Plymouth Public Schools
Science and Technology/Engineering Program
Course Syllabus

Course Name **STE2063 Engineering Design Process CP1**

Credits Semester, 2.5 credits

Grades Grades 9-12

Course Description

This laboratory course will engage students with essential questions about technology, engineering, science, and decision-making. It will provide hands-on experience with the Engineering Design Process and further the introduction of the students to key physics concepts related to careers on technology and engineering.
Prerequisite: departmental recommendation.

Instructional Objectives

Students will individually and collaboratively:

1. Identify the need or problem, propose solutions, test, evaluate, and communicate final solutions.
2. Design and conduct technology and engineering related investigations and analyze and interpret results of technology and engineering related investigations.
3. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to answer a question or solve a problem [CCSS].
4. Draw evidence from literary or informational texts to support analysis, reflection, and research [CCSS].
5. Produce clear and coherent writing in which the development, organization and style are appropriate to task, purpose and audience [CCSS].
6. Demonstrate proficiency in technology and engineering including, but not limited to engineering design, construction technologies, energy and power technologies (fluid systems, thermal systems, and electrical systems), communication technologies, and manufacturing technologies.

Themes and Topics

- *Engineering Design* – Engineering design involves practical problem solving, research, development, and invention/innovation, and requires designing, drawing, building, testing, and redesigning (e.g., orthographic projections, pictorial drawings, prototype/model construction).
- *Construction Technologies* – The construction process is a series of actions taken to build a structure, including preparing a site, setting a foundation, erecting a structure, installing utilities, and finishing a site (e.g., elasticity, plasticity, density, strength, tension, compression, shear, torsion, Bernoulli's principle, resistant force, zoning laws, building codes).
- *Energy and Power Technologies, Fluid Systems* – Fluid systems are made up of liquids or gases and allow force to be transferred from one location to another. They can also provide water, gas, and/or oil, and/or remove waste. They can be moving or stationary and have associated pressures and velocities (e.g., open fluid systems, closed fluid systems, hydraulic system, pneumatic system, velocity, directional change).
- *Energy and Power Technologies, Thermal Systems* – Thermal systems involve transfer of energy through conduction, convection, and radiation, and are used to control the environment (e.g., conduction, convection, radiation, environmental conditions, renewable energies, nonrenewable energies).
- *Energy and Power Technologies, Electrical Systems* – Electrical systems generate, transfer, and distribute electricity (e.g., voltage, current, resistance, power consumption, series circuit, parallel circuit, circuit components, controllers, alternating current, direct current).
- *Communication Technologies* – Applying technical processes to exchange information, which may include symbols, measurements, icons, and graphic images (e.g., electrical wire, optical fiber, digital, analog, source, encoder, transmitter, receiver, decoder, retrieval, electromagnetic signals).
- *Manufacturing Technologies* – Manufacturing processes can be classified into six groups: casting/molding, forming, separating, conditioning, assembling, and finishing (e.g., properties of materials, required tolerances, end-uses, automation, robotics).

Text and Instructional Materials

- *Engineering the Future: Science, Technology, and the Design Process*. Emeryville, CA: Key Curriculum Press, 2008.

Plagiarism (excerpts taken from Plymouth Public Schools Student Handbook)

9.0 Plagiarism and Copyright Infringement

Existing copyright law will govern the use of material accessed through network. The user will not plagiarize works found on the Internet. Plagiarism is taking the ideas or writings of others and presenting them as if they were yours. All copyrighted material used must have the express written permission of the person or organization that owns the copyright.

Cheating/Plagiarism

Any student who has cheated on any academic exercise will receive no credit for that exercise. Plagiarism is a form of cheating. A parent/guardian will be notified by the involved teacher in all instances of cheating. The investigation of the claim of cheating and plagiarism will involve the student, teacher, and administration.

Grading Policy and Assessment

Levels of proficiency on various tasks and assignments determine student grades. During each grading term, students' grades will be based upon the following:

30%	Class Work and Homework
70%	Assessments

The final course average (semester) will be calculated as follows:

Term (First) Grade	40%
Term (Second) Grade	40%
Final Exam	20%

Additional Information (Provided by Teacher, School)