
PETERS TOWNSHIP HIGH SCHOOL

COURSE SYLLABUS: AGILE ROBOTICS II

Course Overview and Essential Skills

This course continues from Agile Robotics 1 by delving further into the details of robotics technology. Highlights of AR2 include use of discipline-specific software tools, additional details of robotic systems, application of robot control programming, motion planning, and additional applied electronics skills. The course follows a breadth/depth ratio of 50% laboratory component along with 50% direct instruction component. The laboratory component features various projects to solidify lecture concepts and team-oriented, hands-on projects to solve various robotics problems. Agile Robotics I is a required course before students can enroll in Agile Robotics II.

Course Textbook and Required Materials

- Robotics Curriculum Project: Agile Robotics Course II Curriculum, Carnegie Mellon / California University
- Super Bundle Robotics Kits (12 PROTOBOT package) Innovative First Corporation,
<http://www.vexrobotics.com/vex/products/robot-starter-kits>
- http://www.education.rec.ri.cmu.edu/roboticscurriculum/vex_online/

Course Outline of Material Covered:

Unit or Topic	Concepts/Skills/Resources	Timeframe
Unit of study or major topic as outlined in curriculum	Unit specific skills or concepts, could include projects or labs, movies used or other specific resources, etc	May indicate the month or amount of time for unit
INTRODUCTION TO AUTONOMUS PLATFORMS	<ul style="list-style-type: none"> • Distinguish between new robot platforms. • Combine software integrated development in an environment for program development. • Experience autonomous navigation problems and solutions. • Demonstrate the assigned task of building a robot to solve a problem. • Create responsibility matrices that will ensure work is distributed throughout the team. 	2 Weeks
AGILE ROBOTICS APPLICATIONS	<ul style="list-style-type: none"> • Identify a potential application for agile robotics. • Create a working model of the robot to demonstrate how it might function. • Research and identify an existing robot designs suitable for solving the stated problem. 	One Month

	<ul style="list-style-type: none"> • Formulate the components and configuration of their proposed solution. • Investigate the mechanical and electrical specifications of their solution. • Describe the software development environment or tool set. • Compose an oral report of the team's results and submit a written report. 	
PATH PLANNING AND NAVIGATION	<ul style="list-style-type: none"> • Describe and identify behaviors of different types (basic, simple, complex). • Construct behaviors as necessary to analyze or implement them. • Program a robot to perform various behaviors on the VEX platform using Easy C software. • Design sensors to improve the reliability or functionality of a robot. • Assess the differences between tele-operated (remote control) and autonomous devices, and program both types of robots using VEX Easy C software. 	One Month
ROBOTIC TASKING	<ul style="list-style-type: none"> • Generate multi-disciplinary teams • Produce and communicate effectively using all forms of verbal and non-verbal communications • Describe various methods used to manage and schedule projects • Investigate and conduct design reviews • Identify, formulate solutions for, and solve engineering problems using engineering design processes • Live demonstration of robot performing assigned task working in a robot work cell moving cargo from platform to platform autonomously. 	One Month

**Depending on the needs of the class or changes in the school year, the course outline is subject to change.*