

Outcomes Mapping

Tech & Health DIVISION

Program:	T0932 – Certificate: Welder – Gas Tungsten Arc Welding	# Courses: (if applicable)	11	Updated:	6/29/2015	Submitted by:	Dan Garcia
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Institutional Level Outcomes (ILOs): *As a result of an educational experience with any aspect of the college, students will develop the following knowledge, skills, abilities, and attitudes:*

1. Communication	2. Critical Thinking	3. Information and Technology Literacy	4: Personal, Social, Civic, & Environmental Responsibility			
Connect PLOs with an I, P, or M (see Key in Footer) identifying the level to which knowledge or a skill can be demonstrated following the completion of the program or educational experience.			PLO to ILO Alignment			
PLO Name	PLO Defined: Upon successful completion of this program, students will be able to:		1	2	3	4
1. Technically Competent	Students completing the certificate will be technically competent		✓	✓	✓	
2. Employment	Program completers will be employed or seeking employment in their area or a related area		✓			✓
3. Weld Certificate T0932	Program completers will solve problems as related to preparing materials prior to welding.			✓	✓	
4.						

See the Outcomes Assessment website for definitions and examples of Mt. SAC's ILOs: <http://www.mtsac.edu/instruction/outcomes/ilos.html>

Student Learning Objectives (SLOs), Measureable Objectives (MOs), Administrative Unit Objectives (AUOs)

Key for Level of Learning

(Use for Mapping SLOs/MOs to PLOs to ILOs)

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Outcomes Mapping

Course: WELD 40	Connect Outcomes with an I , P , or M (see Key in Footer) identifying the level to which knowledge or a skill can be demonstrated in that portion of the course or service.													
SLOs, MOs, AUOs	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	ILO 1	ILO 2	ILO 3	ILO 4
Define terms and conditions related to the welding industry. (MO)	I	I									I	I	I	
Identify the cost effectiveness of each welding process. (MO)	I	I										I		
Recognize and illustrate basic metallurgy related to the welding trades. (MO)	I		I								I	I	I	
Incorporate safety practices into all welding activities. (MO)	I	I	I									I	I	I
Recognize and describe common welding processes used in bonding metals. (MO)	I	I	I								I	I	I	
Demonstrate the use of Oxy-acetylene welding (OAW),Shielded Metal Arc Welding (SMAW), Gas Metal Arc Welding(GMAW),Gas Tungsten Arc Welding (GTAW),Flux Cored Arc Welding (FCAW), Plasma Arc Cutting (PAC),Carbon Arc Cutting(CAC) principles to join and cut metals. (MO)	I	I	I									I	I	
Discuss the different base metal compositions used to make metallurgical bonds. (MO)	I											I	I	
Completers will be able to successfully identify and differentiate between various welding processes presented in the class. (SLO)	I	I	I								I	I	I	
Students will be able to effectively operate the equipment for various welding processes. (SLO)	I	I	I									I	I	

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Outcomes Mapping

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Course: WELD 50	Connect Outcomes with an I, P, or M (see Key in Footer) identifying the level to which knowledge or a skill can be demonstrated in that portion of the course or service.													
SLOs, MOs, AUOs	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	ILO 1	ILO 2	ILO 3	ILO 4
Demonstrate skill in oxyacetylene welding. (MO)	I	I									I	I	I	
Identify the characteristics of metals and their reaction to welding processes. (SLO/MO)	I	I	I								I	I	I	
Demonstrate appropriate maintenance of welding equipment in the work place. (MO)	I	I									I	I	I	
Explain and demonstrate safe and efficient operation of welding equipment. (MO)	I	I									I	I	I	I
Recognize problems of gas fluctuation in welding and cutting operations. (SLO/MO)	I	I									I	I	I	
Use and interpret charts to select filler material. (MO)	I		I								I	I	I	
Calculate the time required to complete quality welding used with the oxyacetylene process. (MO)	I	I									I	I	I	
Each student use proper names of equipment and supplies used in oxyfuel welding (SLO)	I	I									I	I	I	

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Outcomes Mapping

Student Learning Objectives (SLOs), Measureable Objectives (MOs), Administrative Unit Objectives (AUOs)														
Course: WELD 51	Connect Outcomes with an I, P, or M (see Key in Footer) identifying the level to which knowledge or a skill can be demonstrated in that portion of the course or service.													
SLOs, MOs, AUOs	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	ILO 1	ILO 2	ILO 3	ILO 4
Utilize different types of power sources used for welding in shield metal arc, gas metal arc, gas tungsten arc and flux cored arc welding processes. (MO)	I	I	I									I	I	I
Identify and demonstrate a variety of electric welding processes used in bonding metals. (SLO/MO)	I	I	I								I	I	I	
Use a vocabulary of terms and conditions related to the welding trades. (MO)	I	I									I	I	I	
Explain and demonstrate safe and efficient operation of welding equipment. (SLO/MO)	I	I									I	I	I	
Apply safety principles in arc welding procedures. (MO)	I	I										I	I	I
Use and interpret reference charts to select filler material. (SLO/MO)	I	I	I								I	I	I	
Calculate times required to complete quality welding used with the electric arc welding processes. (MO)	I	I										I	I	I
Demonstrate and describe how to set electric arc welding machines using gas metal arc, shield metal arc, gas tungsten arc and the flux cored arc welding processes. (MO)	I	I	I								I	I	I	

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Demonstrate daily maintenance of a safe work place environment. (MO)	I	I										I	I	I	I
Each student will demonstrate knowledge of which process is most commonly used for different aspects of the welding and what advantage it will provide to that aspect of the industry. (SLO)	I	I	I									I	I	I	I

Student Learning Objectives (SLOs), Measureable Objectives (MOs), Administrative Unit Objectives (AUOs)

Course: WELD 53A	Connect Outcomes with an I, P, or M (see Key in Footer) identifying the level to which knowledge or a skill can be demonstrated in that portion of the course or service.													
SLOs, MOs, AUOs	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	ILO 1	ILO 2	ILO 3	ILO 4
Describe nature of metals and the relationship between their structural and mechanical properties. (MO)	I		I								I	I	I	
Utilize metallurgy tools and equipment as a means of determining weld soundness. (SLO/MO)	I	I									I	I	I	
Describe effects of alloying metals in relationship to a welding procedure. (MO)	I										I	I	I	
Explain industrial processes for manufacturing ferrous and non-ferrous metals. (SLO/MO)	I										I	I	I	
Interpret iron-carbon relationship and its effect on welding of ferrous metals. (MO)	I	I									I	I	I	
Examine the purpose of pre- and post-heat treatments on welded metals. (MO)	I	I									I	I	I	

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Outcomes Mapping

Compare and contrast the cause of deformation on welded metals. (MO)	I											I	I	I	
Recognize effects of alloying materials in ferrous and non-ferrous metals. (MO)	I											I	I	I	
Identify crystal structure of metals and their changes in heat treatment processes. (MO)	I											I	I	I	
Students will run hardness tests and other assessments means to understand how grain structure relates to strength and ductility of metals. (SLO)	I	I										I		I	

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Course: WELD 60	Connect Outcomes with an I, P, or M (see Key in Footer) identifying the level to which knowledge or a skill can be demonstrated in that portion of the course or service.													
SLOs, MOs, AUOs	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	ILO 1	ILO 2	ILO 3	ILO 4
Identify print views, lines and dimensioning methods. (SLO/MO)	I	I									I	I		I
Demonstrate concepts of views by sketching objects. (MO)	I/P	I/P									I/P	I/P		I/P
Recognize and identify structural and pipe shapes and sizes. (MO)	I/P	I/P	I/P								I/P	I/P	I/P	I/P
Calculate with fractions, decimals, and metrics by converting and manipulating. (SLO/MO)	I/P	I/P	I/P								I/P	I/P	I/P	I/P
Assess bills of materials, weights and lengths of materials. (MO)	I	I	I								I	I	I	I
Illustrate revolved sections of objects. (MO)	I	I	I								I	I	I	I

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Identify welding symbols on prints and objects. (MO)	I/P	I/P	I/P								I/P	I/P	I/P	
Create objects from print drawings. (MO)	I	I										I/P	I/P	
Interpret detail and assembly prints. (MO)	I	I									I	I	I	
Identify and define print notes and specifications. (MO)	I	I									I	I	I	

Student Learning Objectives (SLOs), Measureable Objectives (MOs), Administrative Unit Objectives (AUOs)														
Course: WELD 70A	Connect Outcomes with an I, P, or M (see Key in Footer) identifying the level to which knowledge or a skill can be demonstrated in that portion of the course or service.													
SLOs, MOs, AUOs	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	ILO 1	ILO 2	ILO 3	ILO 4
Manipulate and perform welds in the flat and horizontal positions. (SLO/MO)	I/P	P	P									P	P	
Develop proper and safe usage of welding equipment and practices. (SLO/MO)	P	P	P								P	P	P	P
Differentiate between welding processes and where industry applies them in the workforce. (MO)	I/P	I/P	I/P								P	P	P	P
Select different types of filler materials with the SMAW, FCAW and GMAW processes on plate steel. (MO)	P	P	P								P	P	P	
Solve problems as related to cutting, preparing and fitting up materials prior to welding. (SLO/MO)	P	P	P									P	P	

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Outcomes Mapping

Student Learning Objectives (SLOs), Measureable Objectives (MOs), Administrative Unit Objectives (AUOs)

Course: WELD 70B	Connect Outcomes with an I, P, or M (see Key in Footer) identifying the level to which knowledge or a skill can be demonstrated in that portion of the course or service.													
SLOs, MOs, AUOs	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	ILO 1	ILO 2	ILO 3	ILO 4
Use vocabulary of terms and conditions related to the welding trades. (MO)	I/P	I/P	I/P								P	P	P	
Explain safe and efficient operation of welding equipment. (SLO/MO)	P	P	P								P	P	P	P
Interpret charts as a reference to select filler materials for welding. (MO)	P	P	P								P	P	P	
Demonstrate machine setups for SMAW and FCAW processes. (SLO/MO)	P	P	P									P/M	P/M	
Utilize different welding processing for welding in flat, horizontal, vertical and overhead positions for quality products. (SLO/MO)	P/M	P/M	P/M									P/M	P/M	

Student Learning Objectives (SLOs), Measureable Objectives (MOs), Administrative Unit Objectives (AUOs)

Course: WELD 70C	Connect Outcomes with an I, P, or M (see Key in Footer) identifying the level to which knowledge or a skill can be demonstrated in that portion of the course or service.												
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Outcomes Mapping

SLOs, MOs, AUOs	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	ILO 1	ILO 2	ILO 3	ILO 4
Read and interpret welding and building codes in the area of light gauge and heavy material of the construction industry. (MO)	P	P									P	P	P	P
Identify modern welding practices. (MO)	P/M	P/M									M	M	M	
Evaluate finished welds for defects by visual and bend inspections. (SLO/MO)	M	M										P	P	P
Demonstrate proper and safe usage of welding equipment and practices by written and practical tests. (MO)	M	M	P									M	M	
Compare and contrast SMAW and FCAW processes for appropriateness of code welding. (SLO/MO)	P	P	P								P	P	P	

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Course: WELD 80	Connect Outcomes with an I, P, or M (see Key in Footer) identifying the level to which knowledge or a skill can be demonstrated in that portion of the course or service.													
SLOs, MOs, AUOs	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	ILO 1	ILO 2	ILO 3	ILO 4
Apply welding skills in required practical projects. (MO)	P	P	P									P	P	
Demonstrate proper and safe usage of welding equipment. (MO)	P	P	P									M	M	P

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Accurately measure to one sixteenth of an inch. (MO)	P	P	P									P	P	
Differentiate the theoretical knowledge necessary to run various electrodes and filler metals using the welding processes presented in the class. (MO)	P	P	P									P	P	P
Identify materials used in construction and fabrication industry and select the correct filler metals for welding and joining. (MO)	P	P	P									P	P	P
Apply principles of identifying base metals and carbon contents of materials used in welding. (MO)	P	P	P									P	P	P
Anticipate and solve problems in project fabrication. (MO)	P	P	P									P	P	P
Student will be able to select the correct welding applications and processes. (SLO)	M	M											P	P
Students will be able to apply the principles of layout and blueprint reading. (SLO)	P	P	P									P	P	P
Students will demonstrate welding skills to industry standards. (SLO)	M	M	M										P	P

Student Learning Objectives (SLOs), Measureable Objectives (MOs), Administrative Unit Objectives (AUOs)

Course: WELD 81	Connect Outcomes with an I, P, or M (see Key in Footer) identifying the level to which knowledge or a skill can be demonstrated in that portion of the course or service.													
SLOs, MOs, AUOs	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	ILO 1	ILO 2	ILO 3	ILO 4

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Apply pipe welding skills in required practical projects. (SLO/MO)	P	P	P									P/M	P/M	
Demonstrate proper and safe usage of welding equipment and practices. (MO)	P/M	P/M	P									P/M	P/M	P
Differentiate the positions necessary to run various electrodes and filler metals using welding processes on pipes and/or tubing. (MO)	P	P	P									P/M	P/M	
Identify materials used in pipe and tubing industry and select the correct filler materials for joining. (MO)	P	P	P								P	P	P	
Solve problems as related to preparing, layout and fitting up materials prior to welding. (SLO/MO)	P	P	P								P	P	P	

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Course: WELD 90A	Connect Outcomes with an I, P, or M (see Key in Footer) identifying the level to which knowledge or a skill can be demonstrated in that portion of the course or service.													
SLOs, MOs, AUOs	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	ILO 1	ILO 2	ILO 3	ILO 4
Manipulate and perform the required practical projects used in GTAW. (SLO/MO)	P/M	P/M	P/M									P/M	P/M	
Develop and demonstrate proper safety practices and safe usage of welding equipment. (SLO/MO)	M	M	M									M	M	P/M

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Recognize differences between welding processes and their industry applications. (MO)	P/M	P/M	P								P/M	M	M	
Demonstrate the application of theoretical knowledge necessary to run different types of filler materials with the GTAW processes on different types of metals. (MO)	P/M	P/M	P									M	M	
Solve problems as related to cutting, preparing and fitting up materials prior to welding. (SLO/MO)	P/M	P/M	P/M									M	M	

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