2026-2027 Principles of Engineering
Sheridan High School
Grace Conrad
gconrad@nlsd.k12.oh.us

Google Classroom Codes:

Course Description

Principles of Engineering is an elective course designed to introduce students to the broad concepts, practices, and problem-solving skills used in engineering and technology.
Students will explore engineering through a combination of **hands-on projects, design challenges, experimentation, computer-based tools, presentations, individual assignments, and collaborative work**.
Because this is an elective, students are encouraged to shape the depth and difficulty of their own experience. Students who want a more challenging experience may pursue more advanced designs, additional research, complex prototypes, or independent projects. Students who prefer an introductory experience can focus on learning fundamental concepts and completing projects at an appropriate level.
The goal is for every student to leave the course with a better understanding of **how engineers think, design, test, communicate, and solve problems.**

Course Goals

By the end of the course, students should have opportunities to:

- Understand the basic principles and practices of engineering.
- Apply mathematics, science, technology, and problem-solving skills to engineering situations.
- Follow an engineering design process to develop solutions.
- Design, build, test, and improve prototypes.
- Use appropriate tools, materials, equipment, and technology.
- Develop basic skills in areas such as CAD, electronics, programming, mechanisms, structures, and manufacturing.
- Analyze failures and use them as opportunities for improvement.
- Communicate engineering ideas clearly through written, visual, and oral presentations.
- Work effectively both independently and as part of a team.
- Practice responsible and safe behavior in the classroom and during hands-on activities.
- Recognize that there can be multiple successful solutions to an engineering problem.
- Develop an appreciation for engineering as a potential career and field of study.

Course Topics

The course will broadly explore topics such as:

- Engineering Design
- Engineering & Technology
- Measurement & Data
- Structures & Materials
- Mechanical Systems
- Electrical & Electronic Systems
- Programming & Automation
- Computer-Aided Design & Manufacturing
- Engineering Communication
- Independent & Group Projects

Grading

Grades will be determined using a combination of:

- Assessments, Presentations, Group Projects, Individual Assignments, Class Participation, Hands-on Activities, Engineering Projects and Design Challenges

General Expectations for Grading

Students are expected to:

- Complete assigned work.
- Participate appropriately in activities.
- Contribute to group projects.
- Demonstrate understanding of course concepts.
- Take responsibility for their work.
- Meet project requirements and deadlines.
- Document their designs and/or results when required.
- Present or explain their work when required.
- Demonstrate appropriate classroom and laboratory safety.

Grades are based on demonstrated learning, effort, completion, participation, and the quality of student work—not simply on whether a project succeeds on the first attempt.

In engineering, failure is often part of the design process. Students are expected to learn from unsuccessful designs, make improvements, and try again when appropriate.

Group Projects

Engineering frequently requires collaboration. Students will participate in group projects and design challenges throughout the course.

Students working in groups are expected to:

- Contribute meaningfully to the project.
- Communicate respectfully.
- Complete their assigned responsibilities.
- Help solve problems.
- Respect different ideas and approaches.
- Share equipment and materials appropriately.
- Take responsibility for the success of the team.

Group members may not always receive identical grades. Individual contributions, understanding, participation, and completed responsibilities may be considered when determining grades.

Participation

Participation is an important part of this course.

Participation does **not** simply mean talking frequently in class. Students can demonstrate participation by:

- Working on assigned activities.
- Contributing to group discussions.
- Asking questions.
- Helping teammates.
- Attempting challenging problems.
- Testing and improving designs.
- Completing hands-on activities.
- Using class time appropriately.
- Participating in presentations and demonstrations.
- Maintaining a positive and productive learning environment.

Engineering Design Philosophy

Students should understand that **engineering is a process, not simply an answer.**

A typical project may involve:

Problem → Research → Ideas → Design → Build → Test → Analyze → Improve → Repeat

A design that does not work as expected is not necessarily a failure. It can provide useful information that helps an engineer create a better solution.

Students will be encouraged to: **Try. Test. Learn. Improve.**

Safety

Safety is an essential part of engineering.
Students must follow all classroom safety instructions and use equipment only as directed.
Students may be required to use appropriate personal protective equipment depending on the activity.
Students should never operate equipment or use materials in a way that has not been authorized by the instructor.
Failure to follow safety expectations may result in removal from an activity and/or additional consequences consistent with school policy.

Academic Integrity

Students are expected to submit work that represents their own effort and understanding.
Collaboration is encouraged when it is part of an assigned group activity. However, students should not represent another person's work, design, writing, code, or ideas as their own when individual work is required.
Students may use outside resources when permitted, but should appropriately acknowledge sources when required.

What Success Looks Like

A successful student in Principles of Engineering is not necessarily the student who builds the most complicated project.
A successful engineering student is someone who:
Thinks critically.
Asks questions.
Tries new ideas.
Works safely.
Works with others.
Learns from mistakes.
Solves problems.
Improves their designs.
Communicates their ideas.

Student Acknowledgment

I have read and understand the general expectations for Principles of Engineering.

Student Name: _____

Student Signature: _____ Date: _____

Parent/Guardian Signature: _____ Date: _____