Mechatronics Contest Information

(Tentative- Information is subject to change check back often)

by Mitchell Thomas — last modified February 15, 2023

NOTE: Secondary Contestants will need to bring a laptop computer

The contest is subject to a last-minute change depending upon the industry technical committee setting up each station.

Written testing will be held ON-LINE through your schools' Testing Liaison.
Testing will be open beginning Monday, March 15th.
Students will receive an email from National Skills USA for testing.
The deadline for taking the on-line tests is Friday, April 7th.
No provisions are being made for make-up testing on-site.
NO Substitutions will be allowed this year after April 7th
See the State SkillsUSA Director's Memo for the policy on substitutions and late registrations.

Each contestant will be required to bring his or her printed resume. It will be presented to the judges upon entry to the contest area. A deduction will be applied to your overall score if you do not have a resume.

Print the General Instructions for each of your competitors and have them become acquainted with the competition BEFORE arriving at the conference.

At the option of the Technical Committee, (if they feel it warranted by the teams represented; check with Mitchell for confirmation) there may be a contestant meeting at 6 p.m. the evening **before** the event to get your contestants oriented to the Festo equipment, go over the format of the contest, and hand out documentation they will need to study to be prepared for the contest. This meeting will be held in the Mechatronics contest area and should only take an hour or so. Question and answer time will be allowed.

See the Festo web site for examples of the modules you may be working on.
https://www.festo.com/us/en/e/technical-education/learning-systems/stem/meclab-r-id_32631/

INDUSTRY AWARDS

As agreed at Summit each instructor is requested to secure a minimum of $50.00 in prizes for each student that you bring to the State SkillsUSA Championships. Please contact your for details and to let him/her know of industry awards you have secured. I know many of you have already been hard at work securing the awards. These awards should be labeled with the name,

address, and contact person for the donating industry so that the contestant they are awarded to can send an appropriate expression of his or her appreciation.

TOOLS AND SUPPLIES

Contestants will need to bring the tools and components listed below.

Each team must bring their own tools:

- Metric combination wrench set
- Metric and standard hex key set (Standard for use with mechanical alignment assemblies)
- Metric nut drivers
- Metric scale
- 18" straight-edge
- Feeler gauges (set)
- Small ball-peen hammer
- Standard pouch tools:
- Two or three sizes of slotted and Phillips screwdrivers
- Needle-nose, side cutting, groove joint and slip joint pliers
- 6" and/or 8" adjustable wrenches (For use with mechanical alignment assemblies)
- Wire strippers
- Volt-ohm-milli-ammeter
- #2 lead pencils
- Scientific calculator
- Safety glasses

PLC's required for PS Students only:

- Postsecondary students will need to bring a PLC they are familiar with and a computer to program with.
- Minimum configuration: 24 V, 8 digital inputs, 8 digital outputs
- They will be connecting it to the Festo Air Logic station using a Festo-supplied cable, and programming it to accomplish the task assigned.
- Secondary students will be provided with a PLC pre-programmed.

ACTIVITIES

Students will work with Festo Mechatronics Stations. Tasks may include:

- Assembling hardware based on schematics
- Connect pneumatic components
- Connect electrical components
- Build circuits in Simulation Software (provided by Festo)
  - Each team of two must bring their own laptop to run software with Windows XP or 7.

- Postsecondary will have an added task of programming a PLC to control the station.
  - Each postsecondary team of two must bring their own PLC with programming cables and computer with programming software.
- Students will perform troubleshooting activities on an electrical-control device.

CONTEST DESCRIPTION AND SCORING

Through this competition, we are selecting a secondary and postsecondary contestant to represent Oklahoma at the SkillsUSA Championships. We will follow the national rules, regulations, and contest content as closely as possible. We want our contestants to be prepared to compete at the national level. Additional rules and regulations may be provided in order to insure a fair and rewarding competition at the contest site.

The contest will consist of:

1. An online SkillsUSA (PDP) knowledge test 2.5%.
2. 10%: On-line written test covering knowledge of electrical, electronic, mechanical, and fluid competencies, and hands-on practical work in designing, constructing and troubleshooting typical manufacturing work cells;
3. 10% Oral Interview covering questions about typical symbols and circuits for electrical systems and air logic;
4. 26% Electro-Pneumatics Machine. Given equipment and a problem statement, contestants will assemble the required hardware to implement. Secondary contestants will be provided with a pre-programmed PLC to interface. Postsecondary contestants must bring their own and will be required to program it.
5. 26% Troubleshooting skills. Contestants will be presented with stations with defects and will be asked to troubleshoot to locate the faults.
6. 25.5% Mechanical Alignment. Contestants will be asked to perform typical alignments of sprockets and couplings and tension chain and belts.

The following links may be helpful as students prepare by becoming familiar with the Siemens STEP 7 software and the COSMIR software.

http://www.automation.siemens.com/simatic/industriesoftware/html_76/produkte/software-step7.htm

http://www.ttintl.com/english/s7w.html

http://www.festo-didactic.com/didactic/news.asp?action=detail&home=1&newsid=2339&nation=us&lang=en

http://www.festo-didactic.com/didactic/news.asp?action=detail&back=search&actpage=1&newsid=2418&sid=50a6cece8d55b0f268903e54f1b129ef&nation=us&lang=en