Ironworking

Level 1

Curriculum Notes

- 235 Hours
- Includes 72.5 hours of Core, which is a prerequisite for Level 1 completion and must be purchased separately.
- Revised: 2011, Second Edition
- Downloadable instructor resources that include module tests, PowerPoints®️, and performance profile sheets are available at www.nccer.org/irc.
- A Spanish translation is available. Please see NCCER’s online catalog for more information.

PAPERBACK
ISBN
Trainee Guide: $69.99 978-0-13-213714-0 see module list
Individual Modules: $24.99

Modules
The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

Introduction to the Trade (5 Hours)
(Module ID 30101-11) Discusses the historical development of the ironworking trade. Explains personal qualities that contribute to successful employment. Describes the organization and purpose of apprenticeship training, and the safety obligations of the employer and employee.

Trade Safety (12.5 Hours)
(Module ID 30102-11) Describes the consequences of on-the-job accidents and the responsibilities of OSHA. Identifies potential ironworker health and safety hazards and safe work practices around cranes. Explains the safe use of personnel lifts. Discusses the safe use and operation of aerial platforms, hoists, and fall protection systems.

Tools and Equipment of the Trade (10 Hours)
(Module ID 30103-11) Identifies safety tools and equipment. Describes the proper use of hand and power tools. Identifies power sources for ironworking tools.

Fastening (5 Hours)
(Module ID 30104-11) Explains how to recognize A-325 and A-490 bolts, washers, and nuts. Describes how to correctly tension bolts and explains procedures for calibrated wrench and turn-of-nut tightening methods.

Mobile Construction Cranes (10 Hours)
(Module ID 30105-11) Identifies common lifting equipment and construction cranes. Describes how to use crane manuals, perform record keeping, and follow safety requirements. Provides procedures for assembling construction cranes.

Rigging Equipment (10 Hours)
(Module ID 30106-11) Describes the use and inspection of equipment and hardware used in rigging. Describes slings and explains how to determine sling capacities and angles. Covers the selection and inspection of rigging equipment, including block and tackle, chains, hoists, come-alongs, jacks, and jiggers.

Rigging Practices (15 Hours)
(Module ID 30107-11) Identifies the site and environmental hazards associated with rigging. Explains how to attach rigging hardware for routine lifts and identify the components of a lift plan. Describes how to perform sling tension calculations and determine the weight of beams and basic weight estimation.

Trade Drawings One (12.5 Hours)
(Module ID 30108-11) Identifies the materials used in steel-framed buildings. Explains how to read basic structural blueprints.

Structural Ironworking One (7.5 Hours)
(Module ID 30109-11) Identifies the types of construction that utilize structural steel, the components of the structures, and the process involved in erecting a steel structure. Explains the principles of structural stresses and the requirements of bolted connections.

Trade Math (25 Hours)
(Module ID 30201-11) Explains fractions and basic math, and includes multiple opportunities for practical applications.

Weld Quality (10 Hours)
(Module ID 29106-09; from Welding Level One, Fourth Edition) Identifies the codes that govern welding, including marine welds. Identifies and explains weld imperfections and causes. Describes non-destructive testing, visual inspection criteria, welder qualification tests, and the importance of quality workmanship.

Welding Level One, Fourth Edition
(Module ID 30112-11) Identifies welding equipment and processes. Describes safety precautions associated with arc welding. Explains how to identify weld joints, their dimensions, and applications from welding symbols and drawings. Describes how to set up and use SAW/weld equipment and explains the governing welding codes.

Introduction to Arc Welding (22.5 Hours)
(Module ID 30113-11) Identifies welding equipment and processes. Describes safety precautions associated with arc welding. Explains how to identify weld joints, their dimensions, and applications from welding symbols and drawings. Describes how to set up and use SAW/weld equipment and explains the governing welding codes.

Oxyfuel Cutting (17.5 Hours)
(Module ID 30114-11) Identifies cutting equipment and processes. Describes the components of a welding machine. Explains how to perform cutting techniques that include straight line, piercing, bevelling, washing, and gouging.

Bar Joists and Girders (5 Hours)
(Module ID 30115-11) Identifies welding equipment and processes. Describes safety precautions associated with arc welding. Explains how to identify weld joints, their dimensions, and applications from welding symbols and drawings. Describes how to set up and use SAW/weld equipment and explains the governing welding codes.

Metal Decking (10 Hours)
(Module ID 30116-11) Identifies welding equipment and processes. Describes the components of a welding machine. Explains how to perform cutting techniques that include straight line, piercing, bevelling, washing, and gouging.

Position Arc Welding (20 Hours)
(Module ID 30202-11) Identifies and explains weld joints, weld positions, and open V-butt welds. Describes how to prepare arc welding equipment and how to make flat welds, horizontal welds, vertical welds, and overhead welds.

Forklifts (17.5 Hours)
(Module ID 30203-11) Identifies the basic components of forklifts and the corresponding hand signals. Explains safe practices and how to perform inspections. Covers how to read load charts and how to operate forklifts.

For more information, please visit www.nccer.org/irc.

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Intermediate Rigging (10 Hours)
(Module ID 38201-11; from Intermediate Rigging, First Edition)
Describes basic procedures for using various slings in hitches and
identifies the symbols and abbreviations used on drawings.

Intermediate Rigging (10 Hours)
(Module ID 38201-11; from Intermediate Rigging, First Edition)
Describes basic procedures for using various slings in hitches and
calculating sling stress. Introduces tools and equipment used for
the lateral movement of loads without a crane. Trainees learn how
to reeve block and tackle, invert loads with hoists, and drift a load
between two hoists.

Structural Ironworking Three (10 Hours)
(Module ID 30312-12) Identifies the types of joists, methods of
end support, and the types of bridging available. Explains how
to locate the ironworking information on framing plans and describes
steel joist installation procedures. Describes the conditions
necessary and the benefits of panelizing bar joist.

Tower Cranes (15 Hours)
(Module ID 30207-11) Describes pre-erection activities for
structural steel. Provides procedures for erecting bearing devices,
columns, beams, girders, joists, bracing, and bridging.

Steel Joists and Joist Girders (15 Hours)
(Module ID 30206-11) Identifies the types of joists, methods of
end support, and the types of bridging available. Explains how
to locate the ironworking information on framing plans and describes
steel joist installation procedures. Describes the conditions
necessary and the benefits of panelizing bar joist.

Structural Ironworking Three (10 Hours)
(Module ID 30312-12) Explains the techniques used to plumb,
align and guy steel structures, including the associated hazards and
risks. Provides information and procedures related to the
installation of trusses and curtain walls.

Advanced Rigging (10 Hours)
(Module ID 38301-11; from Advanced Rigging, First Edition)
Explains how load weight and center of gravity affect lifting and
crane stability. Load calculations for multi-crane lifts are presented,
along with the application of equalizer beams. The movement of
loads up on inclined plane and the line pull required are examined
in detail. The module concludes with guidance in the rigging and
handling of rebar bundles.

Precast/Tilt-Up Erection (12.5 Hours)
(Module ID 30311-12) Describes the fabrication and uses of precast
cement elements and cast-in-place tilt-up wall systems. Focuses
on rigging practices associated with these two distinct construction
methods and the role of ironworkers in their installation.

Special Application Hoisting Devices (10 Hours)
(Module ID 30307-12) Explains techniques for rigging and moving
equipment using a variety of hoisting devices, including gin poles,
Chicago booms, A-frames, davits, balance beams, pump handles,
high lines, caterpillar dollies, rollers. Also covers special cranes,
including derricks, gantries, MLBs, trolley cranes, and jacking
frames.

Survey Equipment Use and Care Two (15 Hours)
(Module ID 30315-12) Focuses on the total station and its uses,
including setup and controls. It includes information on primary
and secondary control points and procedures for turning horizontal
angles and plumbing columns and wall panels.

Pre-Engineered Systems (5 Hours)
(Module ID 30302-12) Identifies the structural components and
accessories of metal buildings and describes their installation.
Describes the pre-erection and erection procedures that apply to
their installation and the safety precautions associated with their
installation.

Miscellaneous/Ornamental Ironworking (5 Hours)
ISBN 978-0-13-292289-0
(Module ID 30303-12) Identifies the types of ornamental
metal and describes the different types of components used in
ornamental ironworking. Explains the skills required to fabricate
and install ornamental components safely.

Grating and Checkered Plate (5 Hours)
(Module ID 30316-12) Provides general information and procedures
for the installation and attachment of gratings and checker
plate. Describes the rigging methods associated with grating and
checker plate.

Air Carbon Arc Cutting and Gouging (12.5 Hours)
(Module ID 29104-09; from Welding Level One, Fourth Edition)
Introduces air carbon arc cutting equipment and processes.
Identifies the electrodes and safe operation of the equipment.
Provides step-by-step instructions for performing air carbon arc
welding and gouging activities.

Demolition (10 Hours)
(Module ID 30309-12) Identifies the tools used to remove rivets and
explains the demolition skills required to safely remove
structural steel beams, steel columns, and steel reinforced concrete
columns.