**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)

### Suggested High School Courses

<table>
<thead>
<tr>
<th>Grade</th>
<th>Graduation Requirements</th>
<th>Workforce/2-Year College Prep</th>
<th>Recommended CTE Cluster Foundation Course(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>9th</td>
<td>CTE and/or Electives</td>
<td></td>
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<tr>
<td>10th</td>
<td>CTE and/or Electives</td>
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<td>11th</td>
<td>CTE and/or Electives</td>
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<tr>
<td>12th</td>
<td>CTE and/or Electives</td>
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</tbody>
</table>

### Advanced Learning Opportunities

**High School to College/Career Linkages**

**CTE START courses:**

**Advanced Placement or IB courses:**

**Dual Enrollment courses:**

**Online courses:**

**Other:**

### 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>13-Semester 1</td>
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<tr>
<td>13-Semester 2</td>
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<tr>
<td>14-Semester 1</td>
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</tbody>
</table>
## MONTANA POSTSECONDARY OPPORTUNITIES

### Montana University System Degree and Program Inventory: [http://mus.edu/Qtools/Degrees/degree_default.asp](http://mus.edu/Qtools/Degrees/degree_default.asp)

### Your Guide to Montana’s Certificate and Associate Degree Programs: [http://mus.edu/2yr/YourGuide/](http://mus.edu/2yr/YourGuide/)

<table>
<thead>
<tr>
<th>MSU Two Year Colleges and Programs:</th>
<th>Community Colleges:</th>
<th>Tribal Colleges:</th>
<th>Four Year Colleges/Universities:</th>
</tr>
</thead>
<tbody>
<tr>
<td>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)</td>
<td>Dawson Community College (DCC) Flathead Valley Community College (FVCC) Miles Community College (MCC)</td>
<td>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)</td>
<td>MSU—Bozeman; MSUB—Billings; MSUN—Havre; MT Tech—Butte; UM—Missoula; UMW—Dillon</td>
</tr>
</tbody>
</table>

### 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
- Industrial Machine Technology/CNC — FVCC
- Metals (Fabrication) Technology — CC
- Machine Tool Technology — HC, UMW
- Sustainable Energy Technician — CC, HC Tech, GFC, MSUN
- Water Quality Technology — HC, MSUN
- Welding Technology — HC, 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)*
- Biofuel Energy — MCC
- Electronics Technology — MC
- Energy Technology — MC
- Metals (Fabrication) Technology — HC, HC Tech, CC
- Machine Tool Technology — HC
- Power Plant Technology — CC
- Process Plant Technology — CC
- Sustainable Energy Technician — CC, HC Tech, GFC, MSUN
- Water Quality Technology — FPCC
- Welding Technology — HC, MC, CC, FC, FVCC

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

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