Additive Manufacturing

Purpose: To evaluate each team's preparation for employment and to recognize outstanding students for excellence and professionalism in the field of Digital and Additive Manufacturing (AM).

On-Site/Off-Site	▪ On-Site
Contest Date	▪ 4/9/2024
Contest Location	▪ Convention Center ▪ C-Hall
Early/Normal Start Time	▪ Normal Start Time ▪ Registration will open at 8:00am. Please report to B-Hall Show Office for Registration. Orientation will begin at 10:00am. ▪ Upon arrival at orientation, students will be provided with the timeslot for their competition. The first timeslot will begin at ~10:30 am and will run every 30min until we have accommodated the number of teams there to compete. ▪ Students are to return to the competition area 30 min after the last timeslot (official time will be provided at the competition) to hear the top 6 teams that will be called back for the 2nd round of group judging. The top-placing teams will be selected from this group of 6.
Contest Open/Closed	▪ Open ▪ Exhibit Halls do not open to observers until 12:00pm.
Eligibility	▪ Schools may send one (1) team of two (2) competitors for every 50 paid SkillsUSA members based on local competition enrolled in a program where the scope of the contest described in the SkillsUSA Technical Content Standards reflects a major

	component of the program. Please refer to the National Technical Standards for more eligibility details on this contest.
Competition Clothing **(To be worn on Day 1)**	Business Casual: ▪ Polo or other collared shirt ▪ Khakis or dress pants; no jeans ▪ Closed-toe dress shoes ▪ Note: Wearing socks or hose is no longer required. If worn, socks must be dress socks, and hose must be either black or skin-tone and seamless/nonpattern. ▪ Note: School identifiers and contestant names must be covered.
Safety Equipment Required	▪ N/A
Awards Ceremony Attire **(To be worn on Day 2)**	SkillsUSA Official Attire: ▪ Official SkillsUSA red blazer ▪ Button-up, collared, white dress shirt (accompanied by a plain, solid black tie or SkillsUSA black tie), or white shirt (collarless or small-collared), with any collar not to extend into the lapel area of the blazer ▪ Black dress slacks or black dress skirt (knee-length at minimum) ▪ Black closed-toe dress shoes ▪ Note: Wearing socks or hose is no longer required. If worn, socks must be black dress socks, and hose must be either black or skin-tone and seamless/nonpattern Or, Business Dress: ▪ Blazer, sports coat, or dress ▪ Button-up, collared, white dress shirt (accompanied by a plain, solid black tie or SkillsUSA black tie), or white shirt (collarless or small-collared), with any collar not to extend into the lapel area of the blazer ▪ Dress slacks or dress skirt (knee-length at minimum) ▪ Closed-toe dress shoes

	▪ Note: Wearing socks or hose is no longer required. If worn, socks must be black dress socks, and hose must be either black or skin-tone and seamless/nonpattern
Testing	▪ There is no written test required for this competition.
Provided by Contestant (Tool List)	▪ Each team is responsible for bringing their 3D Printed model to the competition for testing. No parts will be printed at the competition. Models must adhere to the contest outlines from the proposed standards. ▪ Provide Engineering Notebook (Engineering notebook guidelines below) ▪ Present design to judges and answer questions ▪ Showcase the functionality of the 3D printed component ▪ Each participant must present hard copy of resume to the judges. Each participant must have one, these will not be collected, only verified that they have them. ▪ Provide engineering notebook (guideline below) ▪ Be clearly labeled with contestant number, date and page number on each page ▪ Begin with a problem statement ▪ Include discovery and documentation of approach to solve the problem ▪ Include sketched design concepts with critical features labeled ▪ Critical dimensions clearly labeled in design sketch ▪ Consideration for designing for additive manufacturing distinctly addressed (i.e., part strength, part orientation) especially including any expected risk during printing ▪ Screenshots of the print time and material usage for all printed parts ▪ Design decisions and alternatives are documented and evaluated thoughtfully Presentation Criteria ▪ The team clearly describes their understanding of the problem to be solved. ▪ Design Process: good design logic is used for key design choices was intentional and well-communicated ▪ The presentation is professional and well-rehearsed ▪ Practical evaluation

	▪ Teams may use a laptop to assist with the presentation, though not required.
Contest Notes, Themes, & Deadlines	▪ Each team is responsible for bringing their 3D Printed model to the competition for testing. No parts will be printed at the competition. Models must adhere to the contest outlines from the proposed standards.
Special Notes	▪ Starting in 2024, all State Contests will begin to add a scenario-based component. ▪ Contact with Contest Coordinators is prohibited. Contact with Contest Coordinators outside of the SkillsUSA Ohio office may result in contestant disqualification. ▪ All safety requirements will be heavily enforced. Violation may result in contestant disqualification. ▪ No smart watches and/or phones are permitted during the contest and/or in contest. ▪ No contact with anyone outside of the contest area once the contest begins. ▪ No inappropriate communication between contestants such as verbally degrading another contest. ▪ No cheating on any portion of the contest such as informing another contestant of the skills/test prior to competing. ▪ Starting in 2024, Wi-Fi is provided for contests where it is required for contest success.
National Technical Standards	▪ Please refer to the 2023-2024 National Technical Standards for all contests. Any and all standards included may be tested in any competition. ▪ In conjunction with National Standards, violations may result in student loss of contest.
Resume/Interview Requirement	▪ All SkillsUSA Ohio State Championship Contests will require a short interview component. Students should be prepared with basic job interview skills. ▪ All contestants must have a hard copy of a one (1) page personal resume.

Contest Criteria

On contest day, students will:

- Provide Engineering Notebook (Engineering notebook guidelines below)
- Present Design to judges and answer questions.
- Showcase the functionality of the 3D-printed component.
- Provide resumes to judges (each participant must have one, these will not be
- collected, only verified that they have them).

Engineering Notebook Guideline:

- The Engineering Notebook should contain robust content, including at a minimum the
- following:
    - Be clearly labeled with contestant name(s), date and page # on each page
    - Begin with a problem statement
    - Include discovery and documentation of approach to solve problem
    - Include sketched design concepts with critical features labeled
    - Critical dimensions clearly labeled in design sketch
    - Considerations for designing for additive manufacturing distinctly addressed (i.e. part strength, part orientation) especially including any expected risks during printing
    - Screenshots of the print time and material usage for all printed parts
    - Design decisions and alternatives are documented and evaluated thoughtfully

Presentation Criteria

- The team clearly describes their understanding of the problem to be solved.
- Design Process: good design logic is used for key design choices was intentional and well-communicated
- The presentation is professional and well-rehearsed
- Practical evaluation: team demonstrates visually (videos, photos, drawings, animation, etc) the task they improved, both before and after.
- Teams may use a laptop to assist with the presentation, though not required.
- The presentation emphasizes quantitative improvements (measured and estimated) of the time, quality, or cost of the improvement as well as any DFAM tactics employed

SkillsUSA 2024 Additive

Manufacturing State Challenge

Medallion Models

Welcome to the “Logo Medallion” challenge!

The task at hand is to design an eye-catching Medallion that represents your school, yourself, mascot, state, country, event, or hobby.

Design Examples:

- Bump Maps
- Displacement Texture
- Color/Material Changes
- Embossed/Debossed Text
- Motion

Example of a Basic Design

Competition Requirements

1. The design must be completely 3D printed.
2. The design can be 3d printed using any technology.
3. The design must contain at least two legibly printed words.
4. The design can contain 3D-printed bodies that are glued together for the
1. final part.
5. Parts can be colored or painted.
6. The printed design can have moving bodies.
7. The design must be at least 3” x 3” x ¼”
8. 3D Printed Design - Students must create a design that:
    a. Is original and designed by contestant
    b. Prints all parts in less than 8 hours
    c. Uses less than 5 cubic inches of model and/or support combined for all parts.

Tips for Competitors

Here are some tips to maximize the points awarded to you:

- Build debossed text on a horizontal surface for best results. This may require building the part on its edge or standing up.
- Paint 3D is a free tool to help design the part.
- Try to leverage a design with multiple printed colors or technologies for a more creative part.
- Leverage post-processing techniques to smooth or color-printed bodies.
- Additional moving parts may add to your score but can produce more points of failure on the final assembly.
- Use online resources (YouTube, GrabCAD Tutorials)
- Whenever intellectual property (IP) deters you from a project, try using approximate geometries to communicate the design intent.
- Optional design for additive manufacturing learning resources:
- Stratasys Think Additively™ Masterclass:
    - https://youtube.com/playlist?list=PLUYaY5EIPtNBdU-s-7l9rl05lBHHlTarI