COURSE DESCRIPTION

Principles of Engineering is one of the foundation courses in the Project Lead the Way (PLTW) high school engineering program, and also in the same category as an Advanced Placement (AP) class. It is a rigorous university-level course, but a final exam which allows high schools students to earn college credit while still in high school. In math class, as students are computing numbers, they should also be understanding the mathematical concepts to obtain the solution. In (POE) students apply their mathematical computations and comprehension of the mathematical concepts that were taught to them earlier, to solve engineering problems. (POE) exposes the mathematical gaps of students, gaps viz. applying the concepts of right triangles, division of fractions and manipulating variables in algebraic equations., and sometimes students struggle applying these concepts at the beginning or during the entire school year. However, the course applies and concurrently develops secondary level knowledge and skills in physics, mathematics, science, and technology.

In addition, (POE) is a high school-level course of engineering and exposes students to some of the major concepts that they will encounter in a post-secondary engineering course of study. However, students have an opportunity to study basics and major concepts of principles of engineering to develop in-demand skills through activity-, project-, and problem-based (APB) learning. (APB) centers on hands-on, real-world activities, projects, and problems that help students understand how the knowledge and skills they develop in the classroom may be applied in everyday life. The (APB) approach scaffolds student learning through structured activities and projects that empower students to become independent in the classroom and help them build skillsets to apply to an open-ended design problem. This approach provides students with unique opportunities to work collaboratively, identify problems, apply what they know, persevere through challenges, find unique solutions, and lead their own learning.

Consequently, to be successful in (POE), students should be concurrently enrolled in college preparatory mathematics and science programs. Students will employ engineering and scientific concepts in the solution of engineering design problems. Students will develop problem-solving skills and apply their knowledge of research and design to create solutions to various challenges. Students will also learn how to document their work and communicate their solutions to their peers and members of the professional community.

SAMPLE COURSE OF STUDY

- Energy sources and applications
- Machine systems
- Fluid power
- Testing the strength and durability of materials
- Understanding how things move and applying that knowledge to projects

Note: This course is aligned with the following National Standards:

- National Science Education Standards
- Principles and Standards for School Mathematics
- Standards for the English Language Art
- Project Lead the Way (PLTW)

GRADING

Your grade is based on a point system. For example: if the assignments’ points for the marking period total 892 points; and you earned 697 points, your grade is \( \frac{697}{892} = 0.781 = 78.1 = C+ \)
REQUIRED MATERIALS
½” 3-ring Binder and a little loose-leaf paper, blue or black pens (optional color pens). Engineering Notebook (provided). Computer & internet access at home. Notify me immediately if either is not available. You will need to access online resources for many assignments.

LEARNING RESOURCES
- PLTW LMS: www.my.pltw.org
- YouTube Movies made by PLTW teachers can often be found.

Note: Students will be notified (in class and in the LMS) when extra supplies are needed for projects.

COMPUTER USE
- The computers are the property of the school district and are intended for student instruction, not personal use.
- Students will be assigned a desktop/laptop.
- Students are expected to handle computers with care and respect.
- Students are to report any problems with the desktop/laptop to the teacher when they arise.
- Students are to use the Internet for schoolwork only.
- Students are not to misuse the computers such as: sending unauthorized messages, vandalizing the desktop/laptop, altering a software program, playing games, etc.
- Students are not to download or upload anything to a school program (programs, games, etc.).
- Students are not to change the desktop/laptop screen.
- Any violation of this computer policy may result in the student losing her/his privilege to use the computer.

STUDENT EXPECTATIONS (EVERY DAY)
- Proper uniform attire (No Hoodies).
- Students are to come to class and be ready to THINK!
- Students are to follow all District and school rules as outlined in the student handbooks.
- Students are to be on time for class. If students are not on time, they must have a pass. No pass will mean a referral to administration.
- Students are to be prepared with the required materials.
- Students are not to talk while the teacher (or anyone else) is talking.
- Authorized electronics only.
- Professionally always conduct yourself.
- No chewing gums.
- No food or drink during class.
- Students are not to leave the class without permission.
- No book bags are to be at the tables or computers.

COURSE OUTLINE
Unit 1: Energy and Power
Lesson 1.1.: Mechanisms
Lesson 1.2.: Energy Sources
Lesson 1.3.: Energy Applications
Lesson 1.4.: Design Problem – Energy and Power

Unit 2: Materials and Structures
Lesson 2.1.: Statics
Lesson 2.2.: Material Properties
Lesson 2.3.: Material Testing
Lesson 2.4.: Design Problem – Materials and Structures

Unit 3: Control Systems
Lesson 3.1.: Machine Control
Lesson 3.2.: Fluid Power
Lesson 3.3.: Design Problem – Control Systems

Unit 4: Statistics and Kinematics
Lesson 4.1.: Statistics
Lesson 4.2.: Kinematic
LATE WORK

Assignments are due on the due date. Assignments not submitted on the due date are considered “missing” and will receive a grade of zero (0). To obtain partial credit for the missing assignment; students will have two days, with a 10% deduction of grade accumulated each day, example: 2 days = 20% deduction of grade, after the due date to submit the assignment. After the three days, the assignment grade is a zero (0).

IMPORTANT NOTES

Assignments are due by 11:59 p.m. on the due date. Assignments submitted after 11:59 p.m. are considered missing. Students should not wait until the last minute to submit their assignments; the teacher will not entertain any reasons why assignments were not submitted on time.

Some due dates will be on days that a student’s class is not scheduled.

Academic Dishonesty – Cheating will not be tolerated. Students will receive a grade of zero (0) for submitting dishonest work. Copying work, looking at another person’s test/quiz paper, asking for help during a test or quiz are all forms of cheating. Consequences for academic dishonesty include a zero on the assignment, notification of your parent/guardian, and documentation in your student file. Repeat offenders will be referred to the Principal for disciplinary action. Please be aware that academic dishonesty may impact your ability to be accepted into college.

Attendance/Missed Classes – It is the student’s responsibility to see the teacher immediately upon returning to school to get the information covered in class during their absence and to plan to take a missed test or quiz.

Independent Work – PLTW’s (POE) curriculum requires students to work independently outside of the classroom. Students may benefit from utilizing an external educational support service.

Classroom – Students will not be allowed to leave (POE) class to do work in another class. Students can only do (POE) work in (POE) class.

Field Trips – The ESUMS’ engineering department’s policy is that students will not get the teacher’s permission to go on field trips if their grade is below a C average at the time of the trip. Academically required trips, such as Ed Connections, are an exception. Students attending field trips are responsible for notifying me in advance and are required to complete assignments in preparation for the next class. Students are expected to take any test or quiz that is missed because of a field trip on the next class day. The student will be expected to keep up with the current work at the same time!

If a field trip is scheduled to be more than one day, you must notify me one week in advance of the trip in order for assignments to be ready. It is the student’s responsibility to ask for this work! Please keep your field trips to a minimum! It is very important to be in class for instruction.

Teacher/Student/Parent Conferences – It recommended that a student has a conference with the teacher before the teacher and parent have a conference. Discussions during a conference will concern: (1) a student not receiving the desired grade for an assignment that was submitted on time, and (2) a student is continuing to have difficulty, learning the material, after seeing me for extra help.

Extra Credit – Extra credit is at the discretion of the teacher. However, no extra credit will be considered if there are “missing” assignments.

PowerSchool’s/LMS – Students and parents should check PowerSchool’s, often so that there are no “surprises”. Students and parents can monitor and manage due dates and grades.

Class Preparedness – Students should always come to class prepared. He/She should have a pen or pencil, paper/notebooks/binder.

FREQUENTLY ASKED QUESTIONS

Q. Will I still get a zero on my assignment if I tried to upload my assignment and something happens and you don’t receive it before 11:59 p.m.?
Yes. Do not wait until the last minute to submit your assignments. Give yourself at least 24 hours’ leeway.

Q. Can I submit my assignment by hand?
A. Only work involving calculations and some drawings. However, it must first be uploaded to the LMS and legible.

Q. How can I improve my grade?
A. By seeing your teacher during help times or by appointment, getting a tutor, or utilizing an external educational support service.

Q. When can I come to see you get help?
A. During the times listed at the top of this syllabus.

Q. Will I get a zero if I am absent and do not submit an assignment when it is due?
A. Yes. The assignments are online. Do not wait until the last minute to start your assignments. Adequate time is given to complete the assignments. One absence should not hinder you.

Please Note: Dr. Panchal has the right to modify this syllabus at any time.