

Welding Technology and Metal Fabrication for Construction

Build practical welding and fabrication skills for construction, from fundamental techniques to advanced project execution.

Welding Technology Instructor: Dale Hubbard • 5 sections • 52 lessons • 22.00h total

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About this course

Construction projects depend on skilled welders and fabricators to create safe, durable structures, yet many professionals face gaps in hands-on training or current techniques. This course addresses those challenges by covering welding processes, metal fabrication, and real-world applications. You'll learn through video lessons and case studies, gaining skills in setup, blueprint reading, and executing welds from start to finish.

Course curriculum

Foundations and Preparation

- **Introduction to Welding in Construction (18m)**
We'll cover how welding fits into construction projects, common roles, and what you need to get started.
- **Safety Protocols and Personal Protective Equipment (25m)**
Learn step-by-step safety procedures, including selecting and using PPE to prevent injuries on site.
- **Understanding Metals and Alloys (20m)**
This lesson explains different metals used in construction, their properties, and how they behave during welding.
- **Basic Tools and Equipment Setup (15m)**
You'll set up welding machines and tools, with tips for calibration and maintenance to ensure consistent results.
- **Blueprint Reading for Welders (22m)**
We'll break down construction blueprints, focusing on symbols and dimensions critical for fabrication tasks.
- **Measuring and Layout Techniques (18m)**
Practice accurate measuring and marking methods to prepare materials for welding and assembly.
- **Intro to Welding Processes: MIG, TIG, Stick (30m)**
Get a clear overview of the three main welding processes, their applications, and basic operational steps.
- **Material Preparation and Cleaning (12m)**
Learn how to clean and prepare metals before welding to improve joint quality and reduce defects.

Core Concepts

- **MIG Welding Fundamentals (35m)**
This session covers MIG welding setup, wire feed adjustments, and techniques for consistent beads on various materials.
- **TIG Welding Essentials (30m)**
We'll walk through TIG welding basics, including torch handling, filler rod use, and achieving clean welds on thin metals.
- **Stick Welding Techniques (28m)**
Learn stick welding methods, electrode selection, and how to manage slag for strong, reliable welds in field conditions.
- **Welding Joint Types and Positions (25m)**
Explore common joint designs and welding positions, with practical tips for maintaining quality in different orientations.
- **Heat Control and Distortion Management (22m)**
This lesson covers how to manage heat input and prevent warping, using techniques like backstepping and clamping.

- **Intro to Metal Fabrication (32m)**
We'll introduce fabrication workflows, from cutting to assembly, focusing on planning for construction projects.
- **Cutting and Shaping Metals (20m)**
Learn hands-on methods for cutting and shaping metals using tools like saws, grinders, and plasma cutters.
- **Bending and Forming Techniques (18m)**
Practice bending and forming metals with brakes and rollers, including how to calculate bend allowances.
- **Welding Symbols and Specifications (25m)**
Interpret welding symbols from blueprints to ensure fabricated parts meet design and code requirements.
- **Quality Inspection Basics (15m)**
We'll cover visual inspection methods and simple tests to check weld integrity and identify common issues.

Deep Dive

- **Advanced MIG Welding for Thick Materials (40m)**
Dive into MIG welding on thicker plates, including multi-pass techniques and adjusting parameters for deep penetration.
- **Precision TIG Welding on Thin Metals (35m)**
This session focuses on TIG welding thin sheets, with tips for heat management and achieving leak-proof joints.
- **Multipass Welding Procedures (30m)**
Learn how to plan and execute multipass welds for heavy sections, ensuring strength and minimizing defects.
- **Welding Dissimilar Metals (28m)**
We'll cover challenges and solutions for welding different metals, such as steel to aluminum, using appropriate techniques.
- **Automation and Robotics in Welding (25m)**
Explore how automated welding systems work, their benefits, and how to integrate them into fabrication workflows.
- **Plasma Cutting and Oxy-Fuel Cutting (32m)**
Practice plasma and oxy-fuel cutting methods for precise cuts on various metals, including safety and setup.
- **Sheet Metal Fabrication (22m)**
This lesson covers working with sheet metal, including layout, forming, and welding for ductwork and enclosures.
- **Structural Fabrication Techniques (35m)**
Learn fabrication for structural elements like beams and columns, focusing on alignment and joint preparation.

- **Troubleshooting Common Welding Defects (18m)**

Identify and fix common issues like porosity, cracking, and undercut, with real case examples for reference.

Advanced Application

- **Project Planning for Fabrication (45m)**

We'll cover planning fabrication projects from start to finish, including timelines, material lists, and resource allocation.

- **Building Steel Structures (40m)**

This session applies welding and fabrication to construct steel frameworks, with case studies from real building sites.

- **Piping and Tubing Welding (35m)**

Learn welding techniques for pipes and tubes, including joint preparation and testing for pressure systems.

- **Repair and Maintenance Welding (30m)**

Practice repair welding on damaged structures, focusing on assessment, preparation, and restoring integrity.

- **Welding for Architectural Elements (28m)**

Explore welding for decorative and functional architectural pieces, such as railings and facades, with design considerations.

- **Custom Metalwork Projects (32m)**

Work on custom fabrication projects, from concept to completion, including client specifications and finishing touches.

- **Using CAD in Fabrication (25m)**

Introduce CAD software for creating fabrication drawings, with steps to translate designs into physical parts.

- **Industry Standards and Codes (38m)**

Review key standards like AWS and ASME, and how they apply to welding and fabrication in construction projects.

- **Non-Destructive Testing Methods (22m)**

Learn NDT techniques such as dye penetrant and ultrasonic testing to verify weld quality without damaging parts.

- **Cost Estimation and Bidding (18m)**

This lesson covers estimating material and labor costs for fabrication jobs, and preparing competitive bids.

- **Working with Clients and Specifications (20m)**

We'll discuss communication with clients, interpreting specifications, and managing expectations throughout projects.

- **Advanced Fabrication Equipment (15m)**

Explore specialized tools like CNC machines and laser cutters, their setup, and use in high-precision fabrication.

Implementation & Next Steps

- **Safety Management on Job Sites (30m)**
Learn how to implement and monitor safety programs for welding and fabrication teams on construction sites.
- **Team Leadership in Fabrication (25m)**
This session covers leading fabrication crews, delegating tasks, and ensuring quality and efficiency on projects.
- **Advanced Project Management (28m)**
We'll apply project management principles to complex fabrication jobs, including scheduling and risk assessment.
- **Sustainable Practices in Welding (22m)**
Explore ways to reduce waste and energy use in welding, including material recycling and efficient processes.
- **Emerging Technologies in Metalwork (18m)**
Stay current with new tools and methods in welding and fabrication, such as additive manufacturing and IoT integration.
- **Career Paths and Certifications (35m)**
We'll discuss career options in welding and fabrication, including certification paths like AWS CWI and CWB.
- **Continuing Education Opportunities (20m)**
Find out how to keep skills updated through workshops, online courses, and industry conferences.
- **Building a Portfolio (15m)**
Learn how to document and showcase your fabrication work to attract clients or advance your career.
- **Networking in the Industry (12m)**
This lesson covers strategies for connecting with other professionals, joining associations, and finding mentorship.
- **Starting a Fabrication Business (25m)**
We'll walk through steps to launch a fabrication shop, from planning and permits to marketing and operations.
- **Legal and Insurance Considerations (18m)**
Understand legal requirements, contracts, and insurance needs for welding and fabrication businesses.
- **Case Studies: Successful Projects (40m)**
Review real-world examples of construction fabrication projects, analyzing challenges and solutions applied.
- **Final Review and Next Steps (10m)**
Summarize key takeaways from the course and outline practical steps to apply your skills in ongoing work.

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