



<b>Course Code</b> 6-110	<b>CEUs</b> 1.2 CEUs
-----------------------------	-------------------------

### Course Introduction

Casting quality and yield are directly impacted by gating design. This course guides participants through the basic functions of gating and risers to provide clean, sound and functional castings. An introduction to fluid flow and solidification will serve to guide participants through key design concepts of various function elements of a good gating and riser design. Emphasis will be placed on hands-on activities, animations, and simulations to enhance understanding of the filling and solidification processes in a foundry. Focus will be on practical examples in iron, steel, aluminum, and copper castings. The goal will be to introduce the participants the basics of gating and riser design, common industry norms and troubleshooting.

### Learning Outcomes

1. Identify how quality requirements for a casting effect gating and risers
2. Describe the function of risers
3. Identify the effects of different alloys on riser size and location
4. Identify the effects of production process parameters on riser size and location
5. Determine riser locations
6. Calculate size of riser and connections
7. Demonstrate the basic applications of chills
8. List unique riser considerations for iron castings
9. Describe the function and features of a gating system
10. Identify the effects of different alloys on a gating system
11. Identify the effects of process parameters on gating system design
12. Determine gate locations and sizes
13. Describe the basics of fluid dynamic principles

### Lesson Outline

Module 1: Introduction

Module 2: The Gating and Riser System

- The Rigging System
- Customer Requirements
- Function of the gating/riser system

Module 3: Riser Considerations

- Riser types and functions
- Solidification
- Alloy considerations

Module 4: Riser Placement

- Casting geometry considerations
- process considerations

Module 5: Iron Castings

- Iron specific considerations
- Tools for Riser Size and Placement

Module 6: Gating Design

- Fluid flow principles
- Layout

<ul style="list-style-type: none"> <li>• Calculating gating sizes</li> </ul> <p>Module 7: Influences of the Part Design</p> <ul style="list-style-type: none"> <li>• Casting geometry considerations</li> <li>• Alloy considerations</li> </ul> <p>Module 8: Process Parameters</p> <ul style="list-style-type: none"> <li>• Pouring practices</li> <li>• Defects and troubleshooting</li> </ul> <p>Module 9: Conclusion</p>
<p><b>Instructional Methods:</b></p> <ul style="list-style-type: none"> <li>• Class discussion</li> <li>• Equipment and procedure demonstrations</li> <li>• Group activities</li> <li>• Individual problem solving</li> <li>• Case studies</li> </ul>
<p><b>Assessment Methods:</b></p> <p>No formal assessment will take place in this course; however, attendees will participate in informal activities such as knowledge check and Q&amp;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><b>Recommended Course Prerequisites:</b></p> <ul style="list-style-type: none"> <li>• None</li> </ul>
<p><b>Texts, Books or other Resources available for purchase:</b></p> <ul style="list-style-type: none"> <li>• Basic Principles of Gating &amp; Riser Design 2<sup>nd</sup> Edition, AFS Publication  <a href="http://www.afsinc.org/ProductDetail.cfm?ItemNumber=4165">http://www.afsinc.org/ProductDetail.cfm?ItemNumber=4165</a></li> </ul>
<p><b>Attendee Requirements to Earn CEUs:</b></p> <ol style="list-style-type: none"> <li>1. Present at least 11 hours of the total 12 hours of instructional time (90%), which does not include meals or breaks.</li> <li>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).</li> <li>3. Successful achievement of learning outcomes.</li> </ol>
<p><b>Who Should Attend?</b></p> <p>The target audience for this course consists of individuals responsible for:</p> <ul style="list-style-type: none"> <li>• Developing tooling for castings produced with gravity pouring processes</li> <li>• Improving casting quality issues related to the tooling</li> <li>• Improving yield and production costs related to tooling design</li> </ul>