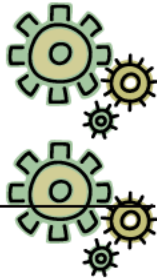


# ENGINEERING TECHNOLOGY NYS



## PURPOSE

To recognize an outstanding engineering innovation project that has been developed by a three-member team of engineering students. The student team will present its innovative idea along with a display and live model.

## ELIGIBILITY (Team of 3)

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

## CLOTHING REQUIREMENT

**NYS Official attire for men:** Official red blazer, NYS Black Jacket, the older red national windbreaker or older red sweater and the Black Carhartt Jacket from Nationals. Black dress slacks; white dress shirt; plain black tie with no pattern or a SkillsUSA black tie. Black socks and black shoes.

**NYS Official attire for women:** Official red blazer, NYS Black Jacket, the older red national windbreaker or older red sweater and the Black Carhartt Jacket from Nationals. Black dress slacks or skirt with businesslike white, collarless blouse or white blouse with small, plain collar that may not extend on to the lapels of the blazer; black sheer or skin-tone hose and black shoes, that are not backless or open toe.

**Note:** Contestants must wear their official contest clothing to the contest orientation meeting.

## OBSERVER RULE

Design prototypes and presentation displays may be viewed on the day of the competition. If time allows all teams will be invited to repeat the team presentation to the public following the judging phase.

## EQUIPMENT AND MATERIALS

1. Supplied by the NYS chair/committee:
  - a. A space for the design prototype and storyboard no bigger than 10'x10'
  - b. One standard 120-volt electrical outlet
  - c. One standard 8' conference table
2. Supplied by the contestant team:
  - a. 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 NY in advance so other arrangements can be made) Design prototypes must be transported and set up in the contest area by the contestant team on competition day. Do not bring equipment/supplies to orientation. No help will be provided by SkillsUSA NY.
  - b. Storyboard
  - c. Engineering notebook
  - d. Industrial review of engineering design
  - e. Laptop or computer with documentation and presentation software such as Microsoft Office or Open Office
  - f. All competitors must create a one-page résumé using a word processor.

**Note:** Your contest may also require a hard copy of your résumé as part of the actual contest. Check the Contest Guidelines and/or the updates page on the NYS SkillsUSA Web site:  
<http://www.nysskillsusa.org/>

## SCOPE AND CONTEST

The team consists of three students, all enrolled in the same educational institution during the current school year. Students may be members

of only one team per contest year. High school educational institutions are eligible to participate.

The project must be designed and constructed by students who are enrolled (or were enrolled immediately preceding the NYLSC) in an engineering program or career and technical education program (see definition in the Eligibility section).

Each team will have one design board explaining the new innovation it collaboratively worked on. The design board must be on a 36 x 56 trifold display board. Digital media, such as digital picture frames, can be attached to the design board. The board should be a comprehensive representation of the team's design process.

The design prototype must be an accurate reflection of what is being claimed in the oral explanation and presentation.

Importance is placed on the oral explanation and presentation, which lasts no longer than 30 minutes. Following the oral presentation, there will be a possible question and answer session by the judging panel to clarify any questions that arise during the presentation.

Each team is required to have an industrial review of its proposed engineering design by a technical person in that area of study. This review can be conducted by engineers, technicians, postsecondary teachers or other technical professions in that area of expertise. The reviewer is to give written feedback to the team, which will be submitted to the judges at the NYLSC.

Leadership from the team's career and technical instructor, academic teachers, and representatives from the business and industry world, including engineers and industrial designers, is highly encouraged.

The panel of judges will consist of engineers, engineering educators and members from business and industry.

### **Judging Criteria**

Each engineering presentation will be judged according to its own merits and compliance

with the listed criteria. Participants should read the guidelines carefully and make sure 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 (e.g., a newly designed air-intake system for a high mileage vehicle). The design prototype must accurately reflect the engineering design accomplishment referred to in the presentation. These criteria include CAD, virtual modeling, materials selection ergonomics, manufacturing analysis, construction and aesthetics. Design prototypes will be judged independently of the oral explanation and presentation.

#### **2. Engineering Notebook**

Teams are required to keep an engineering notebook documenting the engineering process they used to design and prototype their innovation. Every page should be numbered. Every entry should be dated and should follow a general engineering notebook format. The entire engineering process should be documented with such things as sketches, notes, calculations, evidence of research, photographs, etc. The notebook will be submitted to the judges after they have reviewed the team's design prototype.

Engineering notebooks in an electronic format will be accepted for review and are expected to in full the criteria described to meet in full the criteria described above.

#### **3. Oral Explanation and Presentation**

Students should demonstrate appropriate mastery of the engineering project. Each student should take an equal role during the allotted time. The presentation given by the entire group should reflect excellent presentation skills, as well as clear communication and explanation of the technical process related to the engineering design project. This presentation should include analysis on the design feasibility. The use of technology presentation equipment is highly encouraged to convey a clear presentation.

#### 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 their design project to a technical person in that area of study. A written review of the presentation from the technical person must be submitted to the judges at the NYLSC. This important process allows teams to interact with technical professionals and engineers, practice presenting their innovation, and get feedback on their design.

#### 5. Design Board

The design board will chronicle the history of the innovation from idea to reality. The storyboard will be judged on the explanation of the team's engineering process, quality, imagination, appearance and overall effectiveness of the project. A Gantt chart is required to document the progress of the engineering throughout the project history.

#### 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 (e.g., storyboard, design prototype) must be projected in a businesslike and professional manner. The design prototype and presentation materials must be well organized. The judge will look for the students' display of knowledge and overall professionalism.

#### Items judges will be evaluating at NYLC:

- **Design Prototype** – CADD and virtual modeling, material selection, ergonomics, manufacturing analysis, construction and aesthetics, Q&A Prototype-Process.
- **Engineering Notebook**- Format, depth of

documentation, professionalism, story board-Gantt Chart engineering process, appearance.

- **Industrial Review- Written technical review, marker data and information overall effect/synergy/between content. accuracy. and professionalism.**
- **On-site Problem Solving-**
- **Oral Explanation and Presentation-** Clear communication, design feasibility and analysis, team participation, presentation of the design, Q&A general knowledge.

#### Standards and Competencies

**ENG 1.0 — Integrate knowledge of basic engineering principles into technical writing and presentations following the guidelines the contest technical committee has established**

- 1.1 Apply engineering knowledge in the areas of force, work, rate, resistance, energy, power, force transformers, momentum, waves and vibrations, energy converters, transducers, radiation, optical systems

**ENG 2.0 — Transform existing systems into conceptual models**

- 2.1 Transform conceptual models into determinable models
- 2.2 Use determinable models to obtain system specifications
- 2.3 Select optimum specifications and create physical models
- 2.4. Apply the results from physical models to create real target systems
- 2.5 Critically review real target systems and personal performance
- 2.6 Design effective and usable IT-based solutions and integrate them into the user environment
- 2.7 Assist in the creation of an effective project plan
- 2.8 Identify and evaluate current and emerging technologies and assess their

applicability to address the users' needs

**ENG 3.0 — Showcase knowledge of project planning**

- 3.1 Apply brainstorming techniques
- 3.2 Implement benchmarking
- 3.3 Discuss continuous improvement
- 3.4 Explain cause and effect relationships
- 3.5 Apply knowledge of customer satisfaction
- 3.6 Demonstrate how to collect data
- 3.7 Apply decision-making skills
- 3.8 Define and describe a process
- 3.9 Empower team members
- 3.10 Recognize methods of idea generation
- 3.11 Prioritize tasks
- 3.12 Reach consensus amongst the team
- 3.13 Display teamwork during the contest
  - 3.13.1 Have equal team participation
  - 3.13.2 Show positive group dynamics
  - 3.13.3 Define team roles

**ENG 4.0 — Developing/identifying opportunities**

- 4.1 Identify and define the opportunity
  - 4.1.1 Identify the customer
  - 4.1.2 Identify the customer's needs
  - 4.1.3 State the problem or areas of improvement within the identified opportunity clearly and concisely
  - 4.1.4 Quantify the opportunity with data
- 4.2 Show data gathered from research
  - 4.2.1 Identify opportunity for improvement
- 4.3 Make decisions based on facts, not opinions
- 4.4 Show how the team determined the cause(s) of the problem and gained an understanding of the variation that occurs in the process
  - 4.4.1 Diagram and perform a thorough assessment of the possible causes
- 4.5 Develop various solutions
  - 4.5.1 Show alternative approaches or changes that would improve the situation
  - 4.5.2 Show the analysis used to select the most beneficial solution to implement
  - 4.5.3 Define milestones
- 4.6 Recommend a plan to implement the solution(s)
- 4.7 Use analytical decision making by

making full use of flow charts, bar graphs, cause and effect diagrams, Pareto diagrams, etc.

- 4.8 Describe a method to standardize or institutionalize the process

**ENG 5.0 — Write a problem statement**

- 5.1 Define the problem
- 5.2 Define the customer
- 5.3 Explain the customer expectations
- 5.4 Describe the product or service
- 5.5 Discuss how the product or service fulfills the customer's expectations
- 5.6 List the needed data
- 5.7 Reflect on how the process can be improved
- 5.8 Describe how the improved process will meet or exceed the customer's expectations

**ENG 6.0 — Design and deliver a presentation that discusses the problems and processes of the local institution**

- 6.1 Make the presentation clear and concise
- 6.2 Use graphics effectively to clarify presentation topics
- 6.3 Use time wisely while presenting

**ENG 7.0 — Design and develop a presentation that is the result of findings from the on-site problem and process**

- 7.1 Make the presentation clear and concise
- 7.2 Use graphics effectively to clarify presentation topics
- 7.3 Use time wisely while presenting

**ENG 8.0 — Deliver the presentation in a professional manner, meeting the standards outlined by the technical committee**

- 8.1 Explain the topic through the use of displays or practical operations
- 8.2 Demonstrate an effective and pleasing delivery style
- 8.3 Use verbal illustrations and examples effectively
- 8.4 Make a formal and effective introduction to the presentation that clearly identifies the scope of the presentation
- 8.5 Pronounce words in a clear and understandable manner
- 8.6 Use a variety of verbal techniques including: modulation of voice, changing volume, varied inflection, modifying tempo and verbal enthusiasm

- 8.7 Demonstrate poise and self-control while presenting
- 8.8 Demonstrate good platform development and personal confidence
- 8.9 Communicate the primary points of the speech in a compact and complete manner
- 8.10 Tie organizational elements together with an effective ending
- 8.11 Complete the speech within the time limits set by contest requirements
- 8.12 Develop storyboards for the presentation outlining the process