Engineering Research and Design

Engineering Research and Design is a one-credit, capstone course in the engineering field recommended for students in Grades 11–12. The course enables students to make an informed career choice through the study and application of mechanical, electrical, and other engineering systems. Students conduct research and design engineering projects to enhance abilities and expand interest in the field of engineering. Projects reinforce the application of communication, mathematics, and science. Computer technology applications are utilized extensively in this course to enable students to visualize, model, prototype, solve, and report comprehensive design problems.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.

Engineering Pathway

Students will:

1. Explain professional, legal, and ethical responsibilities in the field of engineering, including the need for a diverse workforce.

2. Demonstrate effective skills for seeking employment in a specific engineering pathway, including attributes that contribute to a successful engineering career:
   - Preparing a résumé using personal, educational, and professional information
   - Conducting a job search in a specific engineering field using Internet resources, including education requirements, potential earnings, and need

Project Proposal

3. Create a formal, narrative proposal for an engineering design brief.

Research

4. Conduct independent research related to a chosen engineering design brief.

Design and Evaluation

5. Demonstrate the engineering design process, including defining the problem, developing and selecting solutions, constructing prototype testing, evaluating and documenting results, and redesigning as needed.

6. Apply a standard experimental method to the evaluation process of a given engineering design.
Product and Process

7. Create a written technical report and a multimedia presentation for an engineering design problem, concept, or issue using industry recognized guidelines.

8. Demonstrate correct use and selection of tools, materials, procedures, and equipment in the construction of models, prototypes, and finished products.

9. Apply correct drafting techniques using computer-aided design (CAD) programs to produce plans, diagrams, and working drawings for the construction of models, prototypes, and final products.

10. Design a project portfolio that includes all project-related documentation.