

INTEGRATED METALS (WELDING AND MACHINE TOOL TECHNOLOGIES) - DEGREE

Limited Entry Associate of Applied Science Degree Program | mhcc.edu/
IntegratedMetals (<http://mhcc.edu/IntegratedMetals/>)

Faculty Advisers

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The Integrated Metals program prepares students to enter the machine tool and/or welding workforce. Students will learn: taking precise measurements; material layout; blueprint reading; machine tool and welding setup and operation. The program also explores CNC (computer numerical control) and CAD/CAM (computer assisted design / computer assisted machining) as they relate to the metals industry.

Note: Students are required to maintain a minimum grade of "C" in all IMTL and MFG courses. All core courses must be completed within 5 years in order for the degree to be awarded.

Program Outcomes

At the completion of this program, students should be able to:

- Demonstrate and/or describe safe work habits and the environmental issues associated with modern manufacturing settings
- Read, interpret and apply blueprints for the production and inspection of manufactured work pieces
- Demonstrate the correct application and use of precision measuring equipment commonly found in a manufacturing setting
- Plan and produce work pieces on a manual drill press, manual engine lathe, and manual milling machine to required blueprint specifications using common industry methods
- Demonstrate, explain and/or apply CNC program code and machine tools and software to produce work pieces to required blueprint specifications
- Identify welding equipment/accessories and explain power source principles of operation
- List and perform safe set-up, adjustments and operations of welding and cutting equipment in preparing and completion of welding practice plates
- Describe and perform welding processes as they relate to welding of ferrous and non-ferrous metals
- Identify various electrodes, filler wires, shielding gasses and current types, and their relationship to base-metal varieties
- Describe and apply the variables and techniques used to weld carbon steel, stainless steel and aluminum to print specifications with regard to joint types, weld types and positions of welding
- Visually examine welds for discontinuities, defects, correct weld size and placement and provide solutions for welding procedure errors

- Produce acceptable test plate weldments according to American Welding Society (AWS) Code Standards

Students interested in transferring to OIT should consult with program advisers early in the first quarter.

For the most part, courses that fulfill general education requirements can be taken in any term.

Admitted students may also log on to Navigate (<https://mhcc.campus.eab.com/home/>) to start the process of building an academic plan based on this major and can notify an adviser for review.

First Quarter

Fall		Credits
IMTL110	Machine Shop I Theory	3
IMTL111	Machine Shop I Lab	3
IMTL114	Blueprint Reading for the Metals Industry	3
IMTL116	Introduction to Precision Measuring	3
IMTL118	Machine Shop Math Applications	2
Credits		14

Second Quarter

Winter		
IMTL130	Machine Shop II Theory	3
IMTL131	Machine Shop II Lab	3
IMTL134	Metallurgy Theory	3
IMTL135	Metallurgy Lab	1
IMTL136	Introduction to CNC (Computer Numerical Control) Machining	3
Human Relations requirement (https://catalog.mhcc.edu/degree-certificate-requirements/aas/#human)		3-4
Credits		16-17

Third Quarter

Spring		
IMTL150	Machine Shop III Theory	3
IMTL151	Machine Shop III Lab	3
IMTL153	CNC (Computer Numerical Control) Machining	4
IMTL155	Industrial Safety	3
MTH095	Intermediate Algebra with Right Triangle Trigonometry ★ (or MTH111Z or higher)	5
Credits		18

Fourth Quarter

Fall		
IMTL120	SMAW (Shielded Metal Arc Welding/Stick) Theory	2
IMTL121	SMAW (Shielded Metal Arc Welding/Stick) Lab	3
IMTL124	Blueprint Reading for Welding Applications	3
IMTL171	Welding Certificate Program Lab I	1
MFG217	Modern Manufacturing Concepts	3
WR101 or WR121Z	Workplace Communications I ★ or Composition I ★	3-4
Credits		15-16

Fifth Quarter**Winter**

IMTL140	GMAW/FCAW (Gas Metal and Flux Cored Arc Welding/Wire Feed) Theory	2
IMTL141	GMAW/FCAW (Gas Metal and Flux Cored Arc Welding/Wire Feed) Lab	3
IMTL143	CNC Cutting	4
IMTL172	Welding Certificate Program Lab II	1
IMTL236	Quality Control: Statistical Methods	3
Health and Physical Education requirement (https://catalog.mhcc.edu/degree-certificate-requirements/aas/#health)		3
Credits		16

Sixth Quarter**Spring**

IMTL128	GTAW (Gas Tungsten Arc Welding/ TIG) Theory	2
IMTL129	GTAW (Gas Tungsten Arc Welding/ TIG) Lab	2
IMTL160	Fabrication Practices Theory	2
IMTL161	Fabrication Practices Lab	3
IMTL173	Welding Certificate Program Lab III	1
IMTL257	Geometric Dimensioning and Tolerancing	3
Credits		13
Total Credits		92-94

Admission Information

The Integrated Metals (Welding and Machine Tool Technologies) programs are limited entry programs. Students are admitted on a first-come, first-served basis if they meet the criteria.

1. Read the program information (<https://mhcc.edu/IntegratedMetalsProgramDetails/>)
2. Review the admission process (<https://mhcc.edu/IntegratedMetalsAdmission/>)
3. Apply (https://my.mhcc.edu/ICS/Resources/Limited_and_Restricted_Entry_Programs_Application.jnz)

Exploring **Integrated Metals** as your major? Learn more with MHCC's Career Coach (<https://mhcc.lightcastcc.com/programs/integrated-metals-welding-and-machine-tool-technologies-degree/209250/?region=Greater%20Multnomah%20County%20Area&radius=100%20miles>), which covers: skills needed for each career, wages, employment rates, and live job postings in the Greater Multnomah County Area.

Careers related to integrated metals:

- Welders, Cutters, Solderers, and Brazers (<https://mhcc.lightcastcc.com/careers/welder-cutter-solderer-or-brazer/?region=Greater%20Multnomah%20County%20Area&radius=100%20miles>)
- Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders (<https://mhcc.lightcastcc.com/careers/welding-soldering-and-brazing-machine-setter-operator-and-tender/?region=Greater%20Multnomah%20County%20Area&radius=100%20miles>)
- Structural Iron and Steel Workers (<https://mhcc.lightcastcc.com/careers/structural-iron-and-steel-worker/?region=Greater%20Multnomah%20County%20Area&radius=100%20miles>)
- Reinforcing Iron and Rebar Workers (<https://mhcc.lightcastcc.com/careers/reinforcing-iron-and-rebar-worker/?region=Greater%20Multnomah%20County%20Area&radius=100%20miles>)
- Sheet Metal Workers (<https://mhcc.lightcastcc.com/careers/sheet-metal-worker/?region=Greater%20Multnomah%20County%20Area&radius=100%20miles>)