

# Engineering Principles and Design

## 2020-2021

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Remind = @ a99gc7

OneDrive = *individual student folders*

Microsoft Teams = *6215 1 Engineering P\_D*

### **COURSE DESCRIPTION**

This course engages students in the use of modern technologies in the design and improvement of products. Students use three-dimensional CAD software in the creation and analysis process. Students document designs using standards set by industry for design documentation. Students implement methods of green production and just-in-time component supply, which allow for the lowest cost and highest quality products. This course is designed to expand the students' opportunities for applied learning. This course provides an in-depth lab experience that applies the processes, concepts, and principles as described in their other engineering classroom instruction. The coursework will encourage students to explore and develop advanced skills in their program area. The appropriate use of technology and industry-standard equipment is an integral part of this course.

### **COURSE LEARNING OUTCOMES**

The class will cover the use of engineering concepts through extensive hands-on work in application of theory and related calculations. Topics will include the history of engineering, measurement, machines related to engineering, physics, energy, materials, statics, and kinematics. Students will develop problem solving skills both individually and in teams. Students will apply their knowledge of research and design to create unique solutions to multiple challenges. All work will be documented and presented in industry-standard, professional formats. Students in Engineering P&D do the following:

- Use terminology of the field.
- Research design and production technical texts, journal articles, and related documents.
- Use the Engineering Design Process.
- Use design and production concepts to solve problems.
- Relate manufacturing to societal principles, including economic implications.
- Use design and production tools to make decisions and solve problems.
- Apply project management principles.
- Gain information on how the American manufacturing industry works.
- Use appropriate and effective research skills.
- Use best practices to design and implement research studies.
- Use science practices to design investigations.
- Demonstrate proficiency in word processing, spreadsheets/databases, and presentation software.
- Communicate information, including descriptive mathematics, to audiences.

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## **MATERIALS & ASSESSMENTS**

1. *Engineering Notebook*: Students maintain an electronic portfolio or a written notebook for each project. The purposes are to document the investigative process and research; to develop organization skills necessary for success in continuing education, the workplace, and in completing the written product at the end of the project; to write daily reflections on new insights; to practice the inquiry process for group and individual questions; and to use the notebook as a study guide.
2. *21st-Century Skills*: The 21st-century skills are the personal skills necessary to compete in a global economy that demands innovation by workers, business owners, and entrepreneurs. Competition in the modern economy requires an understanding of global awareness; financial, economic, business, and entrepreneurial literacy; and civic, health, and environmental literacy.

We will use:

*For receiving assignments and work from Mr. Fitzgerald:*

Primary choice = MS Teams

Back-up = Email

Emergency = Remind

*For returning work to Mr. Fitzgerald:*

Primary choice = MS Teams

Back-up = OneDrive

Emergency = Email

*For video conference and attendance:*

Primary choice = MS Teams

Back-up = Remind

Emergency = Zoom

3. *Project Academic and Technical Tasks*: Evaluation includes the demonstration of academic tasks, such as solving mathematics problems, applying science concepts, reading technical and academic materials, writing information/explanatory or argumentative texts, and making oral presentations to an authentic audience.
4. *End-of-Project Exams*: Each project includes an end-of-project exam designed to assess whether or not each student mastered the academic and technical content required to complete the project.

## **GRADING**

1. Quarter grades will be composed of the following types of assignments:  
[Semester Final, 15%] , [Homework/Classwork, 70%: Lab Skills/Safety, Project Work, Project Reports, CTSO engagement and participation(SkillsUSA), Current Events, Presentations, Projects, Posters, Power-points, etc.], [Participation, 15%: Asking/Answering questions, Listening, Actively working and contributing].
2. Homework/classwork will receive a completion grade of 5-50 points based upon the assignment. Points will be deducted for unanswered, incomplete, and incorrect questions. All paper assignments will be collected in the beginning of each period. There will be no printing of paper assignments during the class time. Assignments should be printed and stapled before coming to class. I will collect all homework papers in the beginning of the class. Any work turned in during the class period will be considered late. When turning in an assignment late, the

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assignment will receive a “late” grade. Any assignments over two weeks late will not be accepted.

3. **Citizenship.** Webster’s Dictionary defines citizenship as “the quality of an individual’s response to membership in a community.” Good citizenship is expected of all students. A good citizen not only assumes responsibility for personal success, but also contributes positively toward success of the group. A letter grade of less-than perfect may be given in citizenship. An unsatisfactory (U) will be given to students who have excessive tardies, who have been sent to the Dean’s Office, or who have failed to conduct themselves according to expected behaviors.
4. **Class Notebook.** The notebook is an essential element to the success of the student. The notebook shall contain all class notes, learning logs, lab reports, warm-ups, project summaries, current events, all assignments, tests, quizzes, and test corrections. The notebook will be graded on format, neatness, and completeness.

A	90-100%
B	80-89%

C	70-79%
D	60-69%
F	<60%

## **GENERAL POLICIES & EXPECTATIONS**

All cell phones must be turned off or in silent mode—just like movie theater conduct. Talking or texting on the phone during class activities is prohibited. Violation of these policies is disrespectful of your classmates and instructor. If there is an emergency, please step in to the hall to use your phone.

Assignments must be submitted on time. Late work must be made up within two weeks. All late assignments will lose 20% for 1 to 7 days late, and 50% for 8-14 days late. Students who miss school due to absence or illness will have the same number of days as the absences to make up work.

- *Student Responsibilities* - Students are expected to be aware of assignment due dates for each class and plan their time accordingly in order to complete it by that date. Students who do not understand or need extra help to complete assignments are expected to seek help before the assignment is due.
- *Parent Responsibilities* - Parents are expected to be aware of due dates and support their student in managing his/her time in order to meet them. Parents are expected to regularly monitor progress on Infinite Campus. Parents are expected to encourage and support their student to seek help, when necessary.

## **MATH AND ENGLISH STATEMENT**

Students who complete their college-level Math and English courses early have much higher graduation rates, and your success is our priority. This class encourages development of workplace communication skills, vis-à-vis reading, writing, and presenting your work.

## **ACADEMIC HONESTY**

All students are expected to maintain a high standard of intellectual honesty. Academic dishonesty will not be tolerated and may result in a failing grade and/or reporting to AACT Administration. Anyone involved in academic misconduct in this course will forfeit all assignments and receive a Zero (0) for that

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assignment/test. Repeat offenses will result in a letter to the dean/chair and possible failing grade in the course. See the AACT Parent-Student Handbook for more information. Plagiarism is a serious form of cheating and will not be tolerated. Be sure to cite any references where appropriate in your assignments. Never “copy/paste” in a science class, not even with quotes. Be careful when paraphrasing. Do not copy from other students.

## **CLASSROOM BEHAVIOR EXPECTATIONS**

Students in this class will be asked to take personal responsibility and develop self-discipline by following the school motto of RAP.

**Respectful:** Respect yourself and others. Use classroom materials properly. Respect everyone’s right to learn.

**Appropriate:** Display a positive attitude through your words and actions. Maintain a safe learning/working environment. Take personal responsibility.

**Prepared:** Be an engaged and positive team member. Be on time and prepared to learn. Be proactive.

## **MODE OF INSTRUCTION** (Class meeting may vary based on personal or district schedule)

1. *In-Person* - Class meets Face-to-Face for 85 minutes in room 105.
2. *Hybrid program* - will meet in-person one day and remotely one day. Students will be expected to complete most classwork and textbook work during remote time, using MS Teams and OneNote, to allow for potential project work time on in-person days.
3. *Distance learning* - will be conducted entirely through MS Teams and OneNote with some links to other materials and training. There is a potential for hands-on activities taking place at home with both parent involvement and/or pictures submitted via MS Teams.

The remote and hybrid learning environments will have the same expectations. The only difference is that remote will be completing all requirements online. These assignments will provide them the opportunity to engage with others who are remote learning, as well as receive support from Mr. Fitzgerald. Collaboration and participation in digital group platforms (ex: discussion channels) IS required for 100% online students.

Some of the activities may “look” different for distance learners (ex: a face to face activity will be converted to digital). Technology will be used in both hybrid and remote learning. It is imperative that you complete the back to school survey so I can assess any needs.

## **CLASS PREPARATION**

These items should be brought to class each day: pen and pencil, paper, engineering notebook, colored pens/pencils, highlighters.

## **LABORATORY SAFETY**

Due to the nature of the class, misbehavior during a lab activity will result in removal from the lab and a zero for that lab. Special instructions and rules to follow will be provided before any lab activity and are in class materials. You will be required to sign a lab safety contract prior to our first lab.

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Dear Parents and Guardians,

I would like to take this opportunity to introduce myself. I was a professional hydrologist for 14 years before joining AACT last year as the Manufacturing Engineering teacher. I have taught in various venues and courses over the past 20 years at UNR and TMCC and in obtaining my teaching credential. You will notice that each of these different career experiences impact my teaching, as your child will learn how to research in addition to using technology for learning and producing media projects.

It is my aim to become partners in learning with the common goal of supporting your child toward success in engineering this year! Some ways you can support your child include: checking Microsoft Teams regularly, have discussions and ask them about their learning, ask them to show you progress on their work, and regularly check grades in Infinite Campus (IC).

Please feel comfortable reaching out to me if you should have any questions or concerns. I appreciate your support!

Sincerely,

Brian Fitzgerald

Engineering Principles and Design Student Contract

I, \_\_\_\_\_ [student], have read and understand this syllabus for Mr. Fitzgerald's Engineering classroom. I agree to adhere by the rules made and to be responsible for my actions. I will also work hard to meet the expectations and work to my full potential.

My personal goal for this school year is:

\_\_\_\_\_  
\_\_\_\_\_

Plan on how to achieve goal:

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_ date \_\_\_\_\_ Preferred contact method:  
Guardian Signature

\_\_\_\_\_ date \_\_\_\_\_  
Student Signature