

Articulation Agreement

Ferris State University
AND
All State-Approved Career and Technical Education Programs in Michigan

The purpose of this agreement is to facilitate the transition of students from high school and/or Career and Technical Education (CTE) program to Ferris State University. Program is offered at all State-Approved Career and Technical Education Programs in Michigan.

General Conditions & Requirements:

1. Student must apply for Articulated Credit at Ferris State within two years of high school graduation.
2. Student must complete the Articulated Credit Application/Verification form, gather necessary documentation, obtain appropriate signatures, and request that the career technical center/high school send the form and documentation to Ferris State University's Office of Transfer and Secondary School Partnerships.
3. Student must complete secondary career technical education course competencies with a "B" or better final grade.
4. Student must be recommended by the career and technical education program's welding instructor.
5. Secondary instructor must sign-off on student's ability to complete skills from Ferris State's WELD 113.

Aligned/Articulated Courses:

Michigan Career Pathway (Secondary): Engineering, Manufacturing, and Industry Manufacturing
Federal Career Cluster (Secondary): Manufacturing
PSN from CTEIS: (Use individual school PSN in MEGS) **Perkins Approved:** No

STATE APPROVED SECONDARY PROGRAM NAME	
Welding, Brazing, Soldering	
CIP Code Number:	48.058

Aligned/Articulated Programs



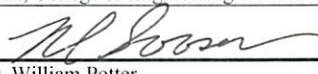
POSTSECONDARY PROGRAM NAME	
Welding Technology	
CIP Code Number:	48.0508

LOCAL SECONDARY COURSE	SEGMENT
Welding, Brazing, Soldering	1-12

Aligned/Articulated with

Postsecondary Courses	Course Number	College Credits
Welding Processes 1 Lab	WELD 113	4
Total PS Credit(s) Possible:		4

Ferris State University will award articulated credit to students for the secondary program according to the condition/requirements as outlined in this agreement. Articulated Credit applies to degrees and certificates. This agreement is valid until date of discard. Attached to this agreement is a 2+2 program of study for this agreement.

Michigan Career and Technical Education	Postsecondary School Information	
Michigan Department of Education Career and Technical Education 608 W. Allegan Street PO Box 30008 Lansing, MI 48909	Ferris State University 1201 S. State Street Big Rapids, MI 49307	
	 Jeff Hardesty Program Coordinator, Welding	11/28/16 Date
	Rich Goosen Director, School of Design and Manufacturing	Date
	 Larry Schult Dean, College of Engineering Technology	11/29/16 Date
	 Dr. William Potter Associate Provost for Retention and Student Success	11/29/16 Date

For the purposes of students enrolling and receiving articulated credit, this agreement remains effective for two additional years after expiration date to permit student access to agreed upon credits.

FOR OFFICE USE ONLY			
Implementation Date:	July 1, 2016	Expiration Date:	June 30, 2019

Documentation of secondary instructional delivery/segments, which includes the postsecondary delivery (Examples-GAP Analysis, CIP Program Review Summary Document, (2010) Assessment Taken/Passed) is available for review at <http://ctenavigator.org/>.

Articulation Agreement (2+2) Program of Study

School Year: 2016-2019

State-Approved CTE Program Name: Welding, Brazing and Soldering

Secondary Program CIP Code Number: 48.0508

PSN from CTEIS: (use individual school PSN in MEGS)

Secondary

Freshman-9 th Grade	Sophomore-10 th Grade	Junior-11 th Grade	Senior-12 th Grade
1 st Semester/2 nd Semester	1 st Semester/2 nd Semester	1 st Semester/2 nd Semester	1 st Semester/2 nd Semester
English Language Arts 9	English Language Arts 10	English Language Arts 11	English Language Arts 12
Algebra I	Algebra II	Geometry	4 th Year Science
Biology	Physics or Chemistry	Biology	4 th Year Math
World History & Geography	U.S. History & Geography	Civics/Economics	
Physical Education	Visual, Performing & Applied Arts	Career Technical Center- Welding, Brazing and Soldering WELD 113 (4 credits)	
Elective	Foreign Language		
Elective	Elective		

Ferris State Degree: Welding Technology

State-Approved CTE/Occupation Program Name: Welding, Brazing and Soldering

State Approved CTE/Occupational Program Postsecondary CIP Code Numbers: 480508

Ferris State University Welding Technology (AAS) Program Courses*

Freshman-Grade 13		Sophomore-Grade 14	
1 st Semester	2 nd Semester	1 st Semester	2 nd Semester
ENGL 150 (3 credits)	Social Awareness (3 credits)	ENGL 250 (3 credits)	WELD 212 (4 credits)
MATH 116 (4 credits)	EEET 201 (3 credits)	WELD 121 (3 credits)	WELD 221 (4 credits)
Cultural Enrichment (3 credits)	MATL 240 (4 credits)	WELD 123 (4 credits)	WELD 222 (3 credits)
PHYS 211 (4 credits)	WELD 111 (3 credits)	WELD 211 (5 credits)	
MFTG 150 (2 credits)	WELD 112 (3 credits)		
FSUS 100 (1 credit)			

To be completed by Secondary Institution

PSN: _____

*please consult the Ferris State University course catalog at www.ferris.edu for up-to-date General Education and program requirements.

Memo

To: Welding Instructor
From: Jeffrey Hardesty, Program Coordinator, Ferris State Welding Programs
Date: 6/5/2014
Re: WELD 113 – Welding Processes I (Lab) Project Details and Expectations for Articulation Applicants

Enclosed please find the “WELD 113 Project Summary – Fall 2011” document. This is intended to serve as a guideline to yourself and any student who may be interested in the articulation of secondary welding courses in to post-secondary credit from your institution to Ferris State University.

Please note that the expectation we have as faculty in the Department of Welding Engineering Technology is that the welding instructor will confirm the ability of any articulation applicant to demonstrate the following pertaining to the WELD 113 projects:

- ability to interpret drawings for the described projects
- perform proper material preparation methods
- determine welding parameters to successfully complete the projects
- set up and proper operation of welding equipment
- demonstrate ability to complete welds to industry standards (i.e.: AWS D1.1 – Structural Welding Code-Steel)
- perform visual inspection of completed welds

If I can be of further assistance, please do not hesitate to contact me at (231) 591-3496 or via email at hardesj@ferris.edu

Ferris State
Welding Technology AAS Degree
WELD 113 - Welding Processes I
Laboratory Projects

Proj #	Process(es)	Weld Joint	Position	Consumable(s)	Base Metal Dimensions	Material	Notes:
1	SMAW	Tee	1F	1/8" and 5/32" E6010/E6011	1/4"x6"	HRS	Multiple pass welds demonstrating proper arc initiation and termination to deposit a 1" fillet weld with a convex face. Final weld passes must demonstrate arc start and stop midweld
		Tee	2F	1/8" E6013			
		Tee	2F	1/8" and 5/32" E7018			
		Tee	1F	1/8" and 5/32" E7024			
2	SMAW	Tee	3F up	1/8" and 5/32" E6010/E6011	1/4"x6"	HRS	Multiple pass welds demonstrating proper arc initiation and termination to deposit a 1" fillet weld with a convex face. Final weld passes must demonstrate arc start and stop midweld
		Tee	3F down	1/8" E6010/E6011			
		Tee	3F up	1/8" and 5/32" E7018			
		Tee	3F down	1/8" E6013			
3	SMAW	Tee	4F	1/8" E6011	1/4"x6"	HRS	Multiple pass welds demonstrating proper arc initiation and termination to deposit a 1" fillet weld with a convex face. Final weld passes must demonstrate arc start and stop midweld
		Tee	4F	1/8" and 5/32" E7018			
		Tee	4F	5/32" E6010			
		Tee	4F	1/8" E6013			
4	SMAW	Open Butt	1G	1/8" E6010	3/8"x6"	HRS	Demonstrate weld joint preparation, root pass deposit, hot/fill pass deposit(s), weave cap. Root pass reinforcement not to exceed 1/16" and face reinforcement not to exceed 1/8"
		Open Butt	2G	1/8" E6010 1/8" E7018 Cap			
		Open Butt	3G down	1/8" E6010			
		Open Butt	3G up	1/8" E6010 1/8" E7018 Cap			
5	SMAW	Tee	2F	1/8" E7018	1/4"x12"	HRS	1/4" fillet weld one side, 3/8" multiple-pass fillet weld on the other
		Lap	2F	1/8" E6010			1/4" fillet weld both sides with one side using an intermittent weld pattern of 2-3. Fully welded side must have a stop and start in the middle.
		Tee	2F	5/32" E6010			1/4" fillet weld one side, 3/8" multiple-pass fillet weld on the other
		Lap	2F	1/8" E7018			1/4" fillet weld both sides with one side using an intermittent weld pattern of 2-3. Fully welded side must have a stop and start in the middle.
6	SMAW	Tee	3F	1/8" E6010	1/4"x12"	HRS	1/4" fillet weld one side, 3/8" multiple-pass fillet weld on the other
		Tee	3F	1/8" E7018			1/4" fillet weld one side, 3/8" multiple-pass fillet weld on the other
		Lap	3F	1/8" E7018			1/4" fillet weld both sides with one side using an intermittent weld pattern of 2-3. Fully welded side must have a stop and start in the middle.
		Outside Corner	3G	1/8" E6010 Root & Hot; 1/8" E7018 Cap			Weld must be performed with vertical up progression. E6010 Root and Hot Pass. E7018 weave cap.
7	SMAW	Lap	2F	1/8" 7024	1/4"x12"	HRS	1/4" fillet weld both sides with one side using an intermittent weld pattern of 2-3. Fully welded side must have a stop and start in the middle.
		Tee	2F	1/8" 7024			1/4" fillet weld one side, 3/8" multiple-pass fillet weld on the other
		Tee	2F	5/32" 7024			5/16" fillet weld both sides with one side using an intermittent weld pattern of 2-3. Fully welded side must have a stop and start in the middle.

Ferris State
Welding Technology AAS Degree
WELD 113 - Welding Processes I
Laboratory Projects

		Tee	2F	3/16" 7024			5/16" fillet both sides. Must demonstrate start and stop in center of weld.
8	SMAW	Tee	2F	1/8" E308L-15	1/4"x6"	HRS or SS	1/4" fillet weld both sides - 90 Amps
		Tee	2F	1/8" E308L-16			1/4" fillet weld both sides
		Tee	2F	1/8" E308L-17			1/4" fillet weld both sides
		Tee	3F	1/8" E308L-XX			1/4" fillet weld both sides. Vertical up progression
9	SMAW	Tee	4F	E7018	1/4" x 6"	HRS	1/4" fillet weld one side, 3/8" multiple-pass fillet weld on the other
		Lap	4F	1/8" E6010 1/8" E7018			1/4" fillet weld both sides
		Outside Corner	4G	1/8" E6010 1/8" E7018			E6010 Root and Hot Pass. E7108 weave cap.
		Tee	4F	E6010			1/4" fillet weld one side, 3/8" multiple-pass fillet weld on the other
10	SMAW	Tee	1F/2F	1/8" 6013 or 7014	1/8"x12"	HRS	1F on one side, 2F on the other
		Lap	2F/3F	1/8" 6013 or 7014			2F on one side, 3F vertical down on the other
		Outside Corner	3G	1/8" 6013 or 7014			3G Vertical down
11	OAW	Outside Corner	1G	AUTOGENOUS	<.100"x6"	HRS	
		Tee	2F	RG60			
		Edge Lap	1G	AUTOGENOUS			
		Lap	2F/3F	RG60			
12	OFC	N/A	N/A	N/A	1/4" AND 1/2"	HRS	Demonstrate constant square cutting on 1/4" and 1/2" HRMS material measuring greater than 8" long
		N/A	N/A	N/A	Variable		Make three proficient cuts using both the automatic and manual OF pipe beveling equipment
		N/A	N/A	N/A	Variable		Make a square cut on a piece of structural steel (I-Beam, Channel, Tubing, etc.) Must be inspected and then rewelded using the SMAW process as instructed.
	CAC-A	N/A	N/A	N/A	Variable		Flat plate gouging; Removal of fillet weld from tee or lap joint.
13	TB	Butt	1G	RBCUZn-C	3/8"	HRS	Braze weld Single V Butt, 60 deg. Included angle
		Lap	2F	RBCUZn-C	1/8"		Braze weld both sides
		Tee	2F	RBCUZn-C	1/8"		Braze weld both sides
		Tee	3F	RBCUZn-C	1/8"		Braze weld both sides
14	TB	Butt	1G	RBCUZn	Variable	Cast Iron	Simulation of crack repair - 800dF
	SMAW	Butt	1G	99Ni; Est; 55Ni			400-500dF
	OFW	Butt	1G	Cast Iron			
15	TB	Tee	2F	125 Silver Braze / S-200 Flux	Variable	Copper/ Stainless	Silver Braze Copper Tube to Stainless Sheet
	TS	Tee	2F	Dynagrip 430 / Duzall Flux	1/16"	CRS	Solder two pieces of carbon steel sheet
	TS	Lap	2F	Aquasafe 100 / Aquasafe Flux	1/2" Copper Pipe	Copper	Solder a coupler to copper pipe
16	GMAW	Tee	1F/2F	ER70S-X/Ar-CO2	1/8" x 12"	HRS	3/16" fillet weld both sides
		Lap	1F/2F	ER70S-X/Ar-CO2	1/8" x 12"		3/16" fillet weld both sides
		Outside Corner	3G	ER70S-X/Ar-CO2	1/8" x 12"		Vertical down progression
		Lap	3F	ER70S-X/Ar-CO2	1/4" x 12"		Vertical up progression one side, Vertical down progression on other side
17	SMAW	Tee	5F	1/8" E7018	1/4" Plate 6" dia. pipe	HRS	Weld pipe to plate with vertical up progression. Demonstrate proper three pass fillet weld technique
	SMAW	Tee	5F	1/8" E6010			Weld pipe to plate with vertical up progression. Demonstrate proper three pass fillet weld technique
	GMAW	Tee	2F	ER70S-X/Ar-CO2			Weld pipe to plate. Demonstrate proper three pass fillet weld technique
18	SMAW	Open Butt	1G	E6010	3/8"	HRS	Complete test plate per AWS D1.1; Prepare root, face and tensile specimens; Prepare AWS D1.1 PQR documentation. Welding procedure developed by student.
19	SMAW	Open Butt	3G	E6010 R/H/F E7018 Cap	3/8"	HRS	Complete test plate per AWS D1.1; Prepare root, face and tensile specimens; Prepare AWS D1.1 PQR documentation. Welding procedure developed by student.