

# ***METALWORKING CURRICULUM FRAMEWORK***



This document was prepared by:

Office of Career, Technical, and Adult Education  
Nevada Department of Education  
755 N. Roop Street, Suite 201  
Carson City, NV 89701

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## INTRODUCTION

The Nevada CTE Curriculum Frameworks are a resource for Nevada's public and charter schools to design, implement, and assess their CTE programs and curriculum. The content standards identified in this document are listed as a model for the development of local district programs and curriculum. They represent rigorous and relevant expectations for student performance, knowledge, and skill attainment which have been validated by industry representatives.

The intent of this document is to provide a resource to districts as they develop and implement CTE programs and curricula.

This program ensures the following thresholds are met:

- The CTE course and course sequence teaches the knowledge and skills required by industry through applied learning methodology and, where appropriate, work-based learning experiences that prepare students for careers in high-wage, high-skill and/or high-demand fields. Regional and state economic development priorities shall play an important role in determining program approval. Some courses also provide instruction focused on personal development.
- The CTE course and course sequence includes leadership and employability skills as an integral part of the curriculum.
- The CTE course and course sequence are part of a rigorous program of study and include sufficient technical challenge to meet state and/or industry-standards.

The CTE program components include the following items:

- Program of Study
- State Skill Standards
- Employability Skills for Career Readiness Standards
- Career Technical Student Organizations (CTSO)
- Curriculum Framework
- CTE Assessments:
  - Workplace Readiness Skills Assessment
  - End-of-Program Technical Assessment
- Certificate of Skill Attainment
- CTE Endorsement on a High School Diploma
- CTE College Credit

**NEVADA DEPARTMENT OF EDUCATION  
CURRICULUM FRAMEWORK FOR  
METALWORKING**

<b>PROGRAM TITLE:</b>	<b>METALWORKING</b>
<b>STATE SKILL STANDARDS:</b>	<b>METALWORKING</b>
<b>STANDARDS REFERENCE CODE:</b>	<b>MTL</b>
<b>CAREER CLUSTER:</b>	<b>MANUFACTURING</b>
<b>CAREER PATHWAY:</b>	<b>PRODUCTION</b>
<b>PROGRAM LENGTH:</b>	<b>3 LEVELS (L1, L2, L3C)</b>
<b>PROGRAM ASSESSMENT</b>	<b>METALWORKING WORKPLACE READINESS SKILLS</b>
<b>CTSO:</b>	<b>SKILLSUSA</b>
<b>GRADE LEVEL:</b>	<b>9-12</b>
<b>AVAILABLE INDUSTRY CERTIFICATIONS/LICENSES PROVIDERS:</b>	<b>CAREERSAFE - OSHA</b>

### **PROGRAM PURPOSE**

The purpose of this program is to prepare students for postsecondary education and employment in the Metalworking industry.

The program includes the following state standards:

- Nevada CTE Skill Standards: Metalworking
- Employability Skills for Career Readiness
- Nevada Academic Content Standards (alignment shown in the Nevada CTE Skill Standards):
  - Science (based on the Next Generation Science Standards)
  - English Language Arts (based on the Common Core State Standards)
  - Mathematics (based on the Common Core State Standards)
- Common Career Technical Core (alignment shown in the Nevada CTE Skill Standards)

### **CAREER CLUSTERS**

The National Career Clusters™ Framework provides a vital structure for organizing and delivering quality CTE programs through learning and comprehensive programs of study (POS). In total, there are 16 Career Clusters in the National Career Clusters™ Framework, representing more than 79 Career Pathways to help students navigate their way to greater success in college and career. As an organizing tool for curriculum design and instruction, Career Clusters™ provide the essential knowledge and skills for the 16 Career Clusters™ and their Career Pathways.\*

\*Cite: National Association of State Directors of Career Technical Education Consortium. (2012). Retrieved from <http://www.careertech.org/career-clusters/glance/careerclusters.html>

**PROGRAM OF STUDY**

The program of study illustrates the sequence of academic and career and technical education coursework that is necessary for the student to successfully transition into postsecondary educational opportunities and employment in their chosen career path. (NAC 389.803)

**PROGRAM STRUCTURE**

The core course sequencing provided in the following table serves as a guide to schools for their programs of study. Each course is listed in the order in which it should be taught and has a designated level. Complete program sequences are essential for the successful delivery of all state standards in each program area.

<b>METALWORKING</b> Core Course Sequence	
<b>COURSE NAME</b>	<b>LEVEL</b>
Metalworking I	L1
Metalworking II	L2
Metalworking III	L3C

The core course sequencing with the complementary courses provided in the following table serves as a guide to schools for their programs of study. Each course is listed in the order in which it should be taught and has a designated level. A program does not have to utilize all of the complementary courses in order for their students to complete their program of study. Complete program sequences are essential for the successful delivery of all state standards in each program area.

<b>METALWORKING</b> Core Course Sequence with Complementary Courses	
<b>COURSE NAME</b>	<b>LEVEL</b>
Metalworking I	L1
Metalworking II	L2
Metalworking III	L3C
Metalworking Advanced Studies *	AS

\*Complementary Courses

**STATE SKILL STANDARDS**

The state skill standards are designed to clearly state what the student should know and be able to do upon completion of an advanced high school career and technical education (CTE) program. The standards are designed for the student to complete all standards through their completion of a program of study. The standards are designed to prepare the student for the end-of-program technical assessment directly aligned to the standards. (Paragraph (a) of Subsection 1 of NAC 389.800)

**EMPLOYABILITY SKILLS FOR CAREER READINESS STANDARDS**

Employability skills, often referred to as “soft skills”, have for many years been a recognizable component of the standards and curriculum in career and technical education programs. The twenty-one standards are organized into three areas: (1) Personal Qualities and People Skills; (2) Professional Knowledge and Skills; and (3) Technology Knowledge and Skills. The standards are designed to ensure students graduate high school properly prepared with skills employers prioritize as the most important. Instruction on all twenty-one standards must be part of each course of the CTE program. (Paragraph (d) of Subsection 1 of NAC 389.800)

**CURRICULUM FRAMEWORK**

The Nevada CTE Curriculum Frameworks are organized utilizing the recommended course sequencing listed in the Program of Study and the CTE Course Catalog. The framework identifies the recommended content standards, performance standards, and performance indicators that should be taught in each course.

**CAREER AND TECHNICAL STUDENT ORGANIZATIONS (CTSOS)**

To further the development of leadership and technical skills, students must have opportunities to participate in one or more of the Career and Technical Student Organizations (CTSOS). CTSOs develop character, citizenship, and the technical, leadership and teamwork skills essential for the workforce and their further education. Their activities are considered a part of the instructional day when they are directly related to the competencies and objectives in the course. (Paragraph (a) of Subsection 3 of NAC 389.800)

**WORKPLACE READINESS SKILLS ASSESSMENT**

The Workplace Readiness Skills Assessment has been developed to align with the Nevada CTE Employability Skills for Career Readiness Standards. This assessment provides a measurement of student employability skills attainment. Students who complete a program will be assessed on their skill attainment during the completion level course. Completion level courses are identified by the letter “C”. (e.g., Level = L3C) (Paragraph (d) of Subsection 1 of NAC 389.800)

**END-OF-PROGRAM TECHNICAL ASSESSMENT**

An end-of-program technical assessment has been developed to align with the Nevada CTE Skill Standards for this program. This assessment provides a measurement of student technical skill attainment. Students who complete a program will be assessed on their skill attainment during the completion level course. Completion level courses are identified by the letter “C”. (e.g., Level = L3C) (Paragraph (e) of Subsection 1 of NAC 389.800)

**CERTIFICATE OF SKILL ATTAINMENT**

Each student who completes a course of study must be awarded a certificate which states that they have attained specific skills in the industry being studied and meets the following criteria: A student must maintain a 3.0 grade point average in their approved course of study, pass the Workplace Readiness Skills Assessment, and pass the end-of-program technical assessment. (Subsection 4 of NAC 389.800)

**CTE ENDORSEMENT ON A HIGH SCHOOL DIPLOMA**

A student qualifies for a CTE endorsement on their high school diploma after successfully completing the following criteria: 1) successful completion of a CTE course of study in a program area, 2) successful completion of academic requirements governing receipt of a standard diploma, and 3) meet all requirements for the issuance of the Certificate of Skill Attainment. (NAC 389.815)

**CTE COLLEGE CREDIT**

CTE College Credit is awarded to students based on articulation agreements established by each college for the CTE program, where the colleges will determine the credit value of a full high school CTE program based on course alignment. An articulation agreement will be established for each CTE program designating the number of articulated credits each college will award to students who complete the program.

CTE College Credit is awarded to students who: (1) complete the CTE course sequence with a grade-point average of 3.0 or higher; (2) pass the state end-of-program technical assessment for the program; and (3) pass the Workplace Readiness Assessment for employability skills.

Pre-existing articulation agreements will be recognized until new agreements are established according to current state policy and the criteria shown above.

Please refer to the local high school's course catalog or contact the local high school counselor for more information. (Paragraph (b) of Subsection 3 of NAC 389.800)

**ACADEMIC CREDIT FOR CTE COURSEWORK**

Career and technical education courses meet the credit requirements for high school graduation (1 unit of arts and humanities or career and technical education). Some career and technical education courses meet academic credit for high school graduation. Please refer to the local high school's course catalog or contact the local high school counselor for more information. (NAC 389.672)

**CORE COURSE:  
RECOMMENDED STUDENT PERFORMANCE STANDARDS**

<b>COURSE TITLE:</b>	<b>Metalworking I</b>
<b>ABBR. NAME:</b>	<b>METALWORKING I</b>
<b>CREDITS:</b>	<b>1</b>
<b>LEVEL:</b>	<b>L1</b>
<b>CIP CODE:</b>	<b>48.0511</b>
<b>PREREQUISITE:</b>	<b>None</b>
<b>CTSO:</b>	<b>SkillsUSA</b>
<b>COURSE DESCRIPTION</b>	
<p>This course introduces students to a general overview of metalworking processes. Students will gain an understanding of equipment, tools, safety procedures, machine operation, metal-fabricating methods, industrial applications, and problem solving. Students will be introduced to career opportunities and necessary job skills.</p>	

### TECHNICAL STANDARDS

#### CONTENT STANDARD 1.0 : IDENTIFY LAB ORGANIZATION AND SAFETY PROCEDURES

Performance Standard 1.1 : Demonstrate General Lab Safety Rules and Procedures

*Performance Indicators :* 1.1.1-1.1.19

Performance Standard 1.2 : Identify and Utilize Hand Tools

*Performance Indicators :* 1.2.1-1.2.5

Performance Standard 1.3 : Identify and Utilize Power Tools and Equipment

*Performance Indicators :* 1.3.1-1.3.5

#### CONTENT STANDARD 2.0 : APPLY FUNDAMENTAL PRINT READING, MEASUREMENT, AND LAYOUT/FIT-UP TECHNIQUES

Performance Standard 2.1 : Demonstrate Print Reading and Sketching Practices

*Performance Indicators :* 2.1.1

Performance Standard 2.2 : Demonstrate Measuring and Scaling Techniques

*Performance Indicators :* 2.2.1, 2.2.5

#### CONTENT STANDARD 3.0 : IDENTIFY PROPERTIES OF METALS

Performance Standard 3.1: Identify Material Properties and Science

*Performance Indicators :* 3.1.4

Performance Standard 3.2: Identify Filler Metal

*Performance Indicators :* 3.2.1-3.2.2

#### CONTENT STANDARD 4.0 : APPLY WELDING TECHNIQUES

Performance Standard 4.1 : Apply Safety Procedures

*Performance Indicators :* 4.1.2, 4.1.5, 4.1.8

Performance Standard 4.4 : Produce Welds Using Oxy-Fuel Welding (OFW)

*Performance Indicators :* 4.4.1-4.4.3

#### CONTENT STANDARD 5.0 : APPLY THERMAL CUTTING PROCESSES

Performance Standard 5.1 : Demonstrate Oxy-Fuel Gas Cutting (OFC)

*Performance Indicators :* 5.1.1-5.1.8

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**CONTENT STANDARD 6.0 : IDENTIFY WELDING CODES, INSPECTIONS, AND TESTING PRINCIPLES**

Performance Standard 6.1 : Identify Welding Codes, Qualifications, and Certifications

*Performance Indicators* : 6.1.2, 6.1.5, 6.1.7

**CONTENT STANDARD 7.0 : APPLY FABRICATION FUNDAMENTALS**

Performance Standard 7.1 : Utilize Base Metal Preparation Fundamentals

*Performance Indicators* : 7.1.1-7.1.2

Performance Standard 7.2 : Demonstrate Part Preparation with Cutting and Forming Techniques

*Performance Indicators* : 7.2.1-7.1.3

Performance Standard 7.4 : Identify Threads and Fasteners

*Performance Indicators* : 7.4.1, 7.4.3

Performance Standard 7.5 : Utilize Metal Forming Processes

*Performance Indicators* : 7.5.1-7.5.2

**CONTENT STANDARD 8.0 : APPLY SHEET METAL TECHNIQUES**

Performance Standard 8.1 : Utilize Sheet Metal Layout Principles and Practices

*Performance Indicators* : 8.1.1-8.1.2

Performance Standard 8.2 : Demonstrate Fastening Techniques

*Performance Indicators* : 8.2.1

**CONTENT STANDARD 9.0 : APPLY MACHINING TECHNIQUES**

Performance Standard 9.3 : Utilize Drilling Machines

*Performance Indicators* : 9.3.1-9.3.2, 9.3.4-9.3.5

**EMPLOYABILITY SKILLS FOR CAREER READINESS STANDARDS****CONTENT STANDARD 1.0 : DEMONSTRATE EMPLOYABILITY SKILLS FOR CAREER READINESS**

Performance Standard 1.1 : Demonstrate Personal Qualities and People Skills

*Performance Indicators* : 1.1.1-1.1.7

Performance Standard 1.2 : Demonstrate Professional Knowledge and Skills

*Performance Indicators* : 1.2.1-1.2.10

Performance Standard 1.3 : Demonstrate Technology Knowledge and Skills

*Performance Indicators* : 1.3.1-1.3.4

**ALIGNMENT TO THE NEVADA ACADEMIC CONTENT STANDARDS\***

**English Language Arts:** Reading Standards for Literacy in Science and Technical Subjects  
Writing Standards for Literacy in Science and Technical Subjects  
Speaking and Listening

**Mathematics:** Mathematical Practices  
Geometry-Similarity, Right Triangles, and Trigonometry  
Geometry-Geometric Measurement and Dimension

\* Refer to the Metalworking Standards for alignment by performance indicator



**CORE COURSE:  
RECOMMENDED STUDENT PERFORMANCE STANDARDS**

<b>COURSE TITLE:</b>	<b>Metalworking II</b>
<b>ABBR. NAME:</b>	<b>METALWORKING II</b>
<b>CREDITS:</b>	<b>1</b>
<b>LEVEL:</b>	<b>L2</b>
<b>CIP CODE:</b>	<b>48.0511</b>
<b>PREREQUISITE:</b>	<b>Metalworking I</b>
<b>CTSO:</b>	<b>SkillsUSA</b>

**COURSE DESCRIPTION**

This course is a continuation of Metalworking I. This course will enhance students' occupational levels of training, understanding, and skill development in the metal-working processes. Emphasis will be directed toward the principles of metallurgy, metal lathe operation, forging methods, casting process, and heat-treating procedures. Advanced welding methods will be presented as well as career awareness and opportunities in the metals industries. The appropriate use of technology and industry-standard equipment is an integral part of this course.

**TECHNICAL STANDARDS****CONTENT STANDARD 2.0 : APPLY FUNDAMENTAL PRINT READING, MEASUREMENT, AND LAYOUT/FIT-UP TECHNIQUES**

Performance Standard 2.1 : Demonstrate Print Reading and Sketching Practices

*Performance Indicators* : 2.1.2-2.1.6

Performance Standard 2.2 : Demonstrate Measuring and Scaling Techniques

*Performance Indicators* : 2.2.2-2.2.4, 2.2.6

Performance Standard 2.3 : Utilize Layout Principles and Practices

*Performance Indicators* : 2.3.1-2.3.5

Performance Standard 2.4 : Demonstrate Preparation and Fit-up Practices

*Performance Indicators* : 2.4.2-2.4.3

**CONTENT STANDARD 3.0 : IDENTIFY PROPERTIES OF METALS**

Performance Standard 3.1 : Identify Material Properties and Science

*Performance Indicators* : 3.1.4

Performance Standard 3.2 : Identify Filler Metal

*Performance Indicators* : 3.2.3-3.2.4

**CONTENT STANDARD 4.0 : APPLY WELDING TECHNIQUES**

Performance Standard 4.1 : Apply Safety Procedures

*Performance Indicators* : 4.1.1, 4.1.3, 4.1.6, 4.1.9

Performance Standard 4.3 : Produce Welds Using Shielded Metal Arc Welding (SMAW) on Carbon Steel

*Performance Indicators* : 4.3.5-4.3.6

Performance Standard 4.4 : Produce Welds Using Gas Metal Arc Welding Short Circuiting Transfer (GMAW-S) on Carbon Steel

*Performance Indicators* : 4.4.4, .4.4.6-4.4.7

Performance Standard 4.5 : Produce Welds Using Flux Core Arc Welding Short Circuiting Transfer (FCAW-G) on Carbon Steel

*Performance Indicators* : 4.5.1-4.5.4, 4.5.6-4.5.7

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**CONTENT STANDARD 5.0 : APPLY THERMAL CUTTING PROCESSES**

Performance Standard 5.1 : Demonstrate Oxy-Fuel Gas Cutting (OFC)

*Performance Indicators* : 5.1.9

Performance Standard 5.2 : Demonstrate Plasma Arc Cutting (PAC) on Carbon Steel and Aluminum

*Performance Indicators* : 5.2.1-5.2.6

**CONTENT STANDARD 6.0 : IDENTIFY WELDING CODES, INSPECTIONS, AND TESTING PRINCIPLES**

Performance Standard 6.1 : Identify Welding Codes, Qualifications, and Certifications

*Performance Indicators* : 6.1.3, 6.1.6

Performance Standard 6.2 : Demonstrate Welding Inspection and Testing Principles

*Performance Indicators* : 6.2.1-6.2.3

**CONTENT STANDARD 7.0 : APPLY FABRICATION FUNDAMENTALS**

Performance Standard 7.1 : Utilize Base Metal Preparation Fundamentals

*Performance Indicators* : 7.1.3-7.1.6

Performance Standard 7.3 : Demonstrate Part Preparation with Cutting and Forming Techniques

*Performance Indicators* : 7.3.1-7.3.5

Performance Standard 7.4 : Utilize Base Metal Preparation Fundamentals

*Performance Indicators* : 7.4.2, 7.4.4-7.4.5

Performance Standard 7.5 : Demonstrate Part Preparation with Cutting and Forming Techniques

*Performance Indicators* : 7.5.3-7.5.5

**CONTENT STANDARD 8.0 : APPLY SHEET METAL TECHNIQUES**

Performance Standard 8.1 : Utilize Sheet Metal Layout Principles and Practices

*Performance Indicators* : 8.1.3

Performance Standard 8.2 : Demonstrate Fastening Techniques

*Performance Indicators* : 8.2.2

Performance Standard 8.3 : Utilize Forming and Cutting Techniques

*Performance Indicators* : 8.3.1-8.3.4

**CONTENT STANDARD 9.0 : APPLY MACHINING TECHNIQUES**

Performance Standard 9.1 : Utilize Sheet Metal Layout Principles and Practices

*Performance Indicators* : 9.1.1-9.1.3

Performance Standard 9.2 : Utilize Metalworking Machines

*Performance Indicators* : 9.2.1-9.2.2

Performance Standard 9.3 : Utilize Drilling Machines

*Performance Indicators* : 9.3.3

**EMPLOYABILITY SKILLS FOR CAREER READINESS STANDARDS****CONTENT STANDARD 1.0 : DEMONSTRATE EMPLOYABILITY SKILLS FOR CAREER READINESS**

Performance Standard 1.1 : Demonstrate Personal Qualities and People Skills

*Performance Indicators* : 1.1.1-1.1.7

Performance Standard 1.2 : Demonstrate Professional Knowledge and Skills

*Performance Indicators* : 1.2.1-1.2.10

Performance Standard 1.3 : Demonstrate Technology Knowledge and Skills

*Performance Indicators* : 1.3.1-1.3.4

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**ALIGNMENT TO THE NEVADA ACADEMIC CONTENT STANDARDS\***

**English Language Arts:** Reading Standards for Literacy in Science and Technical Subjects  
Writing Standards for Literacy in Science and Technical Subjects

**Mathematics:** Mathematical Practices

\* Refer to the Metalworking Standards for alignment by performance indicator

**CORE COURSE:  
RECOMMENDED STUDENT PERFORMANCE STANDARDS**

<b>COURSE TITLE:</b>	<b>Metalworking III</b>
<b>ABBR. NAME:</b>	<b>METALWORKING III</b>
<b>CREDITS:</b>	<b>1</b>
<b>LEVEL:</b>	<b>L3C</b>
<b>CIP CODE:</b>	<b>48.0511</b>
<b>PREREQUISITE:</b>	<b>Metalworking II</b>
<b>CTSO:</b>	<b>SkillsUSA</b>

**COURSE DESCRIPTION**

This course is a continuation of Metalworking II. This course is designed to review the basic elements and processes of metalworking. Students will further develop skills by learning complex metal machining procedures, metallurgy, and industrial production methods and controls. The appropriate use of technology and industry-standard equipment is an integral part of this course. Upon successful completion of this course, students will have acquired entry-level skills for employment in this field.

**TECHNICAL STANDARDS****CONTENT STANDARD 2.0 : APPLY FUNDAMENTAL PRINT READING, MEASUREMENT, AND LAYOUT/FIT-UP TECHNIQUES**

Performance Standard 2.1 : Demonstrate Print Reading and Sketching Practices

*Performance Indicators :* 2.1.7

Performance Standard 2.4 : Demonstrate Preparation and Fit-up Practices

*Performance Indicators :* 2.4.1, 2.4.4-2.4.5

**CONTENT STANDARD 3.0 : IDENTIFY PROPERTIES OF METALS**

Performance Standard 3.1 : Identify Material Properties and Science

*Performance Indicators :* 3.1.1-3.1.2, 3.1.5

Performance Standard 3.2 : Identify Filler Metal

*Performance Indicators :* 3.2.3-3.2.4

**CONTENT STANDARD 4.0 : APPLY WELDING TECHNIQUES**

Performance Standard 4.1 : Apply Safety Procedures

*Performance Indicators :* 4.1.4, 4.1.7, 4.1.10

Performance Standard 4.3 : Produce Welds Using Shielded Metal Arc Welding (SMAW) on Carbon Steel

*Performance Indicators :* 4.3.7

Performance Standard 4.4 : Produce Welds Using Gas Metal Arc Welding Short Circuiting Transfer (GMAW-S) on Carbon Steel

*Performance Indicators :* 4.4.5, 4.4.8

Performance Standard 4.5 : Produce Welds Using Flux Core Arc Welding Short Circuiting Transfer (FCAW-G) on Carbon Steel

*Performance Indicators :* 4.5.5, 4.5.8

Performance Standard 4.6 : Produce Welds Using Gas Tungsten Arc Welding (GTAW) on Carbon Steel

*Performance Indicators :* 4.6.1-4.6.8

Performance Standard 4.7 : Produce Welds Using Gas Tungsten Arc Welding (GTAW) on Aluminum

*Performance Indicators :* 4.7.1-4.7.5

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**CONTENT STANDARD 6.0 : IDENTIFY WELDING CODES, INSPECTIONS, AND TESTING PRINCIPLES**

Performance Standard 6.1 : Identify Welding Codes, Qualifications, and Certifications

*Performance Indicators* : 6.1.1, 6.1.4

**CONTENT STANDARD 8.0 : APPLY SHEET METAL TECHNIQUES**

Performance Standard 8.1 : Utilize Sheet Metal Layout Principles and Practices

*Performance Indicators* : 8.1.4-8.1.5

**CONTENT STANDARD 9.0 : APPLY MACHINING TECHNIQUES**

Performance Standard 9.1 : Demonstrate Fundamentals of Machining

*Performance Indicators* : 9.1.4

Performance Standard 9.2 : Utilize Metalworking Machines

*Performance Indicators* : 9.2.3-9.2.5

**EMPLOYABILITY SKILLS FOR CAREER READINESS STANDARDS****CONTENT STANDARD 1.0 : DEMONSTRATE EMPLOYABILITY SKILLS FOR CAREER READINESS**

Performance Standard 1.1 : Demonstrate Personal Qualities and People Skills

*Performance Indicators* : 1.1.1-1.1.7

Performance Standard 1.2 : Demonstrate Professional Knowledge and Skills

*Performance Indicators* : 1.2.1-1.2.10

Performance Standard 1.3 : Demonstrate Technology Knowledge and Skills

*Performance Indicators* : 1.3.1-1.3.4

**ALIGNMENT TO THE NEVADA ACADEMIC CONTENT STANDARDS\***

**English Language Arts:** Reading Standards for Literacy in Science and Technical Subjects  
Writing Standards for Literacy in Science and Technical Subjects

**Mathematics:** Mathematical Practices

\* Refer to the Metalworking Standards for alignment by performance indicator

**COMPLEMENTARY COURSE(S):**

Programs that utilize the complementary courses can include the following courses. The Advanced Studies course allows for additional study through investigation and in-depth research.

<b>COURSE TITLE:</b>	<b>Metalworking Advanced Studies</b>
<b>ABBR. NAME:</b>	<b>METALWORKING AS</b>
<b>CREDITS:</b>	<b>1</b>
<b>LEVEL:</b>	<b>AS</b>
<b>CIP CODE:</b>	<b>48.0511</b>
<b>PREREQUISITE:</b>	<b>Metalworking III</b>
<b>CTSO:</b>	<b>SkillsUSA</b>
<b>COURSE DESCRIPTION</b>	
<p>This course is offered to students who have achieved all content standards in a program whose desire is to pursue advanced study through investigation and in-depth research. Students are expected to work independently or in a team and consult with their supervising teacher for guidance. The supervising teacher will give directions, monitor, and evaluate the students' topic of study. Coursework may include various work-based learning experiences such as internships and job shadowing, involvement in a school-based enterprise, completion of a capstone project, and/or portfolio development. This course may be repeated for additional instruction and credit.</p>	

**TECHNICAL STANDARDS**

Students have achieved all program content standards and will pursue advanced study through investigation and in-depth research.

**EMPLOYABILITY SKILLS FOR CAREER READINESS STANDARDS**

Students have achieved all program content standards and will pursue advanced study through investigation and in-depth research.

**SAMPLE TOPICS**

- Participate in individual/team competitions
- Complete a capstone project
- Participation in an internship or job shadow opportunities
- Explore college and career opportunities