Career and Technical Education
Adapted CTE Course Blueprint
of
Essential Standards

Trade and Industrial Education

IM61 Welding Technology I

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 I course. This is the first 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
Column information	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. **Cognitive Process Dimension:** 1 Remember 2 Understand 3 Apply 4 Analyze 5 Evaluate 6 Create **Knowledge Dimension:** 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. CTSOs are strategies used to teach course content, develop leadership, citizenship, responsibility, and proficiencies related to workplace needs.

Adapted CTE Course Blueprint of Essential Standards for IM61 Welding Technology I

(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
	Total Course Weight (Contact Hours)	**135 hrs.**	
1.00	**Understand Safety and Health of Welders**	**2.5**	**B2**
	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.		
2.00	**Understand Drawing and Welding Interaction – Part I**	**2.5**	**B2**
	2.01 Understand a welding detail drawing. 2.02 Understand lines, material fills, and sections. 2.03 Understand object views. 2.04 Understand welding dimensioning. 2.05 Understand notes and bill of materials. 2.06 Understand the basic elements of a welding detail drawing. 2.07 Understand how to sketch or draw basic welding drawings.		
3.00	**Understand Drawing and Welding Interaction – Part II**	**5.0**	**B2**
	3.01 Understand the various parts of a welding symbol. 3.02 Understand fillet and groove weld symbols. 3.03 Understand how to read welding symbols on drawings, specifications, and welding procedure specifications. 3.04 Understand how to interpret welding symbols from a print.		
4.00	**Apply Manual Oxyfuel Gas Cutting (OFC)**	**17.5**	**C3**
	4.01 Apply procedures to use of oxyfuel cutting equipment. 4.02 Apply procedures to set up oxyfuel equipment. 4.03 Apply procedures to light and adjust an oxyfuel torch. 4.04 Apply procedures to shut down oxyfuel cutting equipment. 4.05 Apply procedures to disassemble oxyfuel equipment. 4.06 Apply procedures to change cylinders. 4.07 Apply procedures to perform oxyfuel cutting on straight line and square shapes, piercing and slot cutting, bevels, washing, and gouging. 4.08 Apply procedures to operate a motorized, portable oxyfuel gas cutting machine.		

5.00	**Understand Mechanized Oxyfuel Gas Cutting (OFC)**	**5.0**	**B2**
	5.01 Understand how to clean base metal for welding or cutting. 5.02 Understand joint design. 5.03 Understand joint design considerations. 5.04 Understand how to mechanically bevel the edge of a mild steel plate. 5.05 Understand how to thermally bevel the end of a mild steel plate. 5.06 Understand how to select the proper joint design based on a welding procedure specification (WPS) or instructor direction.		
6.00	**Apply Shielded Metal Arc Welding**	**95.0**	**C3**
	6.01 Apply procedures to set up shielded metal arc welding (SMAW) equipment. 6.02 Apply procedures to describe methods of striking an arc. 6.03 Apply procedures to properly strike and extinguish an arc. 6.04 Apply procedures to describe causes of arc blow and wander. 6.05 Apply procedures to make stringer, weave, and overlapping beads. 6.06 Apply procedures to make fillet welds in the following positions: Horizontal (2F), Vertical (3F), Overhead (4F).		
7.00	**Understand Shielded Metal Arc Welding - Equipment and Setup**	**5.0**	**B2**
	7.01 Understand shielded metal arc welding (SMAW) safety. 7.02 Understand welding electrical current. 7.03 Understand welding power supplies and their characteristics. 7.04 Understand how to set up welding power supplies. 7.05 Understand how to set up a machine for welding. 7.06 Understand tools used for weld cleaning.		
8.00	**Understand Shielded Metal Arc Electrodes**	**2.5**	**B2**
	8.01 Understand factors that affect electrode selection. 8.02 Understand the American Welding Society (AWS) and the American Society of Mechanical Engineers (ASME) filler metal classification system. 8.03 Understand different types of filler metals. 8.04 Understand the storage and control of filler metals. 8.05 Understand filler metal traceability requirements and how to use applicable code requirements. 8.06 Understand how to select the proper electrode for an identified welding task.		

The NCCER textbook and course materials align to this crosswalk:

1.00 Understand Welding Safety (Module 29101-09)
2.00 Understand Reading Welding Detail Drawings (Module 29202-09)
3.00 Understand Welding Symbols (Module 29201-09)
4.00 Apply Oxyfuel Cutting (Module 29102-06)
5.00 Understand Base Metal Prep (Module 29105-09)
6.00 Apply SMAW – Beads and Fillet Welds (Module 29109-09)
7.00 Understand SMAW - Equipment and Setup (Module 29107-09)
8.00 Understand Shielded Metal Arc Electrodes (Module 29108-09)