Engineering Design and Development

Mehlville School District
STEM
Grade 12, Duration 1 Year, 1 Credit

Rationale

Today's engineering field requires individuals to have Science, Technology, Engineering and Mathematics (STEM) skills and be able to work with others in teams to solve complex, real world problems.

Course Description

Engineering Design and Development (EDD) is the capstone course in the PLTW high school engineering program. It is an engineering research course in which the student works in teams to design and develop an original solution to a valid open-ended technical problem by applying the engineering design process. This course applies and concurrently develops secondary level knowledge and skills in mathematics,science, and technology.

Utilizing the activity-project-problem-based (APPB) teaching and learning, the student will perform research to choose, validate, and justify a technical problem. After carefully defining the problem, teams of students will design, build, and test their solution. Finally, student teams will present and defend their original solution to an outside panel. While progressing through the engineering design process, the student will work closely with experts and continually hone their organizational, communication and interpersonal skills, their creative and problem solving abilities, and their understanding of the design process. The student will take a national exam at no additional cost to the student. Dual credit offered.

Prerequisites

Senior enrolled in the PLTW 4-year engineering program and current teacher approval

Course Objectives

1. The student will identify the design process steps used in given scenarios and be able to list the steps with 100% accuracy. Locally assessed and nationally assessed.

2. The student will apply engineering notebook standards and protocols when documenting work with 80% accuracy. Locally assessed.

3. Using a rubric, the student will write a problem statement verifying and justifying the statement. Locally assessed. (A+ Writing)

4. The student will discuss the pros and cons of a decision making matrix and defend the matrix the student chose to use with 90% accuracy. (CA3) Locally assessed.

5. The student will conduct research to identify and explain the difference between innovation and invention with 90% accuracy.

6. The student will read and objectively evaluate proposed design solutions using specific criteria with 80% accuracy. (A+ Reading)

7. The student will sketch all parts of their design solution and create a set of working drawings with an isometric with 80% accuracy. Locally assessed.

8. Based on information gained through research, the student will use a detailed set of instructions to build a working prototype that can be tested. (CA1)

9. The student will apply the appropriate statistical analysis tools to the test results to ensure validity. (CA3)

10.The student will gather data and information compiled throughout the project and create a technical research paper, PowerPoint, and three-panel display of their design solution. (CA3) (A+: Research)

11. The student will orally present an effective technical presentation on the chosen design solution in front of a panel of outside experts. (A+: Speaking)
BOE 11-6-14