Motorsports Technology I

8509 36 weeks / 140 hours

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Acknowledgments

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Course Description

Suggested Grade Level: 10 or 11

Motorsports Technology I provides a foundation in the principles of race car fabrication and all facets of the racing industry. Technical aspects of the course include skill development in vehicle assembly using specialty tools and welding. Students explore the motorsports technology industry and identify careers in the field.

As noted in Superintendent's Memo #058-17 (2-28-2017), this Career and Technical Education (CTE) course must maintain a maximum pupil-to-teacher ratio of 20 students to one teacher, due to safety regulations. The 2016-2018 biennial budget waiver of the teacher-to-pupil ratio staffing requirement does not apply.

Task Essentials Table

- Tasks/competencies designated by plus icons (+) in the left-hand column(s) are essential
- Tasks/competencies designated by empty-circle icons (○) are optional
- Tasks/competencies designated by minus icons (●) are omitted
- Tasks marked with an asterisk (*) are sensitive.

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**Interpreting Drawing and Welding Symbols**

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**Using Tools**

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**Demonstrating Plasma Arc Cutting (PAC)**

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Legend: ☑Essential ☐Non-essential ☐Omitted

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**Curriculum Framework**

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**Applying Safety Practices**

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**Task Number 39**

**Follow safety practices.**

**Definition**

Following safety practices should include wearing proper work attire, using eye and hearing protection, and adhering to equipment operation standards. It should also include following regulations and requirements of U.S. Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), and American Welding Society (AWS) concerning the use, storage, and disposal of hazardous materials related to the motorsports industry. Correct applications, training, and penalties associated with each regulation/requirement, according to local ordinances and instructor's guidelines should be observed.
Process/Skill Questions

- When are safety glasses used?
- Why is it important to follow safety regulations?
- What do EPA, OSHA, and AWS stand for?
- What is the purpose of each organization?

Task Number 40

Perform housekeeping duties.

Definition

Performance should include organizing the lab (e.g., tools, work area, and storage) on a daily basis, according to customer service standards and customer and worker safety. It should also include managing supplies and inventory in an efficient manner.

Housekeeping duties should include

- keeping the duty station clean and safe for work
- keeping tools, workbenches, and manual equipment clean, maintained, and safe for work
- responding appropriately to safety hazards
- maintaining the cleanliness of the work area.

Process/Skill Questions

- Why is it important to maintain a clean and orderly work area?
- What safety advantages result from good housekeeping?
- How can good housekeeping improve one's overall work efficiency?

Task Number 41

Demonstrate worker and lab safety.

Definition

Demonstration should include

- wearing safety glasses at all times.
- wearing clothing appropriate for the job or skill.
- wearing personal protective equipment (PPE) when necessary.
- following lab safety guidelines.
- following the instructor's rules and regulations.
Process/Skill Questions

- Why is PPE important?
- What are some types of PPE?
- Why is it important to follow instructor's and safety guidelines?

Task Number 42

Follow safety clothing and equipment guidelines.

Definition

Following safety clothing guidelines should include wearing the types of protective clothing and equipment required to protect the eyes, respiratory system, auditory functions, feet, hands, and body. It should also include taking grooming/hygiene precautions related to hair length, loose clothing, jewelry, greasy hands, shoes, or clothing, and avoiding dirty or scratched eye protection. Guidelines should be followed in accordance with manufacturers' instructions and government regulations concerning hazardous materials and lab safety.

Process/Skill Questions

- What are the advantages of using protective clothing?
- Why are safety glasses needed in lab areas?
- Why are grooming/hygiene precautions important in lab areas?

Interpreting Drawing and Welding Symbols

Task Number 43

Identify basic elements in a drawing or a sketch.

Definition

Identification should include proper interpretation based on line development, dimensions, and materials, in accordance with instructor's guidelines.

Process/Skill Questions

- What is the importance of having three views of the drawing?
- Why is it important to have tolerances on a drawing?
- What is the name of the most important line on the drawing? [object line]
Task Number 44

Interpret basic welding symbol information.

Definition

Interpretation should be based on identifying the basic welding symbols (e.g., fillet weld, plug weld, and lap weld), in accordance with instructor's guidelines.

Process/Skill Questions

- Why is it important to know welding symbols?
- When are welding symbols used in motorsports technology?
- What are some of the welding symbols of the AWS?

Task Number 45

Fabricate simple parts from a drawing or a sketch.

Definition

Fabrication should include applying components (e.g., materials, dimensions, and machine application) in accordance with instructor's guidelines.

Process/Skill Questions

- What does the term fabrication mean?
- What is the importance of knowing the different types of materials used to fabricate components?
- What safety guidelines should be followed in basic fabrication?
- Why is it important to fabricate parts from a drawing or sketch?
- What are the advantages of fabricating simple parts?

Using Tools
Task Number 46

Perform routine inspections and maintenance of tools.

Definition

Performance should include

- checking all tools to make sure they are in proper working condition
- performing required maintenance of tools following the manufacturer's specifications.

Process/Skill Questions

- What are some safety issues that may occur due to the misuse of tools?
- Why is it important to maintain one's tools?
- What are some proper ways to store tools?

Task Number 47

Demonstrate hand and power tool safety.

Definition

Demonstration should include the various types of hand tools (including specialty tools, fasteners, and measuring tools) encountered in motorsports technology including, but not limited to, the following:

- common end wrenches
- socket set components
- wrenches
- screwdrivers
- pliers
- hammers
- punches and chisels
- specialty cutting tools (e.g., hacksaw, tubing cutter, hand reamer, file)
- specialty electrical system tools (e.g., volt/ohmmeter, dwell/tachometer, continuity tester, timing light, remote starter switch)
- battery specialty tools (e.g., cable puller, post and terminal cleaner, battery lifting or carrying strap)
- lubrication specialty tools (e.g., transmission funnel, oil filter wrench, grease gun)
- other miscellaneous specialty tools (e.g., air nozzles, C-clamp, puller set, pressure gauge, screw extractor)
• automotive fasteners (e.g., taps, dies, nuts, bolts, studs)
• automotive measuring tools (e.g., outside and inside micrometers, Plastigauge, dial indicator tool, feeler gauge, vernier caliper, depth micrometer)

Demonstration should also include the various types of power tools (including pneumatic and electric tools)

• air impact gun
• air hammer
• air ratchet
• air drill
• tire burnishing tool
• drop light
• electric drill
• grinding equipment.

Demonstration also should follow manufacturers' instructions and government regulations.

Process/Skill Questions

• Why is maintenance of tools important?
• Why is it important to use the right tool for the right job?
• What are some good tool usage habits?
• Why is it important to lubricate air tools?

Task Number 48

Demonstrate the use of a horizontal saw, a band saw, and a cold-cut saw.

Definition

Demonstration should include

• checking for safe operation of the saw
• checking for a clean and safe work area
• checking the condition of the blade
• determining the type of blade to be used for the material to be cut
• checking the speed of the blade
• determining the travel speed of the material
• checking coolant flow, if applicable
• following clothing safety procedures (i.e., no gloves, no loose clothing, and no jewelry).
Process/Skill Questions

- What factors determine the type of saw one would use when cutting materials?
- What determines the speed of the saw blade?
- What safety issues are involved in using a horizontal saw, a band saw, and a cold-cut saw?

Task Number 49

Demonstrate the use of a sheet metal brake.

Definition

Demonstration of using sheet metal brake (pan brake, finger brake) should include

- ensuring the area around the brake is clear of obstruction
- determining the maximum thickness of metal that can be used in the sheet metal brake
- determining the desired angle to be bent
- setting the depth of the finger to the thickness of the plate or the radius needed
- bending the material to the desired angle.

Process/Skill Questions

- What safety issues occur when operating a sheet metal brake?
- What condition should the edge of the metal be in before bending?
- What type of line would be more precise when laying off material to be bent?

Task Number 50

Demonstrate the use of a hydraulic shear.

Definition

Demonstration should include

- preparing a clean and safe work area
- selecting the material to be sheared
- selecting and mark area to be sheared
- placing the metal in the shear
- applying the bracing arm against the metal
- depressing the foot pedal to activate the shear
- releasing the foot pedal after shearing
- removing excess metal from the shear.

Process/Skill Questions

- What are some safety issues that may occur when operating a hydraulic shear?
- What materials should not be used in a hydraulic shear?
- What is the maximum thickness that can be sheared?

Performing Gas Metal Arc Welding (GMAW, GMAW-S)

Task Number 51

Perform safety inspections of welding equipment.

Definition

Performance should include a daily visual inspection of GMAW and GMAW-S equipment (i.e., welding leads, which include ground and electrode cable) and accessories (e.g., clothing, hand tools, and base metal), according to the instructor's guidelines, and reporting problems to the instructor.

Process/Skill Questions

- Why is it important to inspect equipment before use?
- Who should perform equipment repair? Why?
- What conditions could keep a worker from welding?

Task Number 52

Set up for GMAW operations and base metal preparation.

Definition
Setup should include

- adhering to oral or written instructions
- wearing PPE
- selecting the proper electrode
- adjusting to the proper polarity and current
- applying principles of operation according to instructor's guidelines.

Process/Skill Questions

- What would happen to exposed skin when welding?
- What would happen if one used the wrong numbered filter lens when GMAW-S welding?
- What type of gas is used in GMAW-S?

Task Number 53

Demonstrate single-pass fillet weld, all positions, on carbon steel, using short-circuit transfer.

Definition

Demonstration should include adherence to welding techniques and include wire selection, bun angle, material preparation, the use of proper equipment and hand tools, and adherence to the assignment.

Process/Skill Questions

- What types of materials can GMAW-S be used on?
- What precautions should be taken when welding on a vehicle?
- What types of positions are there in welding?

Demonstrating Plasma Arc Cutting (PAC)

Task Number 54
Perform safety inspections of equipment, materials to be cut, and work area.

Definition

Performance should include a visual inspection of equipment (i.e., power source, air compressors, and connections to the PAC process) and accessories (e.g., clothing, hand tools, base metal), in addition to checking for moisture in the air compressor lines. Inspection must be made daily and in accordance with the instructor's policy.

Process/Skill Questions

- Why is moisture harmful to plasma cutting equipment?
- Why is air pressure important in plasma cutting?
- Why should you always unplug the machine during inspection?

Task Number 55

List PAC safety procedures.

Definition

List should include

- never placing body parts under the cutter tip
- turning off power during maintenance
- preparing a clean and safe work area
- making sure there are no flammable objects around the work area
- covering all windows
- being aware of the direction of the sparks
- using PPE
- ensuring good ventilation.

Process/Skill Questions

- What could happen if your body parts were exposed to the arc?
- What would happen to the exposed skin near the arc?
- Why is ventilation so important?
- What could happen to glass when it is exposed to the sparks of the torch?
Task Number 56

Set up for manual plasma arc-cutting operations.

Definition

Setup should include

- adhering to oral or written instruction
- wearing PPE
- assembling components, including air compressor pressure selection and shielding as it pertains to metal thickness
- selecting amperage or machine setting
- grounding on a power source
- installing torch head parts
- applying principles of PAC operation.

Process/Skill Questions

- Why is proper amperage important in plasma arc cutting?
- What determines the shade of lens used while PAC?
- How do you determine how long you can use a PAC machine?

Task Number 57

Operate plasma arc-cutting equipment.

Definition

Operation should include adhering to a welding assignment, using PPE and accessories, and starting and maintaining the plasma arc on carbon steel, in accordance with the instructor's guidelines.

Process/Skill Questions

- What does post-flow air do in a PAC machine?
- What determines the speed of cutting?
- What determines the amount of amperage used on a PAC?
Task Number 58

Perform shape-cutting operations.

Definition

Performance should include straight and shape cuts, in accordance with the instructor's guidelines.

Process/Skill Questions

- What types of materials can be cut with PAC?
- What materials can be used as patterns to trace shapes?
- What preparation needs to be done to materials after PAC?

Demonstrating Manual Oxyfuel Gas Cutting (OFC)

Task Number 59

Perform safety inspections of all equipment and accessories.

Definition

Performance should include a daily visual inspection of all OFC hoses, cords, and gauges, in accordance with the instructor's or employer's policy.

Task Number 60

Set up for manual OFC operations and base metal preparation on carbon steel.

Definition

Setup should include
• adhering to written or oral instructions
• wearing PPE
• identifying types of gases
• assembling components (e.g., gauges, hoses, torch, cutting tip)
• completing a leak test.

Task Number 61

Operate manual OFC equipment.

Definition

Operation should include

• wearing PPE
• adhering to the written or oral welding assignment
• adjusting equipment to obtain a neutral flame
• visually examining cut surfaces
• identifying types of flames
• shutting down equipment at the end of the job.

Task Number 62

Perform straight-cutting operations on carbon steel.

Definition

Performance should result in a straight production cut surface to specifications of the written or oral assignment.

Applying Tools for Fabrication

Task Number 63
Follow safety procedures.

Definition

Following safety procedures should include the use of manufacturer's suggested guidelines and instructor's rules and regulations in accordance with safety standards set forth by the industry.

Process/Skill Questions

- What are some safety procedures that should be followed when using a hand-held grinder?
- What are some safety procedures that should be followed when using an OFC?
- What are some safety procedures that should be followed when using the PAC?

Task Number 64

Describe the formulas for determining speeds and feeds.

Definition

Description should include

- the formulas and their variables
- where to locate the speeds and feeds charts containing standard information.

Process/Skill Questions

- How is the spindle RPM determined for a lathe with a 2-inch-diameter aluminum shaft?
- What are the inches per minute for a half-inch-diameter end mill (two fluted) when cutting aluminum?
- What is the maximum spindle speed for a 6-inch-diameter, half-inch-wide, 80-grit grinding wheel? How might this information be located?

Task Number 65

Apply mathematical problem solving to machining operations.

Definition

Application should include using arithmetic, geometric, algebraic, and trigonometric operations when
• selecting and sequencing operations
• holding the work
• producing surfaces
• locating surfaces and center lines
• analyzing operations and sequences
• troubleshooting a machine tool or cutting tool
• calculating speeds and feeds
• calculating operation times
• calculating dimensions from a blueprint
• factoring statistics required by control charts
• identifying the effect of a change of speed or feed
• calculating the volume of material stored
• using trade formulas to prepare a process plan
• performing benchwork and layout operations
• operating machine tools
• performing inspection and control functions
• solving for unknowns in right triangles
• analyzing parts for plane perpendicularity, Cartesian coordinates, concentricity, parallelism, straightness, flatness, circularity, and symmetry, with an accuracy required by the blueprint and industry standard.

Process/Skill Questions

• What tools are available to assist in making calculations?
• What is a common machining task or problem that would require the application of principles of trigonometry?
• How are tolerances applied to dimensions?

Task Number 66

Describe the principles and technology of precision measurement operations.

Definition

Description should include

• determining the concentricity of a turned part to a lathe's spindle
• inspecting dimensions of a finished part
• identifying precision transfer tools such as telescoping gauges and adjustable parallels to determine the compliance of a part of selected dimensions
• reading the following:
  o micrometer
  o vernier calipers
  o dial calipers
- electronic calipers
- dial indicators

**Process/Skill Questions**

- What are the four basic measurements made with a dial caliper?
- What are the basic operations performed with a combination square?
- What are the differences between scales and rulers?

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**Task Number 67**

**Apply the properties of the various metals to cutting conditions and problems.**

**Definition**

Application should include determining the appropriate cutter geometry and speeds and feeds for cutting various metals during turning, milling, drilling, radial drilling, and computer numeric control (CNC) operations.

**Process/Skill Questions**

- How is appropriate cutting geometry determined?
- How does speed and feed affect cutting?
- What are the advantages of using insert cutters?

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**Task Number 68**

**Identify fundamental workplace behaviors.**

**Definition**

Identification should include the ability to

- work with team members
- use industry terminology
- listen and follow instructions
- apply mathematical problem-solving skills
- assume the appropriate attitude or mindset
• practice safety
• self-evaluate
• manage time and projects.

Process/Skill Questions

• Why is prompt attendance important?
• Who is affected when a coworker is late for his/her job?
• What kind of attitude is a worker expected to maintain on the job?

Task Number 69

Measure materials and parts.

Definition

Measurement should include the use of non-precision (e.g., rulers, protractors, basic transfer tools) and precision instruments (e.g., micrometer, vernier caliper, dial and electronic calipers, telescoping gauges, adjustable parallels) to determine the compliance of a part of selected dimensions.

Process/Skill Questions

• What are the names of several non-precision measuring instruments?
• What are non-precision transfer tools?
• What does a protractor measure?
• What are the different kinds of rulers or scales?
• What are the names of precision transfer tools?
• What is the difference, when transferring dimension, of using a basic as opposed to a precision measuring tool?
• What does a precision measuring tool measure more accurately?

Task Number 70

Convert standard measurements to the metric system.

Definition

Conversions should include

• describing the significance of the task in the industry
• listing common standard and metric measurements
identifying the associated equations
converting fractions to decimals and vice versa.

Process/Skill Questions

- Why is it important to convert between systems?
- How many millimeters are in an inch?
- What is the formula for converting inches to millimeters?

Task Number 71

Inspect simple parts, using precision tools and techniques.

Definition

Inspection should include

- developing an inspection plan
- identifying and selecting the required measuring instruments
- completing the required written inspection report
- making a decision to reject or accept each part
- providing a brief oral report of inspection procedures, results, and decisions.

Process/Skill Questions

- What are some precision measuring devices and how are they used?
- Why is temperature important when using precision measuring tools?

Task Number 72

Lay out parts.

Definition

Layout of parts should include

- preparing a clean and safe work area
- designing the desired part to be fabricated
- determining the tools and equipment needed
- selecting the type of material to be used
- transferring the template or design to your design material by using necessary tools and equipment.

Process/Skill Questions
• What size scribe line would be best for laying out the part?
• What are some materials that may be used?
• How would center-punch marks help in fabricating design layout?
• What types of tools would be used to scribe a line?

Task Number 73

Fabricate sheet metal.

Definition

Fabrication should include

• selecting sheet metal according to the rules and regulations required for the motorsports project
• preparing a clean and safe work area and table
• laying out the design
• designing and cutting a template out of the desired material
• checking alignment of the design
• transferring the template to the sheet metal
• cutting out the design
• deburring the sheet metal
• bead rolling the sheet metal, if applicable
• rechecking the design for proper fit
• installing and securing as needed (pop rivet, tack weld).

Process/Skill Questions

• What is the importance of understanding the rules and safety regulations in fabricating sheet metal?
• What are some safety issues involved when fabricating sheet metal?
• What are some different types of tools needed when fabricating sheet metal?

Task Number 74

Prepare the vehicle for pre-assembly.

Definition

Preparation of the vehicle for pre-assembly includes

• making a checklist for pre-assembly
• gathering all necessary parts
• gathering all necessary tools and safety equipment.

Process/Skill Questions

• Why are checklists important?
• What are some tools that might be used?
• What are some safety tools that may be collected?

Ensuring Motorsports Safety

Task Number 75

Identify driver safety equipment.

Definition

Identification should include

• full-face helmet with face shield
• head-and-neck-support (HANS) device
• neck collar
• driver restraints
• arm restraints
• protective fireproof clothing may include jacket, pants, socks, shoes, underwear, head socks, and helmet skirts
• fresh-air system
• driver-cooling system
• window nets
• row-bar padding
• fire-suppression system
• all other necessary equipment that is covered in rules and safety regulations in a desired motorsports project.

Process/Skill Questions

• What is one of the newest safety items used in driver protection?
• How has driver safety changed in the past years?
• How often are safety belts changed in accordance with the rules and safety regulations?
Task Number 76

Identify crew safety equipment.

Definition

Identification of crew safety equipment is dependent on the type of motorsports organization. Identification should include complete PPE (i.e., helmets, gloves, and fire-protection clothing).

Process/Skill Questions

- What are some rule changes that have occurred to help pit crew safety?
- How is fire-protection safety emphasized in motorsports?
- What are some crew safety requirements in different motorsports organizations?
- What other crew safety equipment is used in different motorsports organizations?

Task Number 77

Identify auto body safety procedures.

Definition

Identification of safety procedures should include

- the working conditions and safety precautions in the auto body repair lab during vehicle repair
- the eye and hand safety precautions, in compliance with federal, state, and local requirements.

Note: All identifications must be made according to ASE standards.

Process/Skill Questions

- What hazards could occur from auto body?
- What PPE should be worn in auto body?
- Why is proper disposal of chemicals important?

Task Number 78

Demonstrate high-performance safety equipment.

Definition
Demonstration should be performed while adhering to all manufacturing and sanctioning bodies for the rules and regulations to be used on the vehicle project.

**Process/Skill Questions**

- What are some types of safety equipment that would be used?
- What does SFI stand for?
- How often should drivers' harnesses be replaced?

**Identifying and Assembling High-Performance Engines**

**Task Number 79**

**Determine the cost of a high-performance engine.**

**Definition**

Determination should include

- identifying the engine to be modified and the amount of horsepower needed
- gathering prices of parts and machining costs.

**Process/Skill Questions**

- What are two determining factors when building a high-performance engine?
- Should you ask other people for a recommendation for a good machinist? Why or why not?
- What is the least expensive part that will give you the best results for the money?

**Task Number 80**

**Analyze high-performance engine parts.**

**Definition**

Analysis should include
• camshaft
• pistons
• valves
• lifters
• rocker arms
• cylinder heads
• carburetor
• distributor
• push rods

to determine the effect on engine performance.

Process/Skill Questions

• What is the difference between a high-performance part and a regular part?
• How does a high-performance camshaft affect the performance of the engine?
• What is the connection between the compression ratios and the octane of fuel?

Exploring the Motorsports Technology Industry

Task Number 81

Identify the types of motorsports.

Definition

Identification should include any type of motorsport that has an organization, written rules, and competition.

Process/Skill Questions

• What are some different types of motorsports?
• Why are rules important in motorsports?
• What are some of the organizations associated with the world of motorsports?
Task Number 82

Identify all rules, regulations, and technical specifications in the motorsports field.

Definition

Identification should include

- picking a class of competition
- reading and understanding all rules for competition, safety, and the construction of the vehicle.

Process/Skill Questions

- Does every organization of motorsports have rules? Why or why not?
- How often are the rules changed?
- What might cause the rules to be changed?

Task Number 83

Identify careers in the field of motorsports technology.

Definition

Identification incorporates, but is not limited to, the following, in accordance with instructor's guidelines:

- Research the variety of career options in the motorsports technology field, such as engine builders, fabricators, manufacturers, engineers, mechanics, machinists, automotive machinists, public relations personnel, and many sports-related professions.
- Research the types of employment opportunities available in the region.

Process/Skill Questions

- What are some job opportunities in the motorsports technology field?
- What additional training may be needed in this field?
- Why is it important to upgrade training each year?

SOL Correlation by Task
<table>
<thead>
<tr>
<th>Task</th>
<th>History and Social Science: GOVT.1, GOVT.9, GOVT.15</th>
<th>History and Social Science: GOVT.16</th>
<th>History and Social Science: GOVT.9, GOVT.15, GOVT.16</th>
<th>History and Social Science: GOVT.9, GOVT.16</th>
<th>History and Social Science: GOVT.9, GOVT.16</th>
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</thead>
<tbody>
<tr>
<td>Follow safety practices.</td>
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<td>Perform housekeeping duties.</td>
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<td>Demonstrate worker and lab safety.</td>
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<td>Follow safety clothing and equipment guidelines.</td>
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<td>Identify basic elements in a drawing or a sketch.</td>
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<tr>
<td>Interpret basic welding symbol information.</td>
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<tr>
<td>Fabricate simple parts from a drawing or a sketch.</td>
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<tr>
<td>Perform routine inspections and maintenance of tools.</td>
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<tr>
<td>Demonstrate hand and power tool safety.</td>
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<tr>
<td>Demonstrate the use of a horizontal saw, a band saw, and a cold-cut saw.</td>
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<tr>
<td>Demonstrate the use of a sheet metal brake.</td>
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<tr>
<td>Demonstrate the use of a hydraulic shear.</td>
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<tr>
<td>Perform safety inspections of welding equipment.</td>
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<tr>
<td>Set up for GMAW operations and base metal preparation.</td>
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<tr>
<td>Demonstrate single-pass fillet weld, all positions, on carbon steel, using short-circuit transfer.</td>
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<tr>
<td>Perform safety inspections of equipment, materials to be cut, and work area.</td>
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<tr>
<td>List PAC safety procedures.</td>
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<tr>
<td>Set up for manual plasma arc-cutting operations.</td>
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<td>Operate plasma arc-cutting equipment.</td>
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<td>Perform shape-cutting operations.</td>
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<tr>
<td>Perform safety inspections of all equipment and accessories.</td>
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<tr>
<td>Set up for manual OFC operations and base metal preparation on carbon steel.</td>
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<tr>
<td>Operate manual OFC equipment.</td>
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<tr>
<td>Perform straight-cutting operations on carbon steel.</td>
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<tr>
<td>Follow safety procedures.</td>
<td>History and Social Science: GOVT.9, GOVT.15, GOVT.16</td>
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<td>History and Social Science: GOVT.9, GOVT.16</td>
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<tr>
<td>Apply mathematical problem solving to machining operations.</td>
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<tr>
<td>Describe the principles and technology of precision measurement operations.</td>
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<td>Task</td>
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<td>Apply the properties of the various metals to cutting conditions and problems.</td>
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<tr>
<td>Identify fundamental workplace behaviors.</td>
<td>History and Social Science: GOVT.1, GOVT.3</td>
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<tr>
<td>Measure materials and parts.</td>
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<tr>
<td>Convert standard measurements to the metric system.</td>
<td>Mathematics: A.1</td>
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<td>Lay out parts.</td>
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<td>Fabricate sheet metal.</td>
<td>Mathematics: G.3</td>
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<td>History and Social Science: GOVT.9</td>
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<td>Identify crew safety equipment.</td>
<td>History and Social Science: GOVT.9, GOVT.15, GOVT.16</td>
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<td>Identify auto body safety procedures.</td>
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<td>Demonstrate high-performance safety equipment.</td>
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<td>Identify all rules, regulations, and technical specifications in the motorsports field.</td>
<td>English: 10.5, 11.5</td>
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<tr>
<td>Identify careers in the field of motorsports technology.</td>
<td>English: 10.5, 10.8, 11.5, 11.8</td>
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<td>History and Social Science: GOVT.16</td>
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**Entrepreneurship Infusion Units**

Entrepreneurship Infusion Units may be used to help students achieve additional, focused competencies and enhance the validated tasks/competencies related to identifying and starting a new business venture. Because the unit is a complement to certain designated courses and is not mandatory, all tasks/competencies are marked “optional.”
Appendix: Credentials, Course Sequences, and Career Cluster Information

Industry Credentials: Only apply to 36-week courses

- College and Work Readiness Assessment (CWRA+)
- Core: Introductory Craft Skills Entry-Level Assessment
- Customer Service Examination
- Customer Service Specialist (CSS) Examination
- Flux Core Arc Welding (FCAW) Examination
- Gas Metal Arc Welding Examination
- Gas Tungsten Arc Welding (GTAW) Examination
- National Career Readiness Certificate Assessment
- Professional Communications Certification Examination
- SENSE Training Program Certification Examination (Level 1, Entry-Level Welder)
- Shielded Metal Arc Welding (SMAW) Examination
- Welding Assessment
- Welding Examination
- Welding Level One Entry-Level Assessment
- Workplace Readiness Skills for the Commonwealth Examination

Concentration sequences: A combination of this course and those below, equivalent to two 36-week courses, is a concentration sequence. Students wishing to complete a specialization may take additional courses based on their career pathways. A program completer is a student who has met the requirements for a CTE concentration sequence and all other requirements for high school graduation or an approved alternative education program.

- Motorsports Technology II (8510/36 weeks, 280 hours)

Career Cluster: Transportation, Distribution and Logistics

<table>
<thead>
<tr>
<th>Pathway</th>
<th>Occupations</th>
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<tbody>
<tr>
<td>Facility and Mobile Equipment Maintenance</td>
<td>Automotive Body and Related Repairer</td>
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<td>Automotive Service Technician, Mechanic</td>
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<td>Electrical and Electronic Installer</td>
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<td>Electrical and Electronic Repairer</td>
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<td>Marine Watercraft Repair and Maintenance Worker</td>
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<td>Service Technician</td>
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<td>Small Engine Mechanic</td>
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