

PRINCIPLE OF ENGINEERING; Kress, D.

[COURSE TITLE]		
8890	TERM 2013-2014	Year
Mr. Kress	PIONEER CENTRAL HIGH SCHOOL	Technology
Room E-109 716-492-9300 1511	[TEACHER EMAIL ADDRESS] @pioneercohsd.org	Help is available periods 3 and 4, and Tech AIS will be held on certain Wednesdays from 2 until 5 pm, The AIS calendar will be posted on my door.

COURSE DESCRIPTION AND GOALS

[ADD IN THE DESCRIPTION PROVIDED TO GUIDANCE THAT WAS PRINTED IN THE PROGRAM STUDY BOOK PROVIDED TO STUDENTS AND PARENTS.]

LEARNING GOALS OF THE COURSE

Principles Of Engineering (POE) is a high school-level survey course of engineering. The course exposes students to some of the major concepts that they will encounter in a postsecondary engineering course of study. Students have an opportunity to investigate engineering and high tech career POE gives students the opportunity to develop skills and understanding of course concepts through activity-, project-, and problem-based (APPB) learning. Used in combination with a teaming approach, APPB learning challenges students to continually hone their interpersonal skills, creative abilities, and problem solving skills based upon engineering concepts. It also allows students to develop strategies to enable and direct their own learning, which is the ultimate goal of education.

To be successful in POE, students should be concurrently enrolled in college preparatory mathematics and science. 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.

Principles Of Engineering is the second of three foundation courses in the Project Lead The Way high school engineering program. The course applies and concurrently develops secondary level knowledge and skills in mathematics, science, and technology.

The course of study includes:

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- Mechanisms
- Energy Sources
- Energy Applications
- Machine Control
- Fluid Power
- Statics
- Material Properties
- Material Testing
- Statistics
- Kinematics
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COURSE TEXT(S) AND/OR RESOURCES [websites]
All materials are provided from Project Lead The Way, Student version of curriculum will be available on their “P” drive in the computer.
Teacher Webpage: www.pioneerschools.org Click High School then Teacher Tab

GENERAL EXPECTATIONS: READY, RESPECTFUL, RESPONSIBLE
Academic Honesty: The Pioneer Central High School policy will be adhered to in all cases of academic misconduct. Plagiarism is a serious offense. All work is expected to be your own, original undertaking. Using another’s work, with or without their permission and attempting to pass it off as your own is never permitted and will be severely penalized. (Consequences for academic dishonesty will be given consistent with the Code of Conduct).
Statement Regarding Student Conduct: Preparing to become a graduate of Pioneer involves more than academic preparation in the classroom. Every day you need to demonstrate positive attitudes and behaviors that are consistent with our Code of Conduct. All adults in our school will be watching to see that you are developing appropriate behavior and will provide you with feedback on your journey toward becoming world-class citizens.
Class Attendance and Active Participation:
Student Submissions of required work:
Other

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GRADING

- Grades will be calculated on a straight point basis. Projects will be based on a scale of 1 to 100 points depending on the assignment or project. Daily work and participation grades will be based on completion of the Engineering Notebook and Portfolio. Activities 20 pts, quizzes 20 pts, projects 100 pts and a National PLTW Assessment 100pts will be given during the year.
- All students must maintain an Engineering Notebook and Portfolio to pass the class. They will be checked periodically throughout semester.

MAJOR LEARNING ACTIVITIES AND PROJECTS (there may be more or less assignments given at the teacher's discretion):

Activity 1.0 Career Professional Interview

Activity 1.1.1 Simple Machine Investigation (VEX)

Activity 1.1.1 Simple Machines Investigation (FT)

Activity 1.1.2 Simple Machine Practice Problems

Activity 1.1.3 Gears (FT)

Activity 1.1.3 Gears (VEX)

Activity 1.1.4 Pulley Drives and Sprockets

Activity 1.1.5 Gears, Pulley Drives, and Sprockets Practice Problems

Activity 1.2.1 Energy Sources

Activity 1.2.2 Energy Distribution

Activity 1.2.3 Electrical Circuits (physical)

Activity 1.2.3 Electrical Circuits (simulation)

Activity 1.2.4 Circuit Calculations

Activity 1.2.5 Mechanical System Efficiency (SIM)

Activity 1.2.5 Mechanical System Efficiency (VEX)

Activity 1.2.6 Maximizing Motor Power (Optional activity)

Activity 1.3.1 Solar Hydrogen System (FT)

Activity 1.3.1 Solar Hydrogen System (VEX)

Activity 2.0 Career Field Description

Activity 2.1.1 Centroids

Activity 2.1.2 Beam Deflection

Activity 2.1.3 Free Body Diagrams

Activity 2.1.4 Calculating Force Vectors

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Activity 2.1.5 Calculating Moments
Activity 2.1.6 Step-by-Step Truss Calculations
Activity 2.1.7 Calculating Truss Forces
Activity 2.2.1 Product Analysis
Activity 2.2.2 Manufacturing Processes
Activity 2.2.2b SME Videos
Activity 2.2.3 Recycling
Activity 2.3.1 Stress/Strain Calculations
Activity 2.3.2 Tensile Testing (SIM)
Activity 2.3.2 Tensile Testing (SSA)
Activity 3.0 Career Demand, Salary, and Education
Activity 3.1.1 Inputs and Outputs (FT)
Activity 3.1.1 Inputs and Outputs (VEX)
Activity 3.1.2 Basic Outputs Programming (FT)
Activity 3.1.2 Basic Outputs Programming (VEX)
Activity 3.1.3 Basic Inputs Programming (FT)
Activity 3.1.3 Basic Inputs Programming (VEX)
Activity 3.1.4 While and If-else Structures (FT)
Activity 3.1.4 While and If-else Structures (VEX)
Activity 3.1.5 Variables and Functions (FT)
Activity 3.1.5 Variables and Functions (VEX)
Activity 3.1.6 Open and Closed Loop Systems (FT)
Activity 3.1.6 Open and Closed Loop Systems (VEX)
Activity 3.1.7 Machine Control Design (VEX)
Activity 3.2.1 Fluid Power Applications
Activity 3.2.2 Pneumatic Demonstration
Activity 3.2.3 Fluid Power Practice Problems
Activity 3.2.4 Hydraulic Demonstration
Activity 4.0 Career Reflection, Abstract, Presentation
Activity 4.1.1 Statistical Data Exploration
Activity 4.1.2 Candy Statistics
Activity 4.2.2 Projectile Motion (Optional)
Problem 1.4.1 Renewable Electrical Energy Design (FT)
Problem 1.4.1 Renewable Electrical Energy Design (VEX)
Problem 2.4.1 Structural Design
Problem 3.3.1 Design Problem
Problem 4.2.3 Design Problem
Project 1.1.6 Compound Machine Design (FT)

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Project 1.1.6 Compound Machine Design (VEX)

Project 1.3.2 Fuel Cell Technology

Project 1.3.3 Thermodynamics

Project 1.3.4 Renewable Insulation

Project 2.1.8 Truss Design (SSA)

Project 2.1.8 Truss Design (VEX)

Project 3.1.7 Machine Control Design (FT)

Project 3.2.3 Pneumatic Brake Design (FT)

Project 3.2.5 Hydraulic Lift Design

Project 4.2.1 Self-Propelled Vehicle Design

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MISCELLANEOUS:

Parent Signature

Student Signature

Printed Name and Date

Printed Name