

# PRINCIPLES OF ENGINEERING

**Instructor's Name:** Mr. Bill Recher  
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<b>Lab/Office:</b>	CATA Room 525	<b>Credits:</b>	1.0
<b>Hours:</b>	8:15 am – 4:00 pm	<b>Days:</b>	90 days (one semester)
<b>Academy:</b>	Pre-Engineering	<b>Time:</b>	90 minute block class
		<b>Course Level:</b>	Advanced Placement
<b>Tutoring Times:</b>	By appointment – before/after school, or Cougar Time	<b>Recommended Prerequisite:</b>	None

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## Course Description:

Principles of Engineering is one of the specialization courses in the Project Lead The Way® (PLTW) high school pre-engineering program. The course applies and concurrently develops secondary level knowledge and skills in mathematics, science, and technology along with career exploration in engineering.

In this specialized PLTW course, students apply what they learn about various aspects of engineering. Working in teams, students explore hands-on activities and projects to learn the characteristics of various engineering disciplines. Through problems that engage and challenge, students explore a broad range of engineering topics, including mechanisms, the strength of structures and materials, and automation. In Principles of Engineering (POE) students develop skills in problem solving, research, and design while learning strategies for design process documentation, collaboration, and presentation.

## Course Objectives:

Engineering is a profession that contributes to change and improvements in our world. It creates imaginative and visionary solutions to the challenges of the 21st century – the problems of feeding the world, how we will use energy and continue to protect our environment. Engineering and technology play a vital role in the quality of everyday life and wealth creation. Appropriate attitudes relative to the professional social obligations of the engineer, and the relationships between math, science, technology and society need to be learned. Real world, open-ended engineering problems that cover a wide range of content will be presented.

## Statement of Course Level:

This course is an Advanced Placement (AP) course. Students earning credit for an AP level course receive an elevated number of Quality Points for their Grade Point Average. Students should be aware that this level course will include:

- More challenging coursework and assessments. Students will be expected to demonstrate higher levels of understanding for grades.
- Projects and presentations will be more in depth.
- Students will have to focus and study regularly to master the content.
- The expectation that students can move through the coursework at an accelerated pace and students experiencing difficulty should quickly seek guidance from their teacher on how they can be more successful.

### Grading Policy:

The semester will be divided into 3 six-week periods. Each six weeks will count 25% of the final grade. The final exam will count 25% of the overall grade. The final exam cannot be exempted. The six week grades are awarded on a point system as follows:

- Tests: 100-300 points each
- Projects: 100-200 points each
- Classwork, quizzes and other assignments: 10 – 50 points each

Categories of Quizzes, Exams, and Projects will be equally weighted to make up each six week grade – therefore each quiz and test is very important. Extra credit may be possible – at the teacher’s discretion – during the semester to further explore a concept, not to make up for delinquent work or poor grades.

### Final Exam:

A National PLTW Assessment will be given at the end of the course as a review of what was covered during the entire course.

### Supplies Needed:

1. USB Flash Drive (4GB minimum)
2. #2 Pencils or 0.5 mm mechanical pencil
3. Engineering Journal (IED is acceptable)
4. Scientific calculator
5. Misc. materials as necessary during the semester

### Resources:

Each class has a variety of resources available to students to study at home and maximize their success in the class. For this course students have access to:

- Each unit has a module in Canvas which contains class PowerPoints, vocabulary, video clips and more. (Students can access these modules using the home page for this course).
- UCPS subscribes to a variety of resources for students to use in all their classes located on the student “Start Up Page” linked to the UCPS web page. Students will find access to many resources including videos, current events and software for creating digital projects.
- “EmpowerED Family Portal” (<https://www.ucps.k12.nc.us/domain/2917>) – this provides parents with links to online resources and apps that students can access.
- CATA provides a wide variety of print and digital resources through the media center. Students will find resources for researching any topic, writing citations, and a lot more.

The primary resource for communicating information will be through the class Canvas page, which can be found on the CATA website. All assignments and copies of lectures will be made available on Canvas. Additionally there will be a tab for Student Resources available to students. Students should be able to access teacher Canvas pages from any internet source, not just their Chrome books.

### Assignments:

#### Reading:

1. As assigned in class from various sources.

#### Quizzes / Tests:

1. Vocabulary quizzes are used to review new vocabulary introduced with each unit.
2. Unit tests are used to review chapter, lecture and demonstration topics.
3. Review tests are an excellent tool to help reinforce your learning. Please take advantage of the test questions, and do not hesitate to ask about or discuss test questions.
4. Practical assessments are a part of the course where students are expected to be able to produce a drawing within a specified time frame.

### Exercises / Problems:

1. Exercises / problems will be assigned from various resources and can be found in the class Canvas page.
2. Hand drawn and lettering work are to be kept in your journal and will be the student's responsibility to maintain.
3. All CAD work should be saved to your USB Flash Drive using the specified file name. For example, save Exercise 1-2 as EX1-2.
4. Follow all the steps required to complete each exercise. This will be confirmed when your files are evaluated.

### **Make-up Work rules / Procedures:**

Per policy students will have (2) days to make up work for every (1) day of an excused absence. It will be the student's responsibility to determine what was missed by checking Canvas, their partners in class, or the teacher outside of instructional time. Students are to submit any assignments, make up quizzes / tests within this time frame. Failure to do so will result in a zero entered for the grade. Arrangements in advance are welcomed, including via e-mail.

- A zero (0) grade in PowerSchool represents work the student CANNOT makeup;
- A one (1) grade in PowerSchool represents work the student MAY makeup in the allowed period of time, or upon prior agreed upon deadline.

### **Canvas:**

The majority of assignments will be submitted on our "learning platform," Canvas. Assignments can be submitted a variety of ways including, uploading files, typing into text boxes, and sharing Google documents/presentations. Students not having used Canvas before should alert the teacher and they will be shown how to submit assignments on Canvas. Individual assignments will indicate which method of submission on Canvas is expected. If students need a refresher or have questions, they can access the [Canvas Student Guide](#) for specific instructions. It is the student's responsibility to ensure assignments are submitted on time and to contact the instructor if there is a problem. The Canvas Learning Platform logs every student log-in on Canvas which provides teachers with a list of when students log-in to Canvas using their user id.

Canvas is used to grade assignments as well, however, the grades in Canvas, while accurate to that assignment, are NOT the teacher's gradebook. The teacher's gradebook includes categories of assignments that may be weighted differently and may include grades for assignments that did not use the Canvas Learning Platform. Therefore, students and parents should always check their child's true average on the Parent Portal on Powerschool.

### **Classroom Policies and Expectations:**

1. All necessary materials will be brought to class every day.
2. Every student should be seated and ready to learn when the tardy bell rings.
3. All assignments and projects are to be turned in on time. Late work will automatically receive a (1) letter grade deduction for each day late. (Use Cougar time wisely)
4. Cheating will not be tolerated. Do your own work. All suspected of cheating will receive a zero for each assignment.
5. Make up work due to an excused absence is the student's responsibility. A student has 2 days per each day missed to make up missed work. After that the grade will be a zero unless prior agreement is made with the teacher.
6. No food or drink is allowed in the drafting lab.
7. No inappropriate behavior (i.e. profanity, bullying, horse-play)
8. Respect all UCPS property (i.e. computers, desks, chairs, drafting equipment)
9. Students are to receive permission and a handwritten pass from the teacher to leave the classroom.

10. Each student is responsible for keeping up with Handouts and class notes. Focus on the task at hand and do the work that is expected. If a student is absent it is their responsibility to find out what information is needed for their notebook.
11. Everyone is to be treated with respect. If the teacher or another student is speaking to the class they deserve your attention. No threatening, negative talk, or put-downs.
12. All CATA Rules and Union County Public Schools Rules as stated in the student handbook are to be followed, specifically regarding cell phones, ear buds, wearing hats, dress code, etc.

### **Consequences for Violating Policies and Guidelines:**

1. Verbal Warning
2. Student/Teacher Conference
3. Parent Contact (phone call home during class and/or parent/teacher meeting)
4. Office Referral

### **Course Description:**

In this specialization Project Lead the Way (PLTW) course, students apply what they learn about various aspects of civil engineering and architecture to the design and development of a property. Working in teams, students explore hands-on activities and projects to learn the characteristics of civil engineering and architecture. In addition, students use 3D design software to help them design solutions to solve major course projects. Students learn about documenting their project, solving problems, and communicating their solutions to their peers and members of the professional community of civil engineering and architecture.

Civil Engineering and Architecture is one of the specialization courses in the Project Lead The Way® high school pre-engineering program. The course applies and concurrently develops secondary level knowledge and skills in mathematics, science, and technology.

### **Course Objectives:**

Engineering is a profession that contributes to change and improvements in our world. It creates imaginative and visionary solutions to the challenges of the 21st century – the problems of feeding the world, how we will use energy and continue to protect our environment. Engineering and technology play a vital role in the quality of everyday life and wealth creation. Appropriate attitudes relative to the professional social obligations of the engineer, and the relationships between math, science, technology and society need to be learned. Real world, open-ended engineering problems that cover a wide range of content will be presented.

### **Statement of Course Level:**

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- More challenging coursework and assessments. Students will be expected to demonstrate higher levels of understanding for grades.
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### **Final Exam:**

A National PLTW Assessment will be given at the end of the course as a review of what was covered during the entire course.

### **Supplies Needed:**

6. USB Flash Drive (4GB minimum)
7. #2 Pencils or 0.5 mm mechanical pencil
8. Each student is required to have a 1” - Three Ring Binder
9. Engineering Journal (IED is acceptable)

### **Resources:**

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8. Practical assessments are a part of the course where students are expected to be able to produce a drawing within a specified time frame.

### Exercises / Problems:

5. Exercises / problems will be assigned from various resources and can be found in the class Canvas page.
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### **Classroom Policies and Expectations:**

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14. Every student should be seated and ready to learn when the tardy bell rings.
15. All assignments and projects are to be turned in on time. Late work will automatically receive a (1) letter grade deduction for each day late. (Use Cougar time wisely)
16. Cheating will not be tolerated. Do your own work. All suspected of cheating will receive a zero for each assignment.
17. Make up work due to an excused absence is the student's responsibility. A student has 2 days per each day missed to make up missed work. After that the grade will be a zero unless prior agreement is made with the teacher.
18. No food or drink is allowed in the drafting lab.
19. No inappropriate behavior (i.e. profanity, bullying, horse-play)
20. Respect all UCPS property (i.e. computers, desks, chairs, drafting equipment)
21. Students are to receive permission and a handwritten pass from the teacher to leave the classroom.
22. Each student is responsible for keeping up with Handouts and class notes. Focus on the task at hand and do the work that is expected. If a student is absent it is their responsibility to find out what information is needed for their notebook.

23. Everyone is to be treated with respect. If the teacher or another student is speaking to the class they deserve your attention. No threatening, negative talk, or put-downs.
24. All CATA Rules and Union County Public Schools Rules as stated in the student handbook are to be followed, specifically regarding cell phones, ear buds, wearing hats, dress code, etc.

### **Consequences for Violating Policies and Guidelines:**

5. Verbal Warning
6. Student/Teacher Conference
7. Parent Contact (phone call home during class and/or parent/teacher meeting)
8. Office Referral

### **Tardy Policy:**

All students are expected to be in their classrooms and ready to receive instruction before the tardy bell rings for each class. If a student does not have a Tardy Pass it will be recorded as unexcused unless an excuse can be verified by staff. All students must report to the office for a Tardy Pass if late to first period. *Students arriving on late buses will not be considered tardy.*

### **Consequences for Violating Tardy Policy:**

All students must report to the office when tardy to first period and to class the rest of the day.

- **1st/2nd Tardy:** Warning from a teacher (for every tardy)
- **3rd Tardy:** Parent will be contacted by phone
- **4th/5th Tardy:** The teacher will submit a discipline referral to administration and will receive a (1) day ASD with administration. An administrator will contact a parent.
- **6th/7th Tardy:** The teacher will submit a discipline referral to administration and will receive a (2) day ASD with administration. An administrator will contact a parent.
- **8th Tardy:** The teacher will submit a discipline referral to administration and will receive a (3) day ASD with administration. An administrator will contact a parent to set up a parent conference, create a written plan, and possible additional consequences.

*The administration reserves the right to modify consequences on a case-by-case basis whenever appropriate. This may include loss of parking privileges.*

### **Computer Use Guidelines:**

The computers are to be used for classroom instruction only. Students are not to be on the internet unless the classroom assignment requires it. The computer is not to be used to play games. Do not change any settings on the computer.

The following activities are strictly prohibited on all computers and will result in disciplinary action:

- Tampering or mistreating computer hardware in any way (display settings, unplugging, switching mice or keyboards, etc.)
- Listening to music, playing games, or watching videos/movies that are not teacher directed
- Placing games/entertainment files in shared folders on the network
- Bypassing the internet filter to access blocked websites
- Participating in chat rooms or online "meeting" websites (i.e. My Space, facebook, Snapchat)
- Outside Email (only school email accounts are allowed)
- Tampering with system files of computers
- Accessing network files not associated with course content

- Accessing websites with inappropriate content (i.e. gang related, sexually explicit materials, sites containing profanity)

### **Consequences for Violating Computer Guidelines:**

1<sup>st</sup> Offense: Restricted computer access

2<sup>nd</sup> Offense: Access blocked for remaining class period and parent contact (phone call home during class)

Repeated offenses will result in parent/teacher meeting and/or office referral.

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