

# INDUSTRIAL TECHNOLOGIES

Please check the program location for the following programs. Some are available on the Central Campus, and others are available on the M-TEC Campus only.

## *Certificates*

- *Industrial Maintenance (M-TEC Campus)*
- *Outdoor Power Engines (M-TEC Campus)*
- *Welding & Fabricating (Central & M-TEC)*

## *Associate in Applied Science*

- *Industrial Maintenance (M-TEC Campus)*
- *Outdoor Power Engines (M-TEC Campus)*
- *Welding & Fabricating (Central & M-TEC)*

## *Partnership Programs*

- *Davenport University*
- *Ferris State University*
- *Franklin University*

See information on our partnership programs on the web at

[www.kirtland.edu/partnerships/industrial.htm](http://www.kirtland.edu/partnerships/industrial.htm)

## **Foundation**

Kirtland Community College recognizes the importance of students possessing basic academic skills in English, reading, and mathematics in order to successfully complete college-level courses. Therefore, all entry-level students are required to demonstrate their proficiency in basic academic skills. The student's advisor will indicate which of the following courses need to be taken based on ACT scores or COMPASS placement testing results. It is highly recommended that students take these courses during the first semester in order to prepare for the road ahead, as well as possibly satisfying prerequisites needed for more advanced courses. Specific courses needed may be tracked below.

*Students must plan additional time to complete their program requirements if placement results require them to begin with DEV courses.*

- ENG-10000 Writing Lab (if required)     Mathematics: \_\_\_\_\_  
 English: \_\_\_\_\_     Reading: \_\_\_\_\_

### **For more information, please contact the Industrial Technologies Department.**

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Kerry Harwood (M-TEC Campus-Outdoor Power Engines)	989-705-3695
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## **Industrial Technology Course Groupings and Locations**

(Please note that all courses are taught on both campuses unless otherwise noted.)

Metal Machining Level I (MPT-10272--MPT10288, 4.18 credit hours)

Metal Machining Level 2 (MPT-10289—MPT-10299, MPT-10302—MPT-10306, MPT-10364, MPT-10408—MPT10409, 8.72 credit hours)

Metal Machining Level 3 (MPT-20366—MPT20368, 1.29 credits hours) – M-TEC campus only

Metrology (MPT-10308—MPT-10316, 1.83 credit hours) - M-TEC campus only

Metallurgy (MPT-20319—MPT-20330, 2.22 credit hours)

Machinist Handbook (MPT-20331—MPT-20340, 2.9 credit hours) M-TEC campus only

Geometric Dimensioning and Tolerancing (MPT-10307, .33 credit hours) – M-TEC campus only

Statistical Process Control (MPT-20374—MPT20385, 3.96 credit hours) – M-TEC campus only

MPT-10317, MPT-10318, MPT-10364, MPT-10408, MPT-10409, MPT-20366-20370 – M-TEC campus only

Advanced Metal Machining (MPT-20386—MPT-20398) – M-TEC campus only

Outdoor Power Engines (OPE-10001, OPE-11032, OPE-14000, OPE-20003, OPE-20100, OPE-10310, OPE-10510) – M-TEC campus only

Welding Level I (WLD-10120--WLD-10133, 4 credit hours)

Welding Level 2 (WLD-10240-10254, 4 credit hours)

Welding Level 3 (WLD-10370-10377, 4 credit hours)

Welding Level 4 (WLD-20450-20457, 4 credit hours)

Welding Level 5 (WLD-20510-20514, 4 credit hours)

Welding Level 6 (WLD-20606, 4 credit hours)

Welding Technical Electives – WLD-20701-20704

EDT 11000 & EDT 13000 – offered on both campuses

All other EDT courses are offered on central campus only.

**INDUSTRIAL MAINTENANCE / M-TEC Campus**  
**Certificate of Completion (CIND0)**

**Minimum Credits: 31.10**  
**Contact Hours: 48.03**

**Prerequisites:** WorkKeys<sup>®</sup> is used to assess the core competency levels of reading, mathematics, locating information, and writing. Students are required to take WorkKeys<sup>®</sup> assessments as they proceed to completion of requirements for a certificate and/or degree.

**Core Courses (3.7 credits, 92.5 classroom hours):**

Course	Title	Credits	Classroom Hours
COR-10001	Basic Safety	.60	15.0
COR-10002	Introduction to Construction Math	.60	15.0
COR-10003	Introduction to Hand Tools	.40	10.0
COR-10004	Introduction to Power Tools	.20	5.0
COR-10005	Introduction to Blueprints	.30	7.5
COR-10006	Basic Rigging	.80	20.0
COR-10007	Basic Communications Skills	.20	5.0
COR-10008	Basic Employability Skills	.60	15.0

**Industrial Maintenance, Level 1 (3.3 credits, 82.5 classroom hours):**

IND-10202	Electrical Safety	.50	12.5
IND-10203	Hand Bending	.30	7.5
IND-10204	Fasteners & Anchors	.20	5.0
IND-10205	Electrical Theory One	.30	7.5
IND-10207	Electrical Test Equipment	.30	7.5
IND-10208	Introduction to NEC	.10	2.5
IND-10209	Conductors	.60	15.0
IND-10210	Introduction to Electrical Blueprints	.30	7.5
IND-10211	Oxyfuel Cutting	.70	17.5

**Industrial Maintenance, Level 2 (6 credits, 150 classroom hours):**

IND-10212	Wiring: Commercial & Industrial	.3	7.5
IND-10213	Alternating Current	.60	15.0
IND-10214	Motors: Theory & Application	.80	20.0
IND-10215	Grounding	.50	12.5
IND-10216	Boxes & Fittings	.40	10.0
IND-10218	Conductor Terminations & Splices	.30	7.5
IND-10220	Circuit Breakers & Fuses	.50	12.5
IND-10221	Contactors & Relays	.40	10.0
IND-10222	Lubrication	.80	20.0
IND-10223	Introduction to Bearings	.60	15.0
IND-10224	Copper & Plastic Piping Practices	.20	5.0
IND-10225	Ferrous Metal Piping Practices	.20	5.0
IND-10226	Piping Systems	.20	5.0
IND-10227	SMAW Equipment & Setup	.20	5.0

**Industrial Maintenance, Level 3 (6.7 credits, 167.5 classroom hours):**

IND-20228	Overcurrent Protection	.50	12.5
IND-20230	Motor Controls	.80	20.0
IND-20231	Motor Maintenance, Part One	.50	12.5
IND-20233	Installing Couplings	.60	15.0
IND-20234	Installing Mechanical Seals	.80	20.0
IND-20235	Installing Belt & Chain Drives	.40	10.0
IND-20236	Installing Bearings	.80	20.0
IND-20237	Gaskets & Packing	.30	7.5
IND-20238	Installing Seals	.20	5.0
IND-20239	Pumps	.80	20.0
IND-20240	Basic Hydraulic Systems	.40	10.0
IND-20241	Basic Pneumatic Systems	.60	15.0

**Industrial Maintenance, Level 4 (4.2 credits, 105 classroom hours):**

IND-20245	Advanced Controls	.80	20.0
IND-20246	Commercial & Industrial Refrigeration	.90	22.5
IND-20249	Conventional Alignment	1.20	30.0
IND-20252	Steam Traps	.40	10.0
IND-20253	Steam Systems	.60	15.0
IND-20254	Programmable Logic Controllers	.30	7.5

**Industrial Maintenance, Level 5 (6.2 credits, 155 classroom hours):**

IND-20258	Preventive & Predictive Maintenance	.40	10.0
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IND-20259	Performing Reverse Alignment	1.20	30.0
IND-20261	Troubleshooting/Repairing Pneumatic Equipment	.40	10.0
IND-20262	Troubleshooting/Repairing Pumps	.40	10.0
IND-20263	Troubleshooting/Repairing Hydraulic Equipment	.40	10.0
IND-20264	Troubleshooting/Repairing Gearboxes	.80	20.0
IND-20265	Programmable Logic Controllers	1.20	30.0
IND-20267	Flow, Pressure, Level, & Temperature	.40	10.0
IND-20269	Precision Measuring Tools	1.00	25.0

**Core Capstone or minimum competency levels (1 credit, 16 classroom hours):**

CAP-10000	Core Capstone	1.00	16.0
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After completing the certificate, students may continue in Associate in Applied Science: Industrial Maintenance, below:

<b>INDUSTRIAL MAINTENANCE / M-TEC Campus</b>	<b>Minimum Credits: 62.3</b>
Associate in Applied Science (DIND0)	<b>Contact Hours: 79-88</b>

Course	Title	Credits	Classroom Hours
	Industrial Maintenance Certificate (listed above)	31.1	768.5
EDT-11000	Detailing with AutoCAD	3	64
EDT-13000	Fundamentals of MasterCAM	3	48

**Communications (9-10 credits):**

ENG-10000	Writing Lab (if required)	0-1	32
ENG-10303	English Composition I w/Computers	3	48
ENG-10403 Or ENG-10602	English Composition II w/Computers OR Technical Writing	3	48
SPE-10500 Or SPE-11400	Fundamentals of Speech OR Intro to Interpersonal & Public Comm	3	48

**Humanities/Social Science (8-11 credits):**

POL-10100	Introduction to American Government	3	
	Humanities elective	2-4	32-64
	Any Social Science Elective	3-4	48-64

**Math/Natural Science (6-9 credits):**

MTH-12000	Intermediate Algebra or higher (excluding MTH-20500 or MTH-20600)	3-4	48-64
	Any Science Course with lab	3-5	48-80

<b>OUTDOOR POWER ENGINES / M-TEC Campus</b>	<b>Minimum Credits: 30</b>
Certificate of Completion (CODP0)	<b>Contact Hours: 39-41</b>

**Introduction**

The Outdoor Power Engines program prepares students for employment as repair technicians for motorcycles, watercraft, snowmobiles, ATVs, and other two and four cycle engines. The program provides competency-based learning experiences including theory and hands-on labs as well as internship opportunities. Students concentrate on the overall functions of the engines and diagnose or troubleshoot issues for repair. Students and graduate of this program have extensive opportunities for employment or transfer for further study with the nationally accredited and recognized educational leader in the field--Universal Technical Institute (UTI). After completing the Certificate: Outdoor Power Engines requirements, students may continue in Associate in Applied Science: Outdoor Power Engines.

**Prerequisites:** WorkKeys<sup>®</sup> is used to assess the core competency levels of reading, mathematics, locating information, and writing. Students are required to take WorkKeys<sup>®</sup> assessments as they proceed to completion of requirements for a certificate and/or degree.

Course	Title	Credits	Classroom Hours
CAP-10000	Core Capstone	1	16
CAP-20003	Internship/Service Learning	3	72
OPE-10001	Two & Four Cycle Engines Level 1	3	64
OPE-11032	Two & Four Cycle Engines Level 2	3	64
OPE-14000 or AUT-16401	Small Engine Electricity OR Basic Electricity	3	64
OPE-20100	Outdoor Power Engines Capstone	3	64
OPE-20310 or OPE-20510	Power Sports Equipment I OR Watercraft I	3	64

**Metal Machining Level 1 (4.18 credits, 100 classroom hours):**

MPT-10272	Machine Tool Safety	0.17	4.0
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MPT-10273	Identifying Surface Finishes	0.08	2.0
MPT-10274	Shop Math-Speeds & Feeds	0.21	5.0
MPT-10275	Sharpening Drill Bits	0.25	6.0
MPT-10276	Drilling on a Press	0.17	4.0
MPT-10277	Power Tap on the Drill Press	0.25	6.0
MPT-10278	Drill Press Project	0.58	14.0
MPT-10279	Band Saw Blade Welding	0.25	6.0
MPT-10280	Vertical Band Saw Project	0.25	6.0
MPT-10281	Maintaining the Lathe	0.17	4.0
MPT-10282	Grinding Lathe Tools	0.25	6.0
MPT-10283	Facing on the Lathe	0.21	5.0
MPT-10284	Aligning Lathe Centers	0.17	4.0
MPT-10285	Cutting External Threads	0.50	12.0
MPT-10286	Dial In Vise/Tram in Head	0.21	5.0
MPT-10287	Fly Cutter & End Mill/Square Block	0.21	5.0
MPT-10288	Digital Read/Drill, Tap, & Ream	0.25	6.0

**Welding Level I (4 credits, 96 classroom hours):**

WLD-10120	Welding Safety	0.13	3.0
WLD-10121	AWS Joints/Positions/Welds/Symbols	0.13	3.0
WLD-10122	OAW Terms & Equipment Setup	0.17	4.0
WLD-10123	OAW Stringer Beads & Joints 1G-1F	0.36	9.0
WLD-10124	BW Stringer Beads & Joints	0.29	7.5
WLD-10125	Cutting OA/Plasma Cutting/Carbon Arc	0.45	11.0
WLD-10126	Identifying Good Welds per AWS	0.13	3.0
WLD-10127	SMAW Terms/Identify Electrodes	0.17	4.0
WLD-10128	SMAW Set-up & Weld Stringer Beads	0.42	10.0
WLD-10129	SMAW Welding Joints/Flat Pos/1G-1F	0.33	9.6
WLD-10130	GMAW Set-up & Weld Stringer Beads	0.42	10.0
WLD-10131	GMAW Welding Joints/Flat Pos/1G-1F	0.29	7.5
WLD-10132	FCAW Set-up & Weld Stringer Beads	0.42	10.0
WLD-10133	GCAW Welding Joints/Flat Pos/1G-1F	0.29	7.0

**and electives from the following lists for a total of 30 program credits (2.92 credits, 48-68 classroom hours):**

<b>Engineering Design Technology</b>	<b>Manufacturing Processes Technology</b>	<b>Welding</b>
EDT-XXX EDT electives	MPT-XXX MPT electives	WLD-XXX Welding electives

<b>OUTDOOR POWER ENGINES / M-TEC Campus</b> Associate in Applied Science (DODP0)	<b>Minimum Credits: 60</b> <b>Contact Hours: 68-80</b>
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After completing the Certificate: Outdoor Power Engines requirements, students may continue in Associate in Applied Science: Outdoor Power Engines, as listed below.

Course	Title	Credits	Classroom Hours
	Outdoor Power Engines Certificate	30	
EDT-11000	Detailing with AutoCAD	3	64

**Communications (9-10 credits):**

ENG-10000	Writing Lab (if required)	0-1	32
ENG-10303	English Composition I w/Computers	3	48
ENG-10403 or ENG-10602	English Composition II w/Computers OR Technical Writing	3	48
SPE-10500 or SPE-11400	Fundamentals of Speech OR Intro to Interpersonal & Public Comm	3	48

**Humanities/Social Science (8-11 credits):**

POL-10100	Introduction to American Government	3	
	Humanities elective	2-4	32-64
	Any Social Science Elective	3-4	48-64

**Math/Natural Science (6-9 credits):**

MTH-12000	Intermediate Algebra or higher	3-4	48-64
	Any Science Course with lab	3-5	48-80

**Technical Elective, if needed (0-1):**

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<b>WELDING &amp; FABRICATING /Central &amp; M-TEC Campus</b>	<b>Minimum Credits: 31</b>
<b>Certificate of Completion (CWAF1)</b>	<b>Contact Hours: 45-46</b>

**Introduction**

Kirtland's program in Welding & Fabricating is designed to provide instruction in the development of techniques and understanding of quality weldments. The program includes practice in shielded metal arc welding, oxy-acetylene welding and cutting, gas tungsten arc welding, flux cored arc welding, and gas metal arc welding processes. Students will have an understanding of the metallurgical aspects of the weld structure, welding equipment construction, welding codes, planning and estimating and applying current industrial techniques. This program leads to an Associate in Applied Science degree which has a minimum of 62 credit hours. Upon successful completion, students may be eligible to transfer for a bachelor's degree. Welding students should take into consideration that the program must be customized for transfer in order to fulfill the requirements of a four-year institution.

**Electrical (3-3.4 credits, 64-164.1 classroom hours):**

Course	Title	Credits	Classroom Hours
AUT-16401	Basic Electricity	3	48
or ELT-10047	OR Electrical Theory One	.30	7.5
and ELT-10048	AND Electrical Theory Two	.30	7.5
and ELT-10049	AND Electrical Test Equipment	.20	5.0
and ELT-10053	AND Intro to Electrical Blueprints	.30	7.5
and ELT-10056	AND Alternating Current	.60	15.0
and ELT-10058	AND Grounding	.50	12.5
and ELT-20084	AND Basic Electronic Theory	.80	20.0
and ELT-20089	AND Welding Machines	.40	10.0

**Engineering Design Technology (3 credits, 64 classroom hours):**

EDT-11000	Detailing with AutoCAD	3	64
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**Metal Machining Level 1 (4.18 credits, 100 classroom hours):**

MPT-10272	Machine Tool Safety	0.17	4.0
MPT-10273	Identifying Surface Finishes	0.08	2.0
MPT-10274	Shop Math-Speeds & Feeds	0.21	5.0
MPT-10275	Sharpening Drill Bits	0.25	6.0
MPT-10276	Drilling on a Press	0.17	4.0
MPT-10277	Power Tap on the Drill Press	0.25	6.0
MPT-10278	Drill Press Project	0.58	14.0
MPT-10279	Band Saw Blade Welding	0.25	6.0
MPT-10280	Vertical Band Saw Project	0.25	6.0
MPT-10281	Maintaining the Lathe	0.17	4.0
MPT-10282	Grinding Lathe Tools	0.25	6.0
MPT-10283	Facing on the Lathe	0.21	5.0
MPT-10284	Aligning Lathe Centers	0.17	4.0
MPT-10285	Cutting External Threads	0.50	12.0
MPT-10286	Dial In Vise/Tram in Head	0.21	5.0
MPT-10287	Fly Cutter & End Mill/Square Block	0.21	5.0
MPT-10288	Digital Read/Drill, Tap, & Ream	0.25	6.0

**Metallurgy (2.22 credits, 52 classroom hours):**

MPT-20319	Property of Metals/Physical Metallurgy	0.13	3.0
MPT-20320	Constitution of Alloys	0.17	4.0
MPT-20321	Carbon and Alloy Steels	0.13	3.0
MPT-20322	Heat and Surface Treat for Steel	0.13	3.0
MPT-20323	Cast Irons	0.13	3.0
MPT-20324	Light Metals and Alloys	0.13	3.0
MPT-20325	Lead, Tin, and Zinc	0.13	3.0
MPT-20326	Introduction to Metallurgy	0.46	11.0
MPT-20327	Examining and Identifying Metals	0.13	3.0
MPT-20328	Fundamentals of Welding & Brazing/Casting	0.13	3.0
MPT-20329	Fundamentals of Welding Stainless Steel	0.13	3.0
MPT-20330	Testing Metals	0.42	10.0

**Welding Level I (4 credits, 96 classroom hours):**

WLD-10120	Welding Safety	0.13	3.0
WLD-10121	AWS Joints/Positions/Welds/Symbols	0.13	3.0
WLD-10122	OAW Terms & Equipment Setup	0.17	4.0
WLD-10123	OAW Stringer Beads & Joints 1G-1F	0.36	9.0

WLD-10124	BW Stringer Beads & Joints	0.29	7.5
WLD-10125	Cutting OA/Plasma Cutting/Carbon Arc	0.45	11.0
WLD-10126	Identifying Good Welds per AWS	0.13	3.0
WLD-10127	SMAW Terms/Identify Electrodes	0.17	4.0
WLD-10128	SMAW Set-up & Weld Stringer Beads	0.42	10.0
WLD-10129	SMAW Welding Joints/Flat Pos/1G-1F	0.33	9.6
WLD-10130	GMAW Set-up & Weld Stringer Beads	0.42	10.0
WLD-10131	GMAW Welding Joints/Flat Pos/1G-1F	0.29	7.5
WLD-10132	FCAW Set-up & Weld Stringer Beads	0.42	10.0
WLD-10133	GCAW Welding Joints/Flat Pos/1G-1F	0.29	7.0

**Welding Level 2 (4 credits, 96 classroom hours):**

WLD-10240	GMAW Welding Joints/Hor Pos/2G-2F	0.17	4.0
WLD-10241	FCAW Welding Joints/Hor Pos/2G-2F	0.17	4.0
WLD-10242	GMAW Welding Joints/Ver Pos/3G-3F	0.17	4.0
WLD-10243	FCAW Welding Joints/Ver Pos/3G-3F	0.17	4.0
WLD-10244	GMAW Welding Joints/Ovhd Pos/4G-4F	0.21	5.0
WLD-10245	FCAW Welding Joints/Ovhd Pos/4G-4F	0.21	5.0
WLD-10246	GMAW Pulse Arc/Flat Pos/1G-1F	0.17	4.0
WLD-10247	GMAW Metal Core Arc Wld/Flat/1G-1F	0.17	4.0
WLD-10248	GMAW Welding Joints Aluminum/All Ps	0.33	8.0
WLD-10249	Welding Blueprint Reading	0.17	4.0
WLD-10250	Fab Project Using GMAW or FCAW	0.5	12.0
WLD-10251	SMAW Multi-Pass Stringer/Flat/1F	0.42	10.0
WLD-10252	SMAW Multi-Pass Weave/Flat/1F	0.42	10.0
WLD-10253	SMAW Welding Joints/Hor Pos/2G-2F	0.36	9.0
WLD-10254	SMAW Welding Joints/Ver Pos/3G-3F	0.36	9.0

**Welding Level 3 (4 credits, 96 classroom hours):**

WLD-10370	SMAW Welding Joints/Ovhd Pos/4G-4F	0.5	12.0
WLD-10371	Fabricate Project Using SMAW	0.5	12.0
WLD-10372	Welding Metallurgy	0.9	22.0
WLD-10373	GTAW Setup & Weld Stringer Beads	0.42	10.0
WLD-10374	GTAW Weld Joints/Steel/Flat/1G-1F	0.42	10.0
WLD-10375	GTAW Weld Jts/StainSteel/Flat/1G-1F	0.42	10.0
WLD-10376	GTAW Weld Joints/Alum/Flat/1G-1F	0.42	10.0
WLD-10377	GTAW Weld Joints/Steel/Hor/2G-2F	0.42	10.0

**Welding Level 4 (4 credits, 96 classroom hours):**

WLD-20450	GTAW Weld Jts/Stain Steel/Hor/2G-2F	0.5	12.0
WLD-20451	GTAW Weld Joints/Alum/Hor/2G-2F	0.5	12.0
WLD-20452	GTAW Weld Joints/Steel/Ver/3G-3F	0.5	12.0
WLD-20453	GTAW Weld Jts/Stain Steel/Ver/3G-3F	0.5	12.0
WLD-20454	GTAW Weld Joints/Alum/Ver/3G-3F	0.5	12.0
WLD-20455	GTAW Weld Joints/Steel/Ovhd/4G-4F	0.5	12.0
WLD-20456	GTAW Weld Jts/StainSteel/Ovhd/4G-4F	0.5	12.0
WLD-20457	GTAW Weld Joints/Alum/Ovhd/4G-4F	0.5	12.0

**Core Capstone (1 credit, 16 classroom hours):**

CAP-10000	Core Capstone	1	16
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**Technical Electives from the following lists for a total of 31 program credits (1.2 credits, 29 classroom hours)**

Engineering Design Technology	Manufacturing Processes Technology	Welding
EDT-xxxxx EDT Electives	MPT-xxxxx MPT Electives	WLD-xxxxx Welding electives

## WELDING & FABRICATING TECHNOLOGY/Central & M-TEC Campus

Associate in Applied Science (DWAF1)

**Minimum Credits: 62**

**Contact Hours: 83-91**

After completing the Certificate: Welding & Fabricating requirements, students may continue for the Associate in Applied Science: Welding & Fabricating Technology, as listed below.

Course	Title	Credits	Classroom Hours
	Welding & Fabricating Certificate	31	680-780.1

**Welding Level 5 (4 credits, 96 classroom hours):**

WLD-20510	Intro to Pipe Welding	.21	5.0
WLD-20511	Pipe 2G Fixed Position	.67	16
WLD-20512	Pipe Welding 5G Fixed Pos/Vert Up	1.04	25.0
WLD-20513	Pipe Welding 5G Fixed Pos/Vert Down	1.04	25.0
WLD-20514	Pipe Welding 6G Fixed Position	1.04	25.0

**Welding Level 6 (4 credits, 96 classroom hours):**

WLD-20505	6 Welder Qual & Projects	4	96
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**Communications (9-10 credits):**

ENG-10000	Writing Lab (if required)	0-1	32
ENG-10303	English Composition I w/Computers	3	48
ENG-10403 or ENG-10602	English Composition II w/Computers OR Technical Writing	3	48
SPE-10500 or SPE-11400	Fundamentals of Speech OR Intro to Interpersonal & Public Comm	3	48

**Humanities/Social Science (8-11 credits):**

POL-10100	Introduction to American Government	3	
	Humanities elective	2-4	32-64
	Any Social Science Elective	3-4	48-64

**Math/Natural Science (6-9 credits):**

MTH-12000	Intermediate Algebra or higher	3-4	48-64
	Any Science Course with lab	3-5	48-80

## INDUSTRIAL TECHNOLOGIES DEGREE PARTNERSHIPS

**College & University Contact Information:**

**Davenport University**

Karen Aune, [karen.aune@davenport.edu](mailto:karen.aune@davenport.edu)  
989-705-3720

**Ferris State University**

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Gary Ovans, Chair—Manufacturing Department

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Rich Goosen, Chair—Mechanical Design Department

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