**Program:** Helena Adult Basic Education  
**College:** Helena College  
**College Degree Program:** AAS Industrial Welding & Metal Fabrication

### Cluster Overview:
Jobs in the manufacturing career cluster involve planning, managing, and performing the processing of materials into intermediate or final products and related professional and technical support activities, such as production planning and control, maintenance, and manufacturing/process engineering.

### Pathway Options:
- Production
- Manufacturing & Production Process Development
- Maintenance, Installation and Repair
- Quality Assurance
- Logistics and Inventory Control
- Health, Safety and Environmental Assurance

### Occupation Examples:
Assembler, MIG Welder, TIG Welder, Machine Operator, Sheet Metal Worker, Mechanical Engineer, Industrial Engineer, Quality Control Technician, Safety Technician, Safety Engineer, Dispatcher, Production Manager, Purchasing Agent, Logistician

For a complete listing, go to:  
[http://online.onetcenter.org/find/career?c=13&g=Go](http://online.onetcenter.org/find/career?c=13&g=Go)

### Critical Skills Practiced in Adult Learning Center

<table>
<thead>
<tr>
<th>Skill</th>
<th>Concentration</th>
<th>Application</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading</td>
<td>Concentrate on Technical Reading: Find specific information in a technical manual; learn to read blueprints, diagrams and charts; read step-by-step instructions; determine the meaning of key technical terms; research reasons for safety regulations</td>
<td>Read an article in Welding Journal and define terms. Read a safety poster and explain reasons for each rule.</td>
<td></td>
</tr>
<tr>
<td>Applications</td>
<td>Write an email requesting information about a job</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mathematics</td>
<td>Concentrate on fractions, temperatures, volumes, measurements, and angles</td>
<td>Construct a three-dimensional model, calculating angles and fractions</td>
<td>Notes</td>
</tr>
<tr>
<td>Application</td>
<td>Learn properties of hazardous materials used in welding</td>
<td>Shadow a welding student</td>
<td>Notes</td>
</tr>
<tr>
<td>Other academic skills: Chemistry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application</td>
<td>Get to work on time; communicate orally; keep a work space clean; avoid distractions (like cell phones)</td>
<td>Visit a welding shop and ask questions about work expectations</td>
<td>Notes</td>
</tr>
</tbody>
</table>

### Suggested Transitional Courses and Experiences

**College courses:** M111T Technical Mathematics; WRIT121T Technical Writing; WLDG 107 (Industrial Safety)  
**Online courses:** M111T Technical Mathematics; WRIT 121T Technical Writing  
**Other:** Job Shadowing and Student Shadowing at Helena College; Working in a Welding Shop

### POSTSECONDARY PROGRAM OF STUDY

<table>
<thead>
<tr>
<th>Semester</th>
<th>Math</th>
<th>English</th>
<th>Major</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>13th</td>
<td>M111T Technical Mathematics (3)</td>
<td></td>
<td>WLDG 107 Industrial Safety (2); WLDG 112, Cutting Processes (3); WLDG 135 GMAW Theory and Practical Application (5); WLDG 181 Shielded Metal Arc Welding (SMAW) Theory and Practical Application (5)</td>
<td></td>
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<tr>
<td>13th</td>
<td></td>
<td></td>
<td>WLDG 117 Blueprint Reading and Weld Symbols (3); WLDG 131 Layout, Metal Forming &amp; Fabrication (6), WLDG 140 Intro Gas Tungsten ARC Welding (GTAW) - Integrated Lab (3); WLDG 151 Shop Practices (4);</td>
<td></td>
</tr>
<tr>
<td>14th</td>
<td>WRIT 121T Introduction to Technical Writing (3)</td>
<td></td>
<td>WLDG 217 Advanced Blueprint (2); WLDG 225 Structural Fabrication (2); WLDG 230 Field Welding and Processes (2); WLDG 243 Advanced Metal Fabrication I (6); WLDG 255 CNC Burn Table Programming and Operation (3)</td>
<td></td>
</tr>
<tr>
<td>14th</td>
<td></td>
<td></td>
<td>WLDG 213 Pipe Welding Lab I (5); WLDG 244 Advanced Metal Fabrication II (4); WLDG 245 Metal Fabrication Design and Construction (5); WLDG 265 MSHA Safety Training (1)</td>
<td>HR 100T Human Relations (2)</td>
</tr>
</tbody>
</table>

June 2015
## MONTANA POSTSECONDARY OPPORTUNITIES

### Montana University System Degree and Program Inventory:  [http://www.homepage.montana.edu/~mus/drginv/](http://www.homepage.montana.edu/~mus/drginv/)

Your Guide to Montana’s Certificate and Associate Degree Programs: [http://mus.edu/twoyear/YourGuide.html](http://mus.edu/twoyear/YourGuide.html)

### MSU Two Year Colleges and Programs:
- City College MSUB—Billings (CC); Great Falls College MSU—Great Falls (GFC); Helena College UM—Helena (HC); Highlands College MT Tech—Butte (HC-Tech); Missoula College UM—Missoula (MC); Gallatin College MSU—Bozeman (GC)

### Community Colleges:
- Dawson Community College (DCC)
- Flathead Valley Community College (FVCC)
- Miles Community College (MCC)

### Tribal Colleges:
- Aaniih Nakoda College (ANC)
- Blackfeet Community College (BCC)
- Chief Dull Knife College (CDKC)
- Fort Peck Community College (FPCC)
- Little Big Horn College (LBHC)
- Stone Child College (SCC)
- Salish Kootenai College (SKC)

### Four Year Colleges/Universities:
- MSU—Bozeman
- MSUB—Billings
- MSUN—Havre
- MT Tech—Butte
- UM—Missoula
- UMW—Dillon

### MILITARY
- Requires diploma or GED
- 17 with parental consent; 18 without
- Air Force, Air Guard, Army, Coast Guard, Marines, and Navy
- For more information: [http://todaysmilitary.com](http://todaysmilitary.com)

### PROFESSIONAL CERTIFICATE
- Requires diploma or GED
- Less than 30 credits; little/no general ed credits
- Complete in one year or less
- Welding Technology — FVCC

### APPRENTICESHIP
- Requires diploma or GED
- Must be at least 18
- Minimum 2,000 hours of supervised experience
- Electricians
- Sheet Metal Workers
- See the MT Dept of Labor website for more information: [http://wsd.dli.mt.gov/apprenticeship/default.asp](http://wsd.dli.mt.gov/apprenticeship/default.asp)

### CERTIFICATE OF APPLIED SCIENCE
- Requires diploma or GED
- 30-45 credits; limited general education credits
- Complete in one year or less
- Biofuel Energy — MCC
- Computer-Aided Manufacturing — Helena College
- Electronics Technology — MC
- Energy Technology — MC
- Industrial Welding and Metal Fabrication — Helena College
- Metals (Fabrication) Technology — Highlands, CC
- Machine Tool Technology — Helena College
- Power Plant Technology — CC
- Process Plant Technology — CC
- Sustainable Energy Technician — CC, HC Tech, GFC, MSUN
- Water Quality Technology — HC, MSUN
- Welding Technology — Helena College, MC, GFC, CC, GC, MSUN, DCC, FVCC, FPCC

### ASSOCIATE’S OF APPLIED SCIENCE DEGREE
- Requires diploma or GED
- 60-72 credits; includes 15-25 general ed credits
- Complete in two years (if prepared academically in math and English)
- Bioengineering — MSU
- Electrical Engineering — MT Tech, MSU
- Civil Engineering — MT Tech, MSU
- Industrial Engineering — MSU
- Mechanical Engineering — MT Tech MSU
- Mining Engineering — MT Tech
- Occupational Safety & Health — MT Tech
- Welding Engineering — MT Tech
- Metallurgical & Materials Engineering — MT Tech
- Petroleum Engineering — MT Tech

### BACCALAUREATE DEGREE
- Requires 4-year college prep for admission
- 128 credits (approximately)
- Complete in four years

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*Degree and Program Inventory above may not be all inclusive*