Engineering Technology & Design

(Virtual) NC 2021

Purpose

To recognize an outstanding engineering design project that has been developed by a three-member team of engineering or technology students. The student team will present its innovative idea along with a design board, a design prototype and engineering notebook.

Eligibility (Team of 3)

Open to active SkillsUSA members enrolled in a career and technical education engineering program or a curriculum that integrates engineering/pre-engineering concepts and techniques as an integral component of the instructional strategies.

Equipment and Materials

Supplied by the contestant's team:

1. Computer to submit notebook, photo of design board, and connect to live zoom presentation.

2. Design prototype: The design prototype cannot be hazardous in any way. If the prototype is not conducive to being presented in an indoor facility, please notify the SkillsUSA headquarters in advance so other arrangements can be made. Design prototypes must be transported and set up in the contest area during the orientation meeting. No help will be provided by SkillsUSA.

3. Design board

4. Engineering Presentation (Powerpoint, Prezi, Google Slides, etc.). Live zoom presentation.

5. Industrial review of engineering design

Scope of the Contest

1. **Submit your Notebook and Photo of Design Board by Monday April 19 midnight.** Submit through your Canvas Contest Access Site.
2. **Live Zoom Interview will be Wed. April 21. PostSecondary – 8:30am. High School – 9:30am.**
3. The project must be designed and constructed by students who are/were enrolled in an engineering program or career and technical education program (see definition in the Eligibility section).
4. Each team will have one design board explaining the new innovation it collaboratively developed. This must represent the engineering process, detailing brainstorming efforts, schedule, prototypes, modeling, relevant industry regulations, restrictions and laws, safety considerations, manufacturability as is relevant to design. The design board may not be any larger than a 36"x56" tri-fold display. Digital media, such as digital picture frames, can be attached to the design board. The board must be a comprehensive representation of the team’s design process.
5. The design prototype must be an accurate reflection of what is being claimed in the oral explanation and presentation.
6. Recorded presentation submission: Importance is placed on the oral presentation, which lasts no longer than 10 minutes.
7. Each team is required to have an industrial review of its proposed engineering design completed by a technical person in that area of study. This review must be conducted by engineers, technicians or other technical professions within the design’s respective industry.
8. Mentorship from the team’s career and technical instructor, academic teachers, and representatives from the business & industry world, including engineers & industrial designers, is highly encouraged.

Judging Criteria

Each engineering presentation will be judged in accordance with its own merits and compliance with the listed criteria. Participants should read the guidelines carefully to ensure the project presentation covers all the criteria.

1. **Design Prototype**

The design prototype is a working model that demonstrates the results of the team’s research and how the team has put its research into action. The design prototype must accurately reflect the engineering design accomplishment referred to in the presentation. These criteria include: virtual modeling, schematics, assembly drawings. materials selection ergonomics, manufacturing analysis, construction and aesthetics. Students should be able to answer questions about their prototype and its development process. Design prototypes will be judged independently of the oral explanation and presentation.

2. **Engineering Notebook**

Teams are required to keep a handwritten engineering notebook chronologically documenting the engineering process used to design and prototype their innovation. The entries must be written in permanent ink — not pencil. Corrections to entries must be initialed. Every page must be numbered. The notebook must include entries made by each team member. Every entry must be dated and signed. The entire engineering process should be documented with such things as sketches, notes, calculations, evidence of research, photographs, test results, code descriptions, etc. as they apply to the design. **A photo of the prototype should be included in the notebook if you have one**. The notebook must be from the current year in which the project is being presented.

3. **Oral Explanation and Presentation**   
Students must demonstrate appropriate mastery of the engineering project. Each student must take an equal role during the allotted time. The presentation given by the entire group must reflect excellent presentation skills, as well as clear communication and explanation of the technical process related to the engineering design project. This presentation must include analysis on the design feasibility.

4. **Industrial Review**  
The project must demonstrate evidence of the integration and involvement of business and industry related to the engineering field. Each team must present its design project to a technical person in that area of study. The reviewer is to give written feedback to the team, which will be submitted to the judges at the NLSC (**for state conference - include this in the notebook**). The industrial review must include feedback on the engineering design, to include feasibility, industry regulations, laws and/or standards, design safety, prototype quality, and suggested improvements as they apply to the design.

5. **Design Board**  
The design board will chronicle the comprehensive history of the innovation from idea to reality. The design board will be judged on the explanation of the team’s engineering process, to include brainstorming, scheduling (Gantt chart), cost of materials, consideration of industry regulations, laws, and limitations, safety, quality, product testing, redesign, overall appearance.

6. **On-Site Problem-Solving Activity**  
Teams will be given an on-site problem- solving activity during the competition. All required materials will be provided by the technical committee.

7. **Overall Effect**  
The synergy of the overall presentation of the team’s engineering design project and supplied materials must be projected in a businesslike and professional manner. The design prototype and presentation materials must be well organized. The judges will look for the students’ display of knowledge, clear communication and overall professionalism.