# Metallurgy and Materials

**Catalog Description:**
Metallurgy and Materials evaluates the basic elements of metallurgy and weld-ability as it pertains to commonly welded materials. Instruction will be provided on the weld ability of metals, the effects of welding on metals, mechanical properties of metals, alloys and their properties, applications of various types of metals, metal classification systems, and procedures for welding hard-to-weld metals.

**Prerequisites or Necessary Entry Skills/Knowledge:**
None

**FULFILLS MN TRANSFER CURRICULUM AREA(S) (Leave blank if not applicable)**
☐ Goal 1: Communication: By meeting the following competencies:
☐ Goal 2: Critical Thinking: By meeting the following competencies:
☐ Goal 3: Natural Sciences: By meeting the following competencies:
☐ Goal 4: Mathematics/Logical Reasoning: By meeting the following competencies:
☐ Goal 5: History and the Social and Behavioral Sciences: By meeting the following competencies:
☐ Goal 6: The Humanities and Fine Arts: By meeting the following competencies:
☐ Goal 7: Human Diversity: By meeting the following competencies:
☐ Goal 8: Global Perspective: By meeting the following competencies:
☐ Goal 9: Ethical and Civic Responsibility: By meeting the following competencies:
☐ Goal 10: People and the Environment: By meeting the following competencies:

**Topics to be Covered**
- Overview of the joining process
- Overview of the welding process
- Metals as materials
- Solidification of metals and alloys
- Solidification of welds
- Welding of aluminum and stainless steel
- Effects of heat on metals
### Student Learning Outcomes

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<td>Describe the basic metallurgy of the melted metal or alloy.</td>
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<td>Identify the cause and avoid weld defects.</td>
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<td>Demonstrate ability to choose and adjust the welding parameters and techniques to optimize the welding process.</td>
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<td>Demonstrate ability to select the appropriate welding process for a particular application.</td>
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<td>Recognize and demonstrate safe and proper use of materials.</td>
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<td>Demonstrate the technical understanding of metallurgy and materials.</td>
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<th><strong>Is this course part of a transfer pathway:</strong></th>
<th>Yes ☐ No ☒</th>
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<td><em>If yes, please list the competencies below</em></td>
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Revised Date: 3/29/2022