PETERS TOWNSHIP SCHOOL DISTRICT

CORE BODY OF KNOWLEDGE

AGILE ROBOTICS II
GRADES 9-12

For each of the sections that follow, students may be required to understand, apply, analyze, evaluate or create their particular concepts being taught.

COURSE DESCRIPTION:

This course continues from Agile Robotics I 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%/50%. 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.

STUDY SKILLS:

- Maintain an organized robotics notebook
- Adequately follow classroom policies and procedures
- Use concepts to solve non-routine problems
- Apply knowledge from printed text to hands on tasks while developing working models that perform real world tasks.

1. INTRODUCTION TO AUTONOMOUS PLATFORMS

- 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. AGILE ROBOTICS APPLICATIONS

- 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.
- 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.
3. PATH PLANNING AND NAVIGATION

- 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.

4. ROBOTIC TASKING

- 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.

MATERIALS:

Robotics Curriculum Project: Agile Robotics Course II Curriculum, Carnegie Mellon / California University


http://www.education.rec.ri.cmu.edu/roboticscurriculum/vex_online/

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