

Engineering & Robotics Courses

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Intro to Engineering L3/L4

ET130/140 - 1.0 Credit - Year Long - Grades 9-12

Prerequisite:

- None

Students will learn the fundamentals of two-dimensional design using architecture as a focus of study. Throughout the full year, students will use their acquired skills to design and plan a variety of engineering, architecture, and other design-based projects. This course will benefit students interested in the fields of engineering, architecture, and design.

Students who chose the honors option will learn all of the material in the L3 Intro to Engineering class and will also participate in additional units on the topic of architectural history and architectural design styles.

Engineering Design (with 3D Modeling) L3/L4

ET230/240 - 1.0 Credit - Year Long - Grades 10-12

Prerequisite:

- C or better in Intro to Engineering

In this class, students will enhance their understanding of the engineering design process by completing various design projects/challenges selected from examples in the mechanical and civil engineering fields. Throughout the course, students will be using 3D modeling software (e.g. SolidWorks) to assist in the design and documentation of their projects. This course will benefit students interested in the fields of engineering and design as well as students who enjoy a hands-on approach to learning. This course can be taken at the Honors level only with the approval of the instructor.

Advanced Engineering Design (with 3D Modeling)

L3/L4

ET330/340 - 1.0 Credit - Year Long - Grades 11-12

Prerequisite:

- C or better in Engineering Design

In this class, students will further their understanding of the engineering design process by completing various design projects/challenges selected from examples in the mechanical and civil engineering fields. Advanced Engineering Design students will use 3D modeling software (e.g. SolidWorks) to assist in the design, documentation, and detailed analysis of their projects. This course will benefit students interested in the fields of engineering and design as well as students who enjoy a hands-on approach to learning. This course can be taken at the Honors level only with the approval of the instructor.

Desktop Manufacturing L3/L4

ET430/440 - 1.0 Credit - Year Long - Grade 12

Prerequisite:

- C or better in Advanced Engineering Design

The focus of this class will be projects to be completed using various desktop manufacturing tools such as 3D printers and CNC routers. Students will use the engineering design process and 3D modeling software (e.g. SolidWorks) to complete their projects. This course will benefit students interested in the fields of engineering and design as well as students who enjoy a hands-on approach to learning. This course can be taken at the Honors level only with the approval of the instructor.

Robotics L3

ET131 - 0.5 Credit - Semester Long - Grades 9-12

Prerequisite:

- None

During the semester course, students will be building and programming vex robotics using a team approach. The emphasis will be on the building and designing of the robots to perform pre-determined tasks. The tasks will be designed for classroom robotic competitions.

Robotics Design Lab L4

ET142 - 0.5 Credit - Semester Long - Grades 9-12

Prerequisite:

- C or better in either Java Programming L4 or Introduction to Programming Using Python L3/L4; **OR**
- C or better in any of: Intro to Engineering L3/L4, Robotics L3, Applied Engineering L4, Materials Engineering L3/L4, or Topics in Engineering L4

In this class, students will design, build, and program robots that are geared to real-world applications. Students will solve problems posed by their teacher and problems that they design themselves. Kits, such as are used in Robotics L3, will not be used in this class; all robots will be built from the ground up.

Applied Engineering L4

ET141 - 0.5 Credit - Semester Long - Grades 9-12

Prerequisite:

- None

This course involves the practical application of scientific principles. Students will be exposed to a variety of hands-on engineering design activities such as rocketry, alternative energy generation, and a “pumpkin chuck.” Students who enjoy working with a variety of materials and equipment to solve design-based problems are encouraged to take this course.

Applied Engineering II L4

ET242 - 0.5 Credit - Semester Long - Grades 10-12

Prerequisite:

- C or better in Applied Engineering L4 AND recommendation of Applied Engineering L4 teacher

This course involves continued practical application of scientific principles. Students will be exposed to in-depth explorations of engineering including structural design and analysis, fluid mechanics, and electronics. Students who enjoyed Applied Tech I and

wish to work with a variety of materials and equipment to solve design-based problems are encouraged to take this course.

Applied Engineering III L4

ET342 - 0.5 Credit - Semester Long - Grades 11-12

Prerequisite:

- B or better in Applied Engineering II L4 AND recommendation of Applied Engineering II L4 teacher

This course involves continued practical application of scientific principles. A variety of engineering topics will be introduced on a revolving basis and students will also design self-directed projects. Students who enjoyed Applied Tech I and II and wish to continue to work with a variety of materials and equipment to solve design-based problems are encouraged to take this course.

Materials Engineering L3/L4

ET231/241 - 0.5 Credit - Semester Long - Grades 10-12

Prerequisite:

- None

Students in this class will investigate the behavior and engineering properties of various materials. The class will use a project-based approach to look at topics including how materials fail, ways materials can be loaded, and the various ways materials respond to loads. At the conclusion of this class, students will have gained an understanding of how materials behave and how to select a material based on engineering concepts.

Students who chose the honors option will learn all of the material in the L3 Materials Engineering class but will use a more quantitative approach to their investigations.

Wood Technology I L3

ET132 - 0.5 Credit - Semester Long - Grades 9-12

Prerequisite:

- None

This is a project-based course in which the students will be required to complete pre-determined projects while learning how to safely use handheld tools as well as portable and machine tools. Throughout the semester students will be introduced to basic woodworking, production, and finishing methods.

Wood Technology II L3

ET232 - 1.0 Credit - Year Long - Grades 10-12

Prerequisite:

- C or better in Wood Technology I L3

This is a design-based course where students will be required to make one pre-determined project and one or more projects of their own design. A variety of production techniques and furniture construction will be presented throughout the course. Advanced operations on all the tools and machines as well as the use of jigs and fixtures will be included.

Wood Technology III L3

ET331 - 1.0 Credit - Year Long - Grades 11-12

Prerequisite:

- C or better in Wood Technology II L3

Students will be expected to design and build their own projects. Advanced woodworking skills will be expected in the project designs. A unit in framing and structures will be introduced as well.

Wood Technology IV L3/L4

ET431/441 - 1.0 Credit - Year Long - Grade 12

Prerequisite:

L3:

- C or better in Wood Technology III L3

L4:

- B or better in Wood Technology III L3 AND recommendation of Wood Technology III L3 teacher

Students will be expected to design and build their own projects. Advanced woodworking skills will be expected in the project designs. Advanced usage of lathe and hand tools will be emphasized. Students who take this class for Level 4 credit will be required to complete a master project using advanced techniques.

Graphic Technology I L3

ET133 - 0.5 Credit - Semester Long - Grades 9-12

Prerequisite:

- None

This course is an introduction to the tools and equipment used in graphic reproduction. Throughout the course, the students will explore a variety of graphic reproduction techniques used in art and industry. Students will be required to complete assigned projects in different forms of reproduction and be able to explore their own creating visions with self-directed projects.

Graphic Technology II L3

ET233 - 0.5 Credit - Semester Long - Grades 10-12

Prerequisite:

- C or better in Graphic Technology I L3

Students in this class will participate in all of the project-based activities as Graphic Technology I, but on a more advanced level. In addition, students will learn the production and business aspects of graphic reproduction by working on real-life school-based projects.

Topics in Engineering L4

ET341 - 0.5 Credit - Semester Long - Grades 11-12

Prerequisite:

- None

This course is designed to allow students to pursue a topic of their interest in engineering that is not currently covered by the normal Engineering Technology curriculum, or a current topic to a greater level of detail. Students will propose a topic to the teacher prior to enrollment and, if approved, over the course of a semester explore that topic with their teacher. This course will be offered in lieu of an Independent Study.