

Course Syllabus

Copper 101: An Introduction to Copper Alloys & Copper Casting Processes



Course Code 4-120	CEUs 0.5 CEUs
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Course Introduction

This Cast Metals Institute course, Copper 101: An Introduction to Copper and Copper Casting Processes provides participants an introduction covering the characteristics and properties of copper, alloying elements and their general applications, as well as considerations for working with copper cast parts. This course also covers melting technology and casting technology, and looks at the decision making process behind specific technologies used.

Benefits to Taking the Course: Benefits to taking this course include practical and theoretical knowledge for those entering into or establishing relationships with others in the copper casting business. It provides a comprehensive foundation of the processes, treatments and practical applications of cast copper, and walks the participant through decisions that affect final product cost. This course also serves as a prerequisite for other copper courses.

Learning Outcomes

After completing this program, participants should be able to:

1. Describe the principle properties of copper and its uses.
2. Explain the Unified Number System for Copper.
3. Discuss the role of alloying elements in copper castings.
4. Identify copper alloys suited to specific applications.
5. Identify common melting methods for copper.
6. Describe common copper defects.
7. Identify common molding/casting methods for copper.
8. Discuss metalcasting safety.
9. Describe some environmental concerns when handling lead-containing copper alloys.

Lesson Outline

- Module 1: Introduction
- Module 2: Overview of Copper
 - Use of Copper Castings
 - Copper Processing
- Module 3: Copper Properties and Alloying Elements
 - Basic Atomic Structure
 - Physical and Mechanical Properties of Copper
 - Copper Alloy Designation System and Alloying with Copper
- Module 4: Applications of Copper Alloys
 - Copper Families: Properties and Applications
 - Alloy Selection
- Module 5: Copper Melting Technology
 - Furnace Types
 - Melt Control
- Module 6: Copper Casting Process Technology
 - Copper Casting Process Introduction
 - Sand Molding Process
 - Permanent Molding Process
 - Investment Casting Process

<ul style="list-style-type: none"> ○ Value Added Services ● Module 7: Safety and Regulations <ul style="list-style-type: none"> ○ Metalcasting Safety ○ Environmental Safety ● Module 8: Conclusion
<p>Instructional Methods:</p> <ul style="list-style-type: none"> ● Video ● Group discussions ● Case studies ● Partner activities ● Mini lectures ● Games ● Group activities
<p>Assessment Methods:</p> <p>No formal assessment will take place in this course; however, attendees will participate in informal activities such as knowledge check and Q&A sessions with the facilitator to verify that learning outcomes are being met. Assessment of successful achievement of learning outcomes must be included throughout the course in order to meet the ANSI/IACET 1-2013 standard for continuing education programs and for CEUs to be awarded.</p>
<p>Course Prerequisites:</p> <p>None</p>
<p>Attendee Requirements to Earn CEUs:</p> <ol style="list-style-type: none"> 1. Present at least 4.5 hours of the 5 hours of direct instructional time (90%), which does not include meals or breaks, or the introductory and conclusion activities. 2. Active participation (can include asking questions, communicating with other attendees during and taking part in group activities, providing responses during whole class or group discussions). 3. Successful achievement of learning outcomes.
<p>Who Should Attend?</p> <ul style="list-style-type: none"> ● Management – All levels ● Production engineers ● Technical sales staff ● Purchasing staff ● Design engineers ● Anyone new to or desiring to learn about copper