

Course Syllabus

Introduction to Metalcasting



Course Code IM1	CEUs 0.6 CEUs
---------------------------	-------------------------

Course Introduction

This course introduces the process of metalcasting. It provides a broad picture of what happens in a casting facility, while illustrating the technology, variables, and complexity involved in producing a casting. It covers casting design, alloy selection, process selection, design of the gating system, pouring and shakeout methods, cleaning and finishing methods, quality assurance, and 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.

A comprehensive and detailed participant guide is available for download within the course, and contains all information covered in the online course, as well as additional reference information.

Learning Outcomes

1. Describe the metalcasting industry by defining the term metalcasting, listing at least five end-use markets for metalcastings, and listing at least two challenges facing the industry.
 - a. Define the term metalcasting.
 - b. Identify the current state of the metalcasting industry by listing five end use markets and listing two challenges facing the industry.
 - c. Explain the role of technology in the metalcasting process.
2. Summarize the overall process of how a casting is made from part design through delivery to the customer.
 - a. Identify at least three characteristics that must be considered when designing castings.
 - b. Describe the basic characteristics of the major alloys used in metalcasting.
 - c. List at least three criteria that must be considered when selecting an alloy.
 - d. Name the processes available for producing a cast part, outline the basic steps of each, and summarize at least two advantages and two disadvantages of each.
 - e. Name at least three different factors involved in determining which process should be used for a given cast part.
 - f. Explain the function of the gating and risering system, and identify the individual components of the system.
 - g. Explain the role of the gating and risering system in determining casting quality.
 - h. Name the furnaces used in the metalcasting industry, and describe the factors considered when a foundry determines which furnace(s) to use.
 - i. Explain the different methods by which molten metal is poured into a mold.
 - j. Explain the different methods by which the solidified casting may be removed from the mold.
 - k. Explain the purpose of cleaning and finishing a casting, and describe at least three methods that may be used.
 - l. Name the materials, tools and equipment that may be used to clean and finish a casting.
3. Describe the quality assurance methods and measures used to ensure castings meet customer specifications.
 - a. Describe at least five quality assurance tests, and identify whether they would be conducted pre or post casting.

- b. Describe at least two specifications for quality assurance testing.
- c. Name the most common casting defects.
- 4. Explain the importance of safety in the metalcasting industry.
 - a. Name the agencies responsible for safety and environmental regulations.
 - b. Describe the impact of both safety and environmental regulations on the metalcasting industry.

Assessment Methods:

In order to verify that learning outcomes have been met, participants must score 80% or better on the final course assessment; complete the two case studies; and complete the e-learning module. The ANSI/IACET 1-2013 standard for continuing education programs requires verification of learning outcomes for CEUs to be awarded.

Course Prerequisites:

None

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