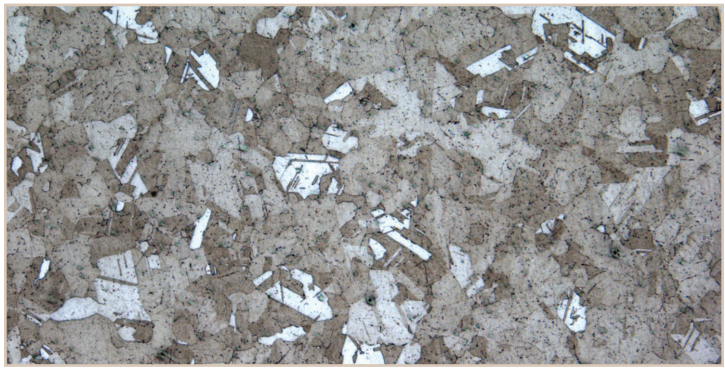
Welding Metallurgy

An EWI Online Micro-credential Course

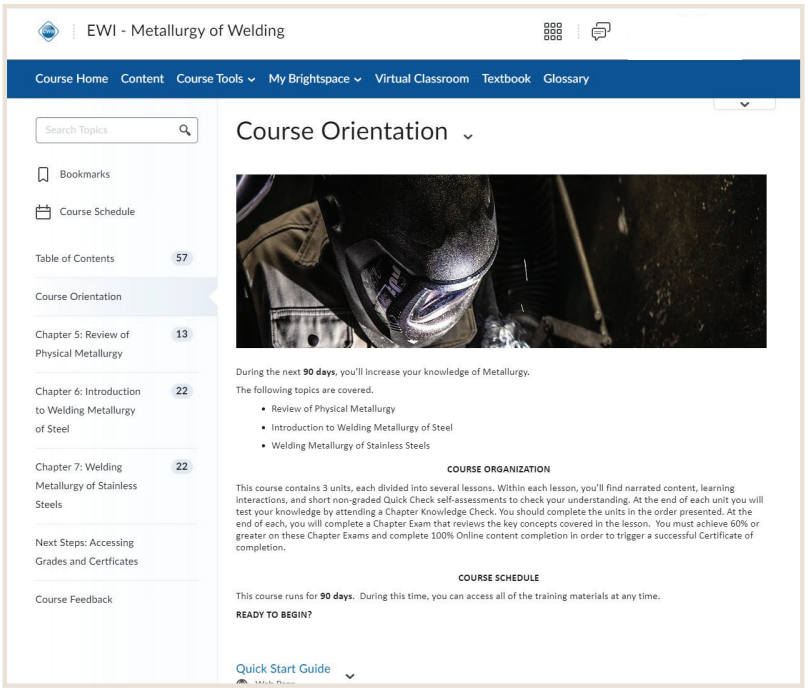
The **Welding Metallurgy** course provides students with an overview of *physical metallurgy*, an introduction to *welding metallurgy of steel*, and a special unit on the *welding metallurgy of stainless steels*. Each of these three parts can be completed by a student on its own for 7.5 PDH credits, or all three can be taken together to complete the Welding Metallurgy micro-credential course for 22.5 PDH credits.

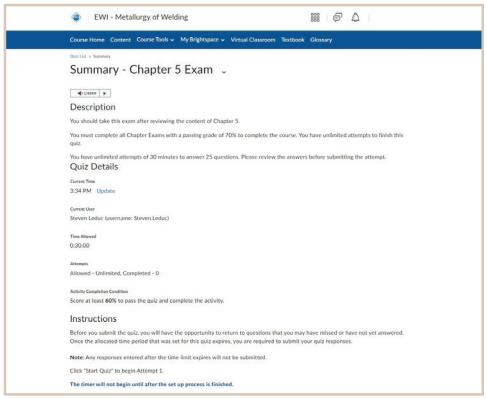


Course Components

Part I Physical Metallurgy: A Review	Part II Introduction to Welding Metallurgy of Steel	Part III Welding Metallurgy of Stainless Steels
Understanding the heating and cooling effects of welding is critical for welding engineers and professionals. Part I covers the basic metallurgy principles of as background to studying how welding can create unexpected metallurgical phenomena that can impact results.	Heat from welding can affect of both the weld and the metal adjacent it, leading to cracks, variations in toughness, or other negative effects. Steels in particular undergo metallurgical transformations when heated and cooled. Specific procedures can ensure that welds are successful. Part II covers metallurgical principles involved in developing these procedures.	Due to their unique properties, stainless steels can be used in corrosive and extreme-temperature environments. Incorrect welding procedures or the wrong choice of filler metal, however, can cause rapid corrosion, cracking, and failure. Most mistakes, however, can be avoided. Part III focuses on the metallurgy in welding stainless steels.
1. *The making of iron and steel* 2. *The iron-carbon phase diagram* 3. *Differences between crystallography of ferrite and austenite lattice* 4. *The role of carbon and other alloying elements in steel* 5. *The effect of heating and cooling on steel* 6. *Strengthening mechanisms* 7. *Using general steel classifications*	1. *The effects of heat flow and cooling rates* 2. *Weld zone identification* 3. *The effects of hydrogen* 4. *Avoiding hydrogen-induced cold cracking* 5. *Metallurgical transformations* 6. *Cracking tests* 7. *The causes of lamellar tearing* 8. *Weld metal reactions* 9. *Conditions that lead to solidification cracking* 10. *Weld properties* 11. *Uses of different steel types*	1. *The role of different alloying elements in stainless steels* 2. *Stainless steels groups and their properties* 3. *Major problems in welding stainless steels and how to overcome them* 4. *The unique properties of stainless steels that resist corrosion in certain environments* 5. *Verifying welding procedures based on stainless steel properties* 6. *The unique low and high temperature properties of certain stainless steels*

EWI
We Manufacture Innovation





This EWI online course is made available to students via the CWB Learning Resources Platform. All content and supporting resources are accessible from anywhere through a single portal, including lessons, activities, exams, links to articles, digital textbooks, and more.

Preview this online course:

121222

EWI
We Manufacture Innovation

For more information regarding our capabilities and services, visit EWI.org

WWW.EWI.ORG→