

Principles of Applied Engineering

2020 – 21 Course Description

How do architects and engineers design the structures and products we use every day? Principles of Applied Engineering is a year-long introduction to the concepts and practices that form the foundation of careers in architecture, engineering, and technical design.

This course is taught in a computer lab, and the computer is a tool that will be used throughout the course to assist students with research, communication, technical writing, simulations, computer-aided drafting, 3D modeling, diagramming, calculations, and presentations.

This course can be taken alone, but it is designed to be the introductory course to a 3- or 4-year pathway in technical design that can lead to a graduation endorsement in STEM for Engineering.

Units and Topics of Instruction

Engineering Norms	<i>innovation & invention, impacts of technology</i>
Engineering Ethics & Failure	<i>professional practice, role of failure in design</i>
Mechanical Design	<i>machines & mechanisms, reverse engineering</i>
Electronics & Robotics	<i>circuit design, sensors, pseudocode, programming</i>
Drafting	<i>technical sketching, visualization, 2D and 3D modeling</i>
Structural Design	<i>loads & forces, bridge design, model-building & testing</i>
Architectural Design	<i>skyscrapers, space planning, floor plans, 3D modeling</i>
<u>over-arching course themes:</u>	
<i>Design Process</i>	<i>concept generation, prototyping, testing, documentation</i>
<i>Productivity Software</i>	<i>file management, word processing, spreadsheets, presentations</i>

Instructional Methodology

The course is project-based—meaning that the end result of each unit of instruction is the completion of one or more individual projects that allow students to demonstrate understanding of concepts and skills learned in class. During each class, the instructor will present new concepts and skills, using demonstration and lecture, and supervise students as they develop their knowledge of techniques, tools, and processes used in the design fields. Long-term projects will be broken into smaller “chunks” appropriate for grade-level work. The only exams are the fall and spring comprehensive finals, which assess both conceptual and skills-based understandings.

ONLINE – classes will include both synchronous (in-person) and asynchronous learning daily; synchronous work will be vital to conceptual understanding as well as partner and team work on projects

Recommended Materials

- Students must have a writing utensil in class every day. A mechanical pencil is recommended for periodic sketching activities.
- Graph paper, either loose sheets or a bound book (does not need to have a lot of pages)

Makeup Work and Absences

A student who misses class is responsible for all work missed during their absence, even if the absence is excused. Students should consult the BLEND class calendar and daily assignment to see what work was missed and ask the instructor for any necessary materials and/or files to complete the work.

Grading Policy

Frontline SIS (TEAMS) is the gradebook of record. Some assignments will be graded in BLEND; however, only grades shown in TEAMS are used for the six weeks average.

<p>Daily Work (many minor grades per grading period)</p>	<p>Typically, every class period will result in one or more daily grades for such work as CAD files, class notes, sketches, etc. There is no “busy work”—everything assigned is important and will be assessed. Most daily assignments will be worth between 5 and 25 points, depending on time spent and complexity.</p>
<p>Projects (a few major grades per grading period)</p>	<p>Most units will end with a project that spans several class periods. The final product will count for more points, but the design steps leading to the final product will also be assessed. Long projects will be broken into pieces, most valued between 50 and 100 points.</p>
<p>Employability Skills & Work Habits (one major grade per grading period)</p>	<p>Employability skills are important. All students will be given a Work Habits assessment <i>every day of class</i>. The average of these daily assessments will count for 15% of the six weeks grade. It is difficult to complete work for this course outside of class time, so our class time is highly valued and must be used well. Tardies, unexcused absences, lack of effort, inappropriate behavior, and inappropriate use of technology are all issues that will affect a student’s Work Habits daily grade.</p> <p>ONLINE – the Work Habits assessment will NOT be used until face-to-face instruction begins in the spring semester</p>

Classroom Policies and Procedures

I enforce all campus and district policies, including dress code. [These apply for online instruction also!](#)

IN-PERSON

- The classroom is a learning and work environment. It is vital that students today learn to use technology appropriately during designated work time.
 - Students are not allowed to play games using classroom computers or personal devices, *even if class work has been completed*. Students playing games in class will receive a zero for the daily work habits grade.
 - Cell phones are for academic use only. Listening to music during class is not an academic use. No headphones should be worn during class time. The campus cell phone policy will be enforced.
 - Use of the internet and social media is strictly for academic purposes. Violation of this policy will result in the daily, weekly, or permanent removal of internet privileges.
- Copying work from another person or changing another student’s work is strictly prohibited. This is a very serious matter, which will merit referral and a grade of zero, which cannot be replaced.
- Changing the fixed settings or configuration of the classroom computers is prohibited. This includes downloading programs.
- When the tardy bell rings each day, all students should be seated and begin working on the daily assignment or wait for instructions. Tardy students will lose points on the work habits grade on the day they are tardy. *Tardy students will not be allowed to use the hall pass—this is a big deal with a 90-minute class!*
- One student is allowed to leave the classroom at a time. Students **MUST** use the hall pass whenever they leave. No hall passes will be given out during the first 10 minutes or last 10 minutes of class. Hall pass privileges can be lost for the week, six weeks, or semester if misused.

ONLINE

- Students are expected to conduct themselves appropriately during online learning. All campus and district policies apply, including appropriate speech, written communication, dress, and general conduct.
- Students are expected to use technology appropriately, including Zoom or other online meetings, email communications, and other platforms.
- Class Zoom meetings will be recorded, even if they are not posted. Chat sessions for each Zoom meeting will be saved.