

# Career and Technical Education Adapted CTE Course Blueprint of Essential Standards

## Trade and Industrial Education

### *IM63 Welding Technology III*

Public Schools of North Carolina  
State Board of Education • Department of Public Instruction  
Academic Services and Instructional Support  
Division of Career and Technical Education  
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**This Adapted CTE Course Blueprint has been reviewed by business and industry representatives for technical content and appropriateness for the industry.**

## Adapted CTE Course Blueprint of Essential Standards

Essential standards are big, powerful ideas that are necessary and essential for students to know to be successful in a course. Essential standards identify the appropriate verb and cognitive process intended for the student to accomplish. Essential standards provide value throughout a student's career, in other courses, and translate to the next level of education or world of work.

This document lays out the essential standards for successfully completing the Welding Technology III course. This is the third level course that leads to an industry certification in the field of Welding. The essential standards use Revised Bloom's Taxonomy (RBT) category verbs (remember, understand, apply, analyze, evaluate, create) that reflect the overall intended cognitive outcome of the indicators written by the certifying body. Each essential standard and indicator reflects the intended level of learning through two dimensions; The Knowledge Dimension is represented with letters A-C, and the Cognitive Process Dimension by numbers 1-6.

The Adapted CTE Course Blueprint includes units of instruction, essential standard(s) for each unit, and the specific indicators aligned with industry certification. Also included are the relative weights of the units and essential standards within the course.

This document will help teachers plan for curriculum delivery for the course, prepare daily lesson plans, and construct valid formative, benchmark, and summative assessments. Curriculum for this course is not provided by NCDPI. Curriculum is aligned to AWS standards. Assessment for this course is written at the level of the **ESSENTIAL STANDARD** and assesses the intended outcome of the sum of its indicators.

For additional information about this blueprint, contact the Division of Career and Technical Education, North Carolina Department of Public Instruction, 6361 Mail Service Center, Raleigh, North Carolina 27699-6361.

Reference: Anderson, Lorin W. (Ed.), Krathwohl, David R. (Ed.), et al., *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*, Addison Wesley Longman, Inc., New York, 2001.

### Interpretation of Columns on the NCDPI Adapted CTE Course Blueprint

No.	1	2	3	4
Heading	Essential Std #	Unit Titles, Essential Standards, and Indicators	Course Weight	RBT Designation
<b>Column information</b>	Unique course identifier and essential standard number.	Statements of unit titles, essential standards per unit, and specific indicators per essential standard. If applicable, includes % for each indicator.	Shows the relative importance of each unit and essential standard. Course weight is used to help determine the percentage of total class time to be spent on each essential standard.	Classification of outcome behavior in essential standards and indicators in Dimensions according to the Revised Bloom's Taxonomy.  <b>Cognitive Process Dimension:</b> 1 Remember 2 Understand 3 Apply 4 Analyze 5 Evaluate 6 Create  <b>Knowledge Dimension:</b> A Factual Knowledge B Conceptual Knowledge C Procedural Knowledge

*Career and Technical Education conducts all activities and procedures without regard to race, color, creed, national origin, gender, or disability. The responsibility to adhere to safety standards and best professional practices is the duty of the practitioners, teachers, students, and/or others who apply the contents of this document.*

*Career and Technical Student Organizations (CTSO) are an integral part of this curriculum. CTOS are strategies used to teach course content, develop leadership, citizenship, responsibility, and proficiencies related to workplace needs.*

**Adapted CTE Course Blueprint of Essential Standards  
IM63 Welding Technology III**  
(Recommended hours of instruction: 135 or 180)

Essential Std #	Units, Essential Standards, and Indicators (The Learner will be able to:)	Course Weight	RBT Designation
1	2	3	4
	<b>Total Course Weight (Contact Hours)</b>	<b>135 hrs.</b>	
<b>1.00</b>	<b>Understand Safety and Health of Welders</b>	<b>2.5</b>	<b>B2</b>
	1.01 Understand common hazards in welding. 1.02 Understand proper personal protection used in welding. 1.03 Understand how to avoid welding fumes 1.04 Understand the causes of accidents. 1.05 Understand uses for material safety data sheets. 1.06 Understand safety techniques for storing and handling cylinders. 1.07 Understand how to avoid electric shock when welding. 1.08 Understand proper material handling methods.		
<b>2.00</b>	<b>Understand Gas Tungsten Arc Welding &amp; Flux Cored Arc Welding - Equipment and Filler Metals</b>	<b>10.0</b>	<b>B2</b>
	2.01 Understand gas metal arc welding (GMAW) and flux-cored arc welding (FCAW) safety. 2.02 Understand the characteristics of welding current and power sources. 2.03 Understand the use of GMAW and FCAW equipment: Spray transfer, Globular, Short circuiting, and Pulse. 2.04 Understand the use of GMAW and FCAW shielding gases and filler metals. 2.05 Understand how to set up GMAW and FCAW equipment and identify tools for weld cleaning.		
<b>3.00</b>	<b>Apply Flux Cored Arc Welding</b>	<b>80.0</b>	<b>C3</b>
	3.01 Apply procedures to perform GMAW-S (short-circuit) multiple-pass fillet welds on carbon steel plate coupons in multiple positions, using solid or composite wire and shielding gas. 3.02 Apply procedures to perform GMAW-S (short-circuit) multiple-pass V-groove welds on carbon steel plate coupons in multiple positions (with or without backing), using solid or composite wire and shielding gas. 3.03 Apply procedures to perform GMAW spray fillet and V-groove welds on carbon steel plate coupons in multiple positions (with or without backing), using solid or composite wire and shielding gas. 3.04 Apply procedures to perform FCAW multiple-pass fillet welds on carbon steel plate coupons in multiple positions, using flux-cored wire and, if required, shielding gas. 3.05 Apply procedures to perform FCAW multiple-pass V-groove welds on carbon steel plate coupons in multiple positions (with or without backing), using flux-cored wire and, if required, shielding gas.		

<b>4.00</b>	<b>Understand Gas Tungsten Arc Welding - Equipment and Filler Metal</b>	<b>10.0</b>	<b>B2</b>
	4.01 Understand gas tungsten arc welding (GTAW) safety. 4.02 Understand the function of GTAW equipment. 4.03 Understand the function of GTAW filler metals. 4.04 Understand the function of GTAW shielding gases. 4.05 Understand how to set up GTAW equipment.		
<b>5.00</b>	<b>Apply Gas Tungsten Arc Welding - Plate</b>	<b>32.5</b>	<b>C3</b>
	5.01 Apply procedures to build a pad in the flat position with stringer beads using GTAW and carbon steel filler metal. 5.02 Apply procedures to perform multiple-pass GTAW fillet welds on carbon steel plate coupons in the following positions, using carbon steel filler metal: 1F, 2F, 3F, and 4F. <b>5.03</b> Apply procedures to perform multiple-pass GTAW V-groove welds on carbon steel plate coupons in the following positions, using carbon steel filler metal: 1G, 2G, 3G, and 4G.		

**The NCCER textbook and course materials align to this crosswalk:**

- 1.00 Understand Welding Safety (Module 29101-09)
- 2.00 Understand GMAW & FCAW - Equipment and Filler Metals (Module 29205-09)
- 3.00 Apply GMAW & FCAW - Plate (Module 29206-09)
- 4.00 Understand GTAW - Equipment and Filler Metal (Module 29207-09)
- 5.00 Apply GTAW - Plate (Module 29208-09)