

# Course Syllabus

## Introduction to Metalcasting



<b>Course Code</b> 1-100	<b>CEUs</b> 1.1 CEUs
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### Course Introduction

This course introduces the metalcasting process by providing a broad overview of what takes place in a metalcasting facility; illustrating the technology, variables and complexities involved in producing a casting. Course topics include: casting design; alloy selection; process selection; gating and design system; pouring and shakeout methods; cleaning and finishing method; quality assurance; safety and environmental regulations.

### Benefits to Taking the Course

The learner will leave the course understanding the basic process of making a casting and key decisions to be made in metalcasting facilities.

### Learning Outcomes:

- Define key metalcasting terminology.
- Identify the current state of the metalcasting industry.
- Identify the first five casting process areas and one key point from each area.
- Identify seven alloys used in the metalcasting process.
- Identify the last five casting process areas and one key point from each area.
- Describe the difference between pre- and post-casting quality assurance tests.
- Identify the two agencies regarding environmental health and safety.
- Actively participate in creating a metalcasting, analyze various case studies, and review a S.W.O.T analysis.

### Lesson Outline:

- Module 1: Introduction
- Module 2: Metalcasting Terminology
  - What is Metalcasting?
  - The Full Process
  - Tour through the Foundry
- Module 3: What is the Metalcasting Industry?
  - Metalcasting Statistics
  - S.W.O.T. Analysis
- Module 4: Casting Production, Part 1
  - Quoting
  - Design Considerations
  - Tooling
  - Mold Preparation
  - Melting and Pouring
- Module 5: Alloys
  - Alloy Basics
  - Alloy Teach Backs
  - Which Alloy?
- Module 6: Casting Production, Part 2
  - Casting Removal
  - Degating

- Port Processing Methods
- Inspection
- Shipping
- Module 7: Quality Assurance
  - Quality Assurance Tests
  - Casting Defects
- Module 8: Environmental Health & Safety Regulations
  - Environmental Protection Agency (EPA)
  - Occupational Safety & Health Administration (OSHA)
- Module 9: Putting It All Together
  - Foundry in a Box
  - Case Studies
  - S.W.O.T. Analysis, Part 2
  - Final Activities: Case Studies and Action Plan
  - Summary of Course and Review of Learning Outcomes
  - Complete Course Evaluation
- Module 10: Conclusion

**Instructional Methods:**

- Mini-lectures
- Hands-on practice (e.g. Foundry in the Box)
- Show and tell/demonstration
- Video
- Discussion
- Group/individual activities
- Group activity feedback
- Case Studies
- Q & A

**Assessment Methods**

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 facilitators 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.

**Course Prerequisites:**

None

**Pre-course Activities:**

None

**Texts, Books or other Resources available for purchase:**

- AFS [Metalcasting Principles & Techniques](https://hub.afsinc.org/nc_store?search=Metalcasting+Principles+%26+Techniques)

**Attendee Requirements to Earn CEUs:**

1. Present at least 9.5 hrs of the total 10.5 hrs of instructional time (90%), which does not include meals or breaks.
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.

**Who Should Attend?**

- Designers
- Engineers – industrial, metallurgical, mechanical, process, project, manufacturing, material
- Shop personnel
- Office personnel
- Sales/Marketing professionals
- Quality Control personnel
- Casting Buyers
- Casting Sales
- Individuals without a metals background wishing to better understand the role of casting from design through production
- Those new to the metalcasting industry, as well as those who have previous experience