2023-24 EDITION

SkillsUSA® CHAMPIONSHIPS

AVIATION MAINTENANCE TECHNOLOGY

SkillsUSA Championships Technical Standards

PURPOSE

To evaluate each competitor's preparation for employment and to recognize outstanding students for excellence and professionalism in the field of aviation maintenance technology.

ELIGIBILITY

Open to active SkillsUSA members enrolled in programs with aviation maintenance technology as an occupational objective.

CLOTHING REQUIREMENT

Class D: Competition Specific — Blue Attire

- Official SkillsUSA light blue work shirt
- Navy pants
- Black, brown, or tan work safety shoes (with protective toe cap)

Note: Safety glasses with side shields or goggles (prescription glasses may be used only if they are equipped with side shields. If not, they must be covered with goggles).

These regulations refer to clothing items that are pictured and described at www.skillsusastore.org. If you have questions about clothing or other logo items, call 1-888-501-2183.

Note: Competitions must wear their official competition clothing to the competition orientation meeting.

EQUIPMENT AND MATERIALS

1. Supplied by the technical committee:
   a. All necessary tools and equipment for the competition
   b. All necessary information and furnishings for judges and technical committees
2. Supplied by the competitor:
   a. Calculator (non-programmable)
   b. Ear plugs
   c. Safety glasses
   d. All competitors must create a one-page resume. See "Resume Requirement" below for guidelines.

RESUME REQUIREMENT

Competitors must create a one-page resume to submit online. SkillsUSA South Carolina competitors should submit their resume by the deadline published on the competition updates page of our website. Failure to submit a resume will result in a 10-point penalty.

Your resume must be saved as a PDF file type using file name format of "Last Name_First Name." For example, "Amanda Smith" would save her resume as Smith_Amanda. If you need assistance with saving your file as a PDF, visit the Adobe website for more information.

Note: Check the Competition Guidelines and/or the updates page on the state website.

PROHIBITED DEVICES

Cellphones, electronic watches and/or other electronic devices not approved by a competition's national technical committee are ***NOT*** allowed in the competition area. Please follow the guidelines in each technical standard for approved exceptions. Technical committee members may also approve exceptions onsite during the SkillsUSA Championships if deemed appropriate.

Penalties for Prohibited Devices

If a competitor's electronic device makes noise or if the competitor is seen using it at any time during the competition, an official report will be documented for review by the Director of the SkillsUSA Championships. If confirmed that the competitor used the device in a manner which compromised the integrity of the competition, the competitor's scores may be removed.

SCOPE OF THE COMPETITION

The competition will be consistent with the airframe and powerplant mechanics certification guide published by the Department of Transportation Federal Aviation Administration Advisory Circular EA-AC 65-2D [Amdt. 147–2, 35 FR 5535, April 3, 1970, as amended by Amdt. 147–5, 57 FR 28960, June 29, 1992] and Sec. 6(c), Dept. of Transportation Act; 49 U.S.C. 1655(c)

[Amdt. 147–2, 35 FR 5535, April 3, 1970, as amended by Amdt. 147–5, 57 FR 28961, June 29, 1992].

The high-school competition will cover the competencies classified as general aviation by the FAA.

The college/postsecondary competition will cover those competencies classified as power plant and airframe by the FAA.

KNOWLEDGE PERFORMANCE

The competition will include a written knowledge test assessing general knowledge of aviation maintenance technology. Definitions, knowledge, processes, and procedures relevant to aviation maintenance technology will be assessed.

SKILL PERFORMANCE

The competition will include a series of operations. A total of eight (8) to 15 operations will be assigned; each operation must be broken down into specific criteria and points assigned based on the difficulty of the task.

COMPETITION GUIDELINES

1. Tasks assigned to a competitor will not have a set time limit or sequence.
2. The following shop safety rules will be followed:
    a. Safety glasses must be used
    b. No loose clothing is permitted
    c. Long hair must be tied behind the head and netted or worn under a cap
    d. No jewelry will be allowed

STANDARDS AND COMPETENCIES (HIGH SCHOOL COMPETITION)

AMT-HS 1.0 — Apply knowledge of basic aviation electricity to FAA general aviation competencies

1.1. Calculate and measure capacitance and inductance
1.2. Calculate and measure electrical power
1.3. Measure voltage, current, resistance and continuity
1.4. Determine the relationship of voltage, current and resistance in electrical circuits
1.5. Read and interpret aircraft electrical circuit diagrams including solid state devices and logic functions
1.6. Inspect and service batteries

AMT-HS 2.0 — Interpret aircraft drawings to FAA general aviation competencies

2.1. Use aircraft drawings, symbols and system schematics
2.2. Draw sketches of repairs and alterations
2.3. Use blueprint information
2.4. Use graphs and charts

AMT-HS 3.0 — Use weight and balance knowledge to FAA general aviation competencies

3.1. Weigh aircraft
3.2. Perform complete weight-and-balance check and record data

AMT-HS 4.0 — Demonstrate the ability to install fluid lines/fittings to FAA general aviation competencies

4.1. Fabricate and install rigid and flexible fluid lines and fittings

AMT-HS 5.0 — Demonstrate a knowledge of materials and processes to FAA general aviation competencies

5.1. Identify and select appropriate nondestructive testing methods
5.2. Perform dye penetrant, eddy current, ultrasonic and magnetic particle inspections
5.3. Perform basic heat-treating processes
5.4. Identify and select aircraft hardware and materials
5.5. Inspect and check welds
5.6. Perform precision measurements

AMT-HS 6.0 — Demonstrate knowledge of ground operation and servicing to FAA general aviation competencies

6.1. Start, ground operate, move, service and secure aircraft and identify typical ground operation hazards
6.2. Identify and select fuels

AMT-HS 7.0 — Demonstrate knowledge of cleaning and corrosion control to FAA general aviation competencies

7.1. Identify and select cleaning materials
7.2. Inspect, identify, remove and treat aircraft corrosion and perform aircraft cleaning

AMT-HS 8.0 — Demonstrate knowledge of mathematics to FAA general aviation competencies

8.1. Extract roots and raise numbers to a given power
8.2. Determine areas and volumes of various geometrical shapes
8.3. Solve ratio, proportion and percentage problem
8.4. Perform algebraic operations involving addition, subtraction, multiplication and division of positive and negative numbers

AMT-HS 9.0 — Use maintenance forms and records to FAA general aviation competencies

9.1. Write descriptions of work performed including aircraft discrepancies and corrective actions using typical aircraft maintenance records
9.2. Complete required maintenance forms, records and inspection reports

AMT-HS 10.0 — Recall knowledge of basic physics to FAA general aviation competencies

10.1. Use and understand the principles of simple machines; sound, fluid and heat dynamics; basic aerodynamics; aircraft structures; and theory of flight

AMT-HS 11.0 — Use maintenance publications to FAA general aviation competencies

11.1. Demonstrate ability to read, comprehend and apply information contained in FAA and manufacturers' aircraft maintenance specifications, data sheets, manuals, publications and related federal guidelines
11.2. Use aviation regulations, airworthiness directives, and advisory material
11.3. Read technical data

AMT-HS 12.0 — Explain mechanic privileges and limitations to FAA general aviation competencies

12.1. Exercise mechanic privileges within the limitations prescribed by Part 65 of this chapter

AMT-HS 13.0 — Demonstrate knowledge of job-related safety requirements to FAA general aviation competencies

13.1. Demonstrate proper application of job site and shop rules and regulations (OSHA)
13.2. Demonstrate correct selection and use of electrical and hand tools
13.3. Demonstrate proper techniques and practices for working on and around live equipment

AMT-HS 14.0 — SkillsUSA Framework

The SkillsUSA Framework is used to pinpoint the Essential Elements found in Personal Skills, Workplace Skills and Technical Skills Grounded in Academics. Students will be expected to display or explain how they used some of these Essential Elements. Please reference the graphic, as you may be scored on specific elements applied to your project. For more, visit: www.skillsusa.org/who-we-are/skillsusa-framework/.

STANDARDS AND COMPETENCIES: AIRFRAME STRUCTURES, SYSTEMS AND COMPONENTS (COLLEGE/POSTSECONDARY COMPETITION)

AMT-CPS 1.0 — Maintain wood structures to FAA power plant and airframe competencies

1.1. Service and repair wood structures
1.2. Identify wood defects
1.3. Inspect wood structures

AMT-CPS 2.0 — Maintain aircraft covering to FAA power plant and airframe competencies

2.1. Select and apply fabric and fiberglass covering materials
2.2. Inspect, test and repair fabric and fiberglass

AMT-CPS 3.0 — Maintain aircraft finishes to FAA power plant and airframe competencies

3.1. Apply trim, letters, and touchup paint
3.2. Identify and select aircraft finishing materials
3.3. Apply finishing materials
3.4. Inspect finishes and identify defects

AMT-CPS 4.0 — Maintain sheet metal and nonmetallic structures to FAA power plant and airframe competencies

4.1. Select, install, and remove special fasteners for metallic, bonded, and composite structures
4.2. Inspect bonded structures
4.3. Inspect, test and repair fiberglass, plastics, honeycomb, composite, and laminated primary and secondary structures
4.4. Inspect, check, service and repair windows, doors, and interior furnishings
4.5. Inspect and repair sheet-metal structures
4.6. Install conventional rivets
4.7. Form, lay out, and bend sheet metal

AMT-CPS 5.0 — Demonstrate ability in aviation welding to FAA power plant and airframe competencies

5.1. Weld magnesium and titanium
5.2. Solder stainless steel
5.3. Fabricate tubular structures
5.4. Solder, braze, gas-weld, and arc-weld steel
5.5. Weld aluminum and stainless steel

AMT-CPS 6.0 — Demonstrate knowledge of assembly and rigging to FAA power plant and airframe competencies

6.1. Rig rotary-wing aircraft
6.2. Rig fixed-wing aircraft
6.3. Check alignment of structures
6.4. Assemble aircraft components, including flight control surfaces
6.5. Balance, rig and inspect movable primary and secondary flight control surfaces
6.6. Jack aircraft

AMT-CPS 7.0 — Apply knowledge of airframe inspection to FAA power plant and airframe competencies

7.1. Perform airframe conformity and airworthiness inspections

AMT-CPS 8.0 — Apply knowledge of aircraft landing gear systems to FAA power plant and airframe competencies

8.1. Inspect, check, service and repair landing gear, retraction systems, shock struts, brakes, wheels, tires, and steering systems

AMT-CPS 9.0 — Apply knowledge of hydraulic and pneumatic power systems to FAA power plant and airframe competencies

9.1. Repair hydraulic and pneumatic power systems components
9.2. Identify and select hydraulic fluids
9.3. Inspect, check, service, troubleshoot and repair hydraulic and pneumatic power systems

AMT-CPS 10.0 — Ability to apply knowledge of cabin atmosphere control systems to FAA power plant and airframe competencies

10.1. Inspect, check, troubleshoot, service and repair heating, cooling, air conditioning and pressurization systems and air cycle machines

10.2. Inspect, check, troubleshoot, service and repair heating, cooling, air conditioning and pressurization systems
10.3. Inspect, check, troubleshoot, service and repair oxygen systems

AMT-CPS 11.0 — Apply knowledge of aircraft instrument systems to FAA power plant and airframe competencies

11.1. Inspect, check, service, troubleshoot and repair electronic flight instrument systems and both mechanical and electrical heading, speed, altitude, temperature, pressure and position indicating systems to include the use of built-in test equipment
11.2. Install instruments and perform a static pressure system leak test

AMT-CPS 12.0 — Apply knowledge of communication and navigation systems to FAA power plant and airframe competencies

12.1. Inspect, check and troubleshoot autopilot, service and approach coupling systems
12.2. Inspect, check and service aircraft electronic communication and navigation systems, including VHF passenger address interphones and static discharge devices, aircraft VOR, ILS, LORAN, radar beacon transponders, flight management computers, and GPWS
12.3. Inspect and repair antenna and electronic equipment installations

AMT-CPS 13.0 — Apply knowledge of aircraft fuel systems to FAA power plant and airframe competencies

13.1. Check and service fuel dump systems
13.2. Perform fuel management transfer and defueling
13.3. Inspect, check and repair pressure fueling systems
13.4. Repair aircraft fuel system components
13.5. Inspect and repair fluid quantity indicating systems
13.6. Troubleshoot, service and repair fluid pressure and temperature warning systems
13.7. Inspect, check, service, troubleshoot and repair aircraft fuel systems

AMT-CPS 14.0 — Apply knowledge of aircraft electrical systems to FAA power plant and airframe competencies

14.1. Repair and inspect aircraft electrical system components; crimp and splice wiring to manufacturers' specifications; and repair pins and sockets of aircraft connectors
14.2. Install, check and service airframe electrical wiring, controls, switches, indicators and protective devices
14.3. Inspect, check, troubleshoot, service and repair alternating and direct current electrical systems
14.4. Inspect, check and troubleshoot constant speed and integrated speed drive generators

AMT-CPS 15.0 — Apply knowledge of position and warning systems to FAA power plant and airframe competencies

15.1. Inspect, check and service speed and configuration warning systems, electrical brake controls and anti-skid systems
15.2. Inspect, check, troubleshoot and service landing gear position indicating and warning systems

AMT-CPS 16.0 — Apply knowledge of ice and rain control systems to FAA power plant and airframe competencies

16.1. Inspect, check, troubleshoot, service and repair airframe ice and rain control systems

AMT-CPS 17.0 — Apply knowledge of fire protection systems to FAA power plant and airframe competencies

17.1. Inspect, check and service smoke and carbon monoxide detection systems
17.2. Inspect, check, service, troubleshoot and repair aircraft fire detection and extinguishing systems

AMT-CPS 18.0 — Demonstrate knowledge of job-related safety requirements to FAA power plant and airframe competencies

18.1. Demonstrate proper application of job site and shop rules and regulations (OSHA)
18.2. Demonstrate correct selection and use of electrical and hand tools
18.3. Demonstrate proper techniques and practices for working on and around live equipment

STANDARDS AND COMPETENCIES: POWER PLANT THEORY, MAINTENANCE, SYSTEMS AND COMPONENTS (COLLEGE/POSTSECONDARY COMPETITION)

AMT-CPS 1.0 — Apply knowledge of reciprocating engines to FAA power plant and airframe competencies

1.1. Inspect and repair a radial engine
1.2. Overhaul reciprocating engine
1.3. Inspect, check, service and repair reciprocating engines and engine installations
1.4. Install, troubleshoot and remove reciprocating engines

AMT-CPS 2.0 — Apply knowledge of turbine engines to FAA power plant and airframe competencies

2.1. Overhaul turbine engine
2.2. Inspect, check, service and repair turbine engines and turbine engine installations
2.3. Install, troubleshoot and remove turbine engines

AMT-CPS 3.0 — Apply knowledge of engine inspection to FAA power plant and airframe competencies

3.1. Perform power plant conformity and airworthiness inspections

AMT-CPS 4.0 — Demonstrate knowledge of engine instrument systems to FAA power plant and airframe competencies

4.1. Troubleshoot, service and repair electrical and mechanical fluid rate-of-flow indicating systems
4.2. Inspect, check, service, troubleshoot and repair electrical and mechanical engine temperature, pressure and rpm indicating systems

AMT-CPS 5.0 — Demonstrate knowledge of engine fire protection systems to FAA power plant and airframe competencies

5.1. Inspect, check, service, troubleshoot and repair engine fire detection and extinguishing systems

AMT-CPS 6.0 — Demonstrate knowledge of engine electrical systems to FAA powerplant and airframe competencies

6.1. Repair engine electrical system components
6.2. Install, check and service engine electrical wiring, controls, switches, indicators and protective devices

AMT-CPS 7.0 — Demonstrate knowledge of lubrication systems to FAA powerplant and airframe competencies

7.1. Identify and select lubricants
7.2. Repair engine lubrication system components
7.3. Inspect, check, service, troubleshoot and repair engine lubrication systems

AMT-CPS 8.0 — Demonstrate knowledge of ignition and starting systems to FAA power plant and airframe competencies

8.1. Overhaul magneto and ignition harness
8.2. Inspect, service, troubleshoot and repair reciprocating and turbine engine ignition systems and components
8.3. Inspect, service, troubleshoot and repair turbine engine electrical starting systems
8.4. Inspect, service, and troubleshoot turbine engine pneumatic starting systems

AMT-CPS 9.0 — Demonstrate knowledge of fuel metering systems to FAA power plant and airframe competencies

9.1. Troubleshoot and adjust turbine engine fuel metering systems and electronic engine fuel controls
9.2. Overhaul carburetor
9.3. Repair engine fuel metering system components
9.4. Inspect, check, service, troubleshoot and repair reciprocating and turbine engine fuel metering systems

AMT-CPS 10.0 — Demonstrate knowledge of engine fuel systems to FAA power plant and airframe competencies

10.1. Repair engine fuel system components
10.2. Inspect, check, service, troubleshoot and repair engine fuel systems

AMT-CPS 11.0 — Demonstrate knowledge of induction and engine airflow systems to FAA power plant and airframe competencies

11.1. Inspect, check, troubleshoot, service and repair engine ice and rain control systems
11.2. Inspect, check, service, troubleshoot and repair heat exchangers, superchargers, and turbine engine airflow and temperature control systems
11.3. Inspect, check, service and repair carburetor air intake and induction manifolds

AMT-CPS 12.0 — Demonstrate knowledge of engine cooling systems to FAA power plant and airframe competencies

12.1. Repair engine cooling system components
12.2. Inspect, check, troubleshoot, service and repair engine cooling systems

AMT-CPS 13.0 — Demonstrate knowledge of engine exhaust and reverser systems to FAA power plant and airframe competencies

13.1. Repair engine exhaust system components
13.2. Inspect, check, troubleshoot, service and repair engine exhaust systems
13.3. Troubleshoot and repair engine thrust reverser systems and related components

AMT-CPS 14.0 — Demonstrate knowledge of propellers to FAA power plant and airframe competencies

14.1. Inspect, check, service and repair propeller synchronizing and ice control systems
14.2. Identify and select propeller lubricants
14.3. Balance propellers
14.4. Repair propeller control system components
14.5. Inspect, check, service and repair fixed-pitch, constant-speed and feathering propellers, and propeller governing systems
14.6. Install, troubleshoot and remove propellers
14.7. Repair aluminum alloy propeller blades

AMT-CPS 15.0 — Demonstrate knowledge of unducted fans to FAA power plant and airframe competencies

15.1. Inspect and troubleshoot unducted fan systems and components

AMT-CPS 16.0 — Demonstrate knowledge of auxiliary power units to FAA power plant and airframe competencies

16.1. Inspect, check, service and troubleshoot turbine-driven auxiliary power units

AMT-CPS 17.0 — Demonstrate knowledge of job-related safety requirements to FAA power plant and airframe competencies

17.1. Demonstrate proper application of job site and shop rules and regulations to OSHA standards
17.2. Demonstrate correct selection and use of electrical and hand tools
17.3. Demonstrate proper techniques and practices for working on and around live equipment

AMT-CPS 18.0 — SkillsUSA Framework

The SkillsUSA Framework is used to pinpoint the Essential Elements found in Personal Skills, Workplace Skills and Technical Skills Grounded in Academics. Students will be expected to display or explain how they used some of these Essential Elements. Please reference the graphic, as you may be scored on specific elements applied to your project. For more, visit: www.skillsusa.org/who-we-are/skillsusa-framework/.

COMMITTEE IDENTIFIED ACADEMIC SKILLS

The technical committee has identified that the following academic skills are embedded in this competition.

Math Skills

- Use fractions to solve practical problems.
- Solve practical problems involving percentages.
- Measure angles.
- Find surface area and perimeter of two-dimensional objects.
- Find volume and surface area of three-dimensional objects.

Science Skills

- Describe and recognize solids, liquids and gases.
- Describe characteristics of types of matter based on physical and chemical properties.
- Use knowledge of physical properties (shape, density, solubility, odor, melting point, boiling point, color).
- Use knowledge of chemical properties (acidity, basicity, combustibility, reactivity).
- Use knowledge of classification of elements as metals, metalloids and nonmetals.
- Use knowledge of potential and kinetic energy.
- Use knowledge of mechanical, chemical and electrical energy.
- Use knowledge of heat, light, and sound energy.
- Use knowledge of temperature scales, heat, and heat transfer.
- Use knowledge of speed, velocity, and acceleration.
- Use knowledge of Newton's laws of motion.
- Use knowledge of work, force, mechanical advantage, efficiency and power.
- Use knowledge of simple machines, compound machines, powered vehicles, rockets and restraining devices.
- Use knowledge of principles of electricity and magnetism.
- Use knowledge of static electricity, current electricity and circuits.
- Use knowledge of magnetic fields and electromagnets.
- Use knowledge of motors and generators.

Language Arts Skills

- Provide information in conversations and in group discussions.
- Demonstrate knowledge of appropriate reference materials.
- Use print, electronic databases, and online resources to access information in books and articles.
- Demonstrate informational writing.

CONNECTIONS TO NATIONAL STANDARDS

State-level academic curriculum specialists identified the following connections to national academic standards.

Math Standards

- Numbers and operations
- Algebra
- Geometry
- Measurement
- Data analysis and probability
- Problem solving
- Reasoning and proof
- Communication
- Connections
- Representation

***Source**: NCTM Principles and Standards for School Mathematics. For more information, visit: www.nctm.org.*

Science Standards

- Understands atmospheric processes and the water cycle
- Understands the structure and properties of matter
- Understands the sources and properties of energy
- Understands forces and motion
- Understands the nature of scientific inquiry

***Source:** McREL compendium of national science standards. To view and search the compendium, visit: https://www2.mcrel.org/compendium/.*

Language Arts Standards

None Identified

***Source:** IRA/NCTE Standards for the English Language Arts. To view the standards, visit: www.ncte.org/standards.*