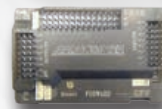
GPS & COMPASS



ENCODER



DASHBOARD



DRONE MODULE



RC CONTROL

FIND YOUR MINDS-i SALES REPRESENTATIVE AT:

mindsieducation.com »

info@my minds i.com »

CURRICULUM OUTLINE - 45 HOURS

Unit 1: Introduction to Autonomous Vehicles

1. Student Performance
2. What is an Autonomous Vehicle

Unit 2: Autonomous Self-Driving Tractor

1. Self-Driving Tractors; Levels of Autonomy
2. Self-Driving Tractors; Current and Future Use Cases

Unit 3: Autonomous Tractor Technologies

1. Self-Driving Tractors; Localization
 - a. GPS Navigation
 - b. Inertial Measurement Unit (Gyro, Accelerometer, Compass)
 - c. Encoder (Cruise Control)
 - d. Localization (Cross-Track Error)
2. Self-Driving Tractors; Communication
 - a. Control Systems
 - b. Object Detection & Avoidance

Unit 4: Electrical Engineering & Energy Transfer

1. Energy Types & Transfer
2. Electric Motors
 - a. How They Work & Benefits
3. Batteries
 - a. Usage, Maintenance, Technologies

Unit 5: Applied Systems Thinking

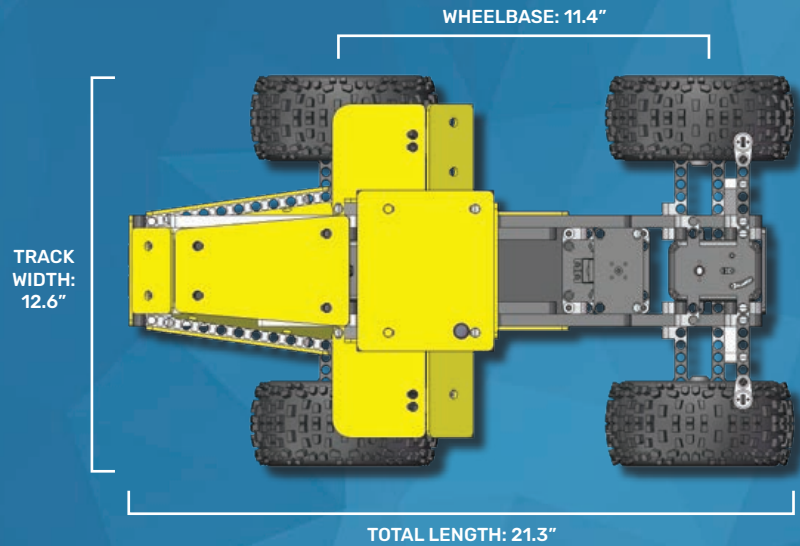
1. Inputs, Outputs and Constraints
2. Interrelationship Diagrams

Unit 6: Culminating Projects; Automated Farming

1. Ground Prep
2. Planting
3. Fertilizing
4. Watering
5. Harvesting



TRACTOR CHASSIS



I 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, Capable of Navigating to 100 Waypoints
- » Live Location Tracking and Wirelessly Adjust Settings
- » Customizable Graphs: Latitude, Longitude, Yaw/Direction, Pitch, Roll, Ground Speed, Voltage, Amperage and Altitude
- » Full Telemetry Logging and Inclinometer Gauges

