

**201 MICHIGAN SKILLSUSA CHAMPIONSHIPS  
TASK & MATERIALS LIST**

**SKILL OR LEADERSHIP AREA:** Automated Manufacturing

**TASKS TO BE PERFORMED:**

1. Teams must be composed of three members. Teams will demonstrate their ability to perform, exhibit and compile skills and knowledge necessary from the following list of competencies determined by the SkillsUSA Championships technical committee.
2. The teams will be presented with dimensioned drawing(s) of a part(s) to prototype. When the teams finish machining the prototype part(s), they will present it to the client (judges). At this time, they may be presented with a second drawing(s) as either a change order or as an additional part(s). Additionally, team may be asked to create or redesign a part.
3. Each team will be issued a notebook. This will be a three-ring view binder. Included in the binder will be all the necessary information and forms to complete the project. These forms will not be highly specific but will coach the teams. All binders, forms and drawings must be turned in to the judges at the end of the competition.
4. The competencies required for contestants to successfully compete are as follows:
  - a. Performing Mathematical and Measurement Calculations**
    1. Measure work piece to the nearest .001 inch
    2. Calculate CNC speed and feeds
    3. Calculate stock utilization and setup
    4. Calculate tolerances
  - b. Designing, Sketching, Planning Machine Work**
    1. Transfer information from drawing to CAD drawing
    2. Create CAD file for manufacturing
    3. Begin manufacturing documentation process
    4. Process plan
    5. Plot CAD file #1
    6. Export CAD file
    7. Process ECO (Engineering Change Order(s))
  - c. Create Toolpath (CAM file), CNC Code**
    1. Create process plan (Job Plan)
    2. Read-in CAD export file
    3. Create toolpath
    4. Verify toolpath
    5. Create CNC code
    6. Send CNC code to machine tool
    7. Process ECO
  - d. Perform CNC Machining Functions**
    1. Verify CNC file existence
    2. Verify toolpath
    3. Setup part on mill
    4. Set all offsets and tooling

5. Adjust speeds and feeds as needed
6. In-process quality assurance
7. Perform tool changes
8. Perform multiple machining operations in one setup
9. Verify (TQM) process and part
10. Process ECO

**e. Inspection of Part TQM process**

1. Verify part to standards
2. Verify part to ECO standards
3. Document process

**STUDENT MUST SUPPLY:**

- CNC Machining center with:
  - Machinist vise
  - Hold-downs and clamps to secure fixture supplied by Technical Committee
  - Tool holders
  - End mills
- Two computers:
  - One computer loaded with CAD software for CAD program
  - One computer loaded with software for CAM program
  - Three computers are now allowed at the State Competition.
- One 6" dial or digital vernier caliper
- One dial indicator
- One calculator
- One pair of 2/4" or 1" parallels
- One soft-face hammer
- One 6" or 12" steel rule
- One memory stick/flash drive (to transfer files to Technical Committee computers)

**NOTES:**

- Contestant should bring all appropriate measuring tools.
- Parts may be dimensioned in either metric or English.
- It should be stressed that students should make sure the team's equipment is tested and ready to use when the competition starts.

**TECHNICAL COMMITTEE WILL SUPPLY:**

- Part(s) design
- Competition notebook
- Material for machining
- Necessary information and furnishings from judges and technical committee

## **CLOTHING REQUIREMENT (if different from National contest):**

- ALWAYS wear SAFETY GLASSES, safety goggles, or face shields designed for the type of work being done when operating any machine or doing any work in the shop. If you are wearing a face shield, you should always wear your safety glasses or goggles also.
- Wear your safety glasses or safety goggles at all times in the shop.
- Wear shirts with short sleeves, sleeves cut off or rolled up above the elbows.
- Wear shoes with thick penetration resistant leather soles-safety shoes or boots, if required.
- Always remove gloves before turning on or operating any machine. If material is rough or sharp and gloves must be worn, place or handle material with the machine turned Off.
- Wear your hair suitable for the trade. You may protect long hair by:
  - Tying it neatly behind your head
  - Wearing a hair net
  - Wearing a suitable hat or welding cap

*Additional contest information is available at*  
<http://www.great-lakes-training.com/skillsusa.html>

Revised 12/14/09

# SCORECARD Automated Manufacturing Technology - Example Only

Items Evaluated	Possible Points	Contestant Number						
<b>PROTO-CAD Eval Dim Drawing</b>	<b>170</b>							
<b>PROTO-CAD Contest Drawing</b>	<b>25</b>							
<b>PROTO-CAM Process Plan Form</b>	<b>100</b>							
<b>PROTO-CNC Fixture Desc. Form</b>	<b>100</b>							
<b>PROTO-CNC Quality Assurance</b>	<b>50</b>							
<b>PROTO-CNC Surface Finish Accuracy</b>	<b>150</b>							
<b>PROTO-CNC Hand in Time</b>	<b>100</b>							
<b>CONC ENG-CAD Change Order Drawing</b>	<b>25</b>							
<b>CONC ENG-CAM Process Plan</b>	<b>10</b>							
<b>CONC ENG-CAD Eval Dim Drawing</b>	<b>70</b>							
<b>CONC ENG –Surface Fin-Dim Accuracy</b>	<b>100</b>							
<b>Math Problem</b>	<b>100</b>							
<b>Résumé Penalty</b>	<b>0 or -50 only</b>							
<b>Clothing Penalty</b>	<b>Up to -50</b>							
<b>Safety Penalty</b>	<b>Up to -50</b>							
<b>Total Possible Points</b>	<b>1000</b>							

Date:

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Judges' Signatures:

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