



EL515

Principles of Welding

Module 1: What is welding and how is it accomplished?

- Electric Circuits for Arc Welding
- The Welding Arc
- Material Properties

Module 2: What Are the Effects of Welding on the Welded Structure?

- Fundamental Steel Metallurgy
- Metallurgical Transformations In Steel During Welding
- Residual Stress & Distortion
- Cracking, Corrosion & Other Degradation

Module 3: Welding Processes

- Welding Process Categories
- Flux-shielded processes
- Gas-shielded processes
- Process selection

Module 4: Welding of Various Materials

- Welding of ferrous materials
- Welding of non-ferrous and dissimilar materials
- Material Groupings & Specifications

Module 5: Basics of Welding Design

- Terminology
- Joint types, weld types, positions
- Weld strength and weld sizing
- Design for manufacturability
- Filler metal selection
- Overmatched and undermatched
- Weld and welding symbols
- Standard parts of a weld symbol
- Common weld details

Module 6: Weld Examination & Quality Control

- Common welding codes & standards
- Welding qualifications
- Procedure & performance qualifications
- Quality inspections
- Before, during, and after welding
- Nondestructive examination
- Welding safety
- Common welding defects