Engineering & Technology Ed (ETE): Course Descriptions

Robotics I 1 semester, 1 credit 9, 10, 11, 12

Prerequisite: Currently taking or completed or Algebra 1

Students will get hands-on and minds-on to explore basic principles of robotics, automation and programming. Topics will cover robotic principles including basic theory, robot safety, robot classifications, applications, design, C-based programming, and sensor integration. Working individually and collaboratively, students will program, test, and troubleshoot computer controlled automation and robotic processes in both real and virtual world environments. This class provides students with the fundamentals necessary to be a successful member of the school's competitive robotics team, "The Porta-Botz!".

Activities Include: Robot Structure, Configuration and Assembly, C-Based Programming, Code Optimization, Computer Simulations, Autonomous and Human Controls, Sensor Application and Integration, Automation and Robotics Challenges.

Robotics II 2 semester, 2 credit 10, 11, 12

Prerequisite: Robotics I

In this year-long course, students will conduct an in-depth application of robotics principles and automation. Applying the Engineering Design Process, student teams will research, design, fabricate, test and troubleshoot, and optimize a customized robot in a project-based learning environment. Topics cover robotic principles and theory, applications, design, structure, sensor and actuator interfacing, and C-based robot programming. Students will use Computer Aided Design (CAD) software to produce robot models. Members of this class are the core of the school's award winning, competitive robotics team, the Porta-Botz! and will take part in after school practices, weekend competitions, participate in fundraising efforts, and promote STEM and Robotics education in the community through mentorship opportunities.

Activities Include: Engineering Design Process, Documentation, Research and Brainstorming, CAD Drawings, Robot Design and Fabrication, Sensor Integration, Autonomous Programming, Driver Control, Engineering Presentations, and Compete in VEX Robotics Tournaments

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Introduction to Manufacturing I 1 semester, 1 credit 9, 10, 11, 12

In this course students will work individually and in groups studying the effects of manufacturing on society. Activities include creating production systems, testing materials, designing and producing products, and evaluating manufactured products. Students will explore techniques used to apply technology in obtaining resources and changing them into industrial materials and finished products.

Activities Include: Product Design, Jigs and Fixtures, Wooden Tool Box, Mass Production Project, Sheet Metal Project and Laser Engraving

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Introduction to Manufacturing II 1 semester, 1 credit 10, 11, 12

Prerequisite: Introduction to Manufacturing I

In this course you will learn about the process of manufacturing - properties of materials, manufacturing assembly lines, automation principles, and design techniques. Students will design a product, build a prototype of the product, test and evaluate the prototype, and set up an assembly line to produce the product.

Activities Include: Facility Layout, Sheet Metal Project, Project Assembly, CNC Router Project, Laser Engraving, Manufacturing Flow Charts and Automated Work Cells.

Introduction to Construction I 1 semester, 1 credit 9, 10, 11, 12

In this course students will work individually and in groups studying different kinds of residential, commercial, and industrial building structures. Activities include designing construction projects, making working drawings, writing construction specifications, surveying properties, and building foundations and superstructures. Students will explore the applications of tools, materials, and energy used in developing, producing, using, and assessing constructed works.

Activities Include: Power Tool Safety and Use, Transit, Levels and Elevations, Concrete Forms, Framing, and Electrical Wiring.

Introduction to Construction II 1 semester, 1 credit 10, 11, 12

Prerequisite: Introduction to Construction I

In this course you will work individually and in groups studying changes in construction technology as it relates to construction personnel, the design process, contractual obligations, management systems, construction tools and materials, construction of buildings, civil construction, purchasing and financing structures, and community planning.

Activities Include: Framing, Plumbing, Drywall, Roofing, Interior Finishing and Painting, and an Individual Wood Working Project.

Introduction to Transportation I 1 semester, 1 credit 9, 10, 11, 12

Introduction to Transportation 1 is a course that specializes in the study of moving people and goods in the past, present and future. Students will explore vehicular systems used to transport via land, water, air and space emphasizing the principles of operation and societal impacts. Using the Design Process, activities allow students to investigate, understand, design, produce, test and evaluate specific methods of transportation. Major projects include the

Activities Include: Power Point Presentations, Egg Container Drop, CO_2 Race Cars, Boat Hulls, Hot Air Balloons, and 2-Liter Water Rockets

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Introduction to Transportation II 1 semester, 1 credit 10, 11, 12

Prerequisite: Introduction to Transportation I

This course is an activity-based in depth study of transportation and energy technology. Students will design, construct, test and evaluate Electric Air Planes, Solar Powered Vehicles, Mouse Trap Powered Vehicles, and Bridges. Students will also study basic aviation and learn to fly a small aircraft with extensive simulator training and an introductory flight at the airport with a pilot. (An additional field trip fee of $75 is necessary. Students are not required to participate, however.)

Activities Include: Wind Tunnel Testing, Electric Airplanes, Flight Simulation, Bridges, Solar Power Car, and Mouse Trap Vehicle.
