



## Syllabus: Principles of Engineering (POE) (Project Lead the Way)

### Course Overview:

Students will experience engineering and design technology and use various technological systems and manufacturing processes that demonstrate ways in which engineers and technicians use math, science and technology to benefit people. This course will be a mix of hands-on and academic activities including computer aided design projects, research activities, case studies, team product development, and discussions on the social and political consequences of technological change. (Dual/transcripted credit is offered by Milwaukee School of Engineering [MSOE] with transfer possibilities to other colleges and universities.)

<b>Department</b> Technology and Engineering	<b>Department/Course Website (if applicable):</b> Insert here
<b>Course Number:</b> TEC1020	<b>Instructor:</b> Ignacio Retana
<b>Credits Earned/Length of Course:</b> 1 credit/Semester	<b>Office Hours:</b> available during lunch and 3:30- 5 pm tues,wed, fri
<b>Prerequisites:</b> Introduction to Engineering & Design	<b>Instructor Contact Info:</b> Phone: 608-204-3697 Email: retana@madison.k12.wi.us
<b>Required Materials:</b> VEX Robotics (Provided), Pencils, erasers, black/blue pen, 3 ring binder, calculator	<b>Other:</b> College credit possible if grade of A or B and score of 7 or above on End of Course Exam
	<b>Pathway:</b> STEM: Engineering

### Course Standards:

- [Common Core State Standards for Literacy in All Subjects](#)
- [Common Core State Standards for Mathematics -- Standards for Mathematical Practice](#)
- [Next Generation Science Standards](#)
- [Wisconsin Common Career Technical Core Standards](#)
- [Wisconsin Standards for Technology and Engineering](#)
- [Wisconsin Model Academic Standards for Science \(WMAS\)](#)



# Syllabus: Principles of Engineering (POE) (Project Lead the Way)

## Course Assessment(s):

- PLTW Projects for each lesson
- End-of-Course Assessment: PLTW Principles of Engineering Exam

## Course Outline (including Unit(s) of Time and Essential Questions):

### Unit 1 Energy and Power

Time 20 Days

#### Essential Questions

1. What is a design brief and what are design constraints?
2. Why is it important to begin considering career paths during high school?
3. What career opportunities are available to match your specific interests?
4. What are some current applications of simple machines, gears, pulleys, and sprockets?
5. Why is a design process so important to follow when creating a solution to a problem?

### Unit 2 Materials and Structures

Time 20 Days

#### Essential Questions

1. Why is a design process so important to follow when creating a solution to a problem?
2. What is a decision matrix and why is it used?
3. What does consensus mean, and how do teams use consensus to make decisions?
4. How do the properties and types of materials affect the solution to a design problem?

### Unit 3 Control Systems

Time 23 Days

#### Essential Questions

1. What are the advantages and disadvantages of using programmable logic to control machines versus monitoring and adjusting processes manually?
2. What are some everyday seemingly simple devices that contain microprocessors, and what function do the devices serve?



## Syllabus: Principles of Engineering (POE) (Project Lead the Way)

3. What questions must designers ask when solving problems in order to decide between digital or analog systems and between open or closed loop systems?
4. What impact does fluid power have on our everyday lives?
5. Can you identify devices or systems that do not use fluid power that might be improved with the use of fluid power?
6. What does consensus mean, and how do teams use consensus to make decisions?
7. How does the use of mechanisms affect the overall solution to a design problem?

### Unit 4 Statistics and Ballistics

**Time 20 Days**

#### Essential Questions

1. What are the relationships between distance, displacement, speed, velocity, and acceleration?
2. Why is it important to understand and be able to control the motion of a projectile?
3. Why is process control a necessary statistical process for ensuring product success?
4. Why is theory-based data interpretation valuable in decision making?
5. Why is experiment-based data interpretation valuable in decision making?

### Unit 5 Career Development/21st Century Skills

**Time Ongoing**

#### Essential Questions

1. How do the skills and knowledge I am learning in this class get applied within a job setting?
2. How can I work with a team to develop an answer to a question or solution to problem?
3. How I apply the skills that my future employers will value?

#### **Texts, Technology, and Resources:**

Project Lead the Way Online Learning Management System



## Syllabus: Principles of Engineering (POE) (Project Lead the Way)

### **Behavior/Attendance Policy:**

Part of the grade is employability skills. Students are expected to behave and attend as if at a place of employment. This includes use of cell phone, teamwork and completion of assignments. Behavior and attendance will impact grades. Students are responsible for completing missed work.

### **Grading Policy:**

100-90	A
89-80	B
79-70	C
69-60	D
59>	F

As a student I agree to not use my cell phone for personal use and only use it in class for assistance in completing my work with permission of the classroom teacher/adult. If I use it without permission, I will hand over my cell phone immediately when asked by the teacher/adult. I also agree to complete all assignments and make up any work due to absences or tardies.

\_\_\_\_\_ date: \_\_\_\_\_

As a parent I agree to supporting the teacher by encouraging my student to finish all assignments by seeking support during lunch or after school when necessary.

\_\_\_\_\_ date: \_\_\_\_\_