

Course Information

WELDING TECHNOLOGY I

Grade Level:	10 -11-12
Prerequisite:	Students must purchase gloves, welding goggles, pliers, and safety glasses
Length:	1 Semester
Period(s) Per Day:	1
Credit:	2
Credit Requirement Fulfilled:	Vocational/Elective

Course Description

Content: The course is designed as an introduction to arc welding, MIG (wire feed), and oxyacetylene welding practices. Emphasis is placed on skill development and safe use of all welding equipment. Related information on welding symbols, electrode selection, and metallurgy are integrated with the practical lab work.

Course Objectives and Expectations

Course Objectives and Expectations

1. To explore basic and advanced skills associated with the Welding/Fabrication Industry.
2. To create a greater awareness to safety in our everyday routines.
3. To become aware of when to apply academic appropriate and technical skills in the Welding Industry.
4. To work productively in teams, and to use technology to enhance productivity
5. To utilize critical thinking to make sense of problems and persevere in solving them.

Student Objectives

After completing this course the student will be able to:

1. Identify tools and machines used in the welding industry,
2. List core safety rules for self, shop, machine, and operate each efficiently,
3. Develop skills in the areas of Oxyacetylene and Shielded Metal Arc Welding,
4. Weld coupons that will be strong and neat in appearance,
5. Identify different metals used in Industry by shape and composition,
6. Understand basic metallurgy and use it to prevent distortion,
7. Identify welding symbols and read welding blueprints,
8. Develop safe work habits-such as proper shop procedures, tool maintenance, and good clean up practices,
9. Select the correct electrode for arc welding according to its tensile strength, flux coating, position it is to be used in, and other factors,
10. Anneal, temper, and perform other heat-treating processes on metal.

COURSE OUTLINE:

Quarter I/First 9 Weeks

Career and Education Exploration **Week 1, 2** CS1 BM 1 2 3
MTCIS-Career and Learning Exploration CS2 BM 2 34
 Personal Portfolio/Interest Surveys
 Multiple Intelligences/Holland Personality Comparison CS3 BM 1 2 3

Technology **Week 1**
 What is Technology?
 How is Technology used in Welding?

Measuring **Week 2**
 What is measuring?
 How is measuring used in Welding?

Safety **Week 2, 3, 4**
 What is Safety?
 Types of Safety
 Personal Protective Equipment (PPE)

Welding **Week 2, 3, 4**
 What is Welding?
 Fusion/Capillary Attraction
 Types of Welding
 Oxyacetylene/Shielded Metal Arc Welding/Gas Metal Arc Welding/Brazing
 Welding Safety
 Personal Protective Equipment (PPE)/Equipment/Others/Surroundings
 Blue Prints/Working Drawings/Bill of Materials
 Parts toBlue Prints/Working Drawings/Bill of Materials

 Weld Symbols
 What/Where/When/why/how they are used

Oxyacetylene **Week 3, 4, 5, 6, 7, 8, 9** CS4 BM 1 2 345 CS5 BM 1 2 34

 What isOxyacetylene?
 What isOxyacetyleneWelding?
 Define and identify different Oxyacetylene Welding modes
 CS3 BM 1 2 3 CS4 BM 1 2 345 CS5 BM 1 2 34
 Reducing/Neutral/Oxidizing
 Define what safety and Oxyacetylene Welding have in common
 Personal Protective Equipment (PPE)/Equipment/Others/Surroundings

Properly Identify Tools/Setup/Proper usage/Maintenance/storage
 Explore Different Oxyacetylene weld designs and Processes
 7 Runs with and without Rod/Square/Lap/Fillet weld processes/Lawn Art-Bug

Shielded Metal Arc Welding

Week 3, 4, 5, 6, 7, 8, 9 CS3 BM 1 2 3 CS4 BM 1 2 3 4 5 CS5 BM 1 2 3 4

What is Shielded Metal Arc Welding? **Week 3, 4, 5, 6, 7, 8, 9**
 Define and identify different Shielded Metal Arc Welding modes

Electricity DC + DC- AC **Week 5**

Define what safety and Shielded Metal Arc Welding have in common
 Personal Protective Equipment (PPE)/Equipment/Others/Surroundings
 Properly Identify Tools/Setup/Proper usage/Maintenance/storage
 Explore Different weld designs and Processes
 Practice Pad/Open Root/Air tight Box/10 Piece Sculpture **Week 5, 6, 7, 8, 9**

Quarter II/ Second 9 Weeks

Gas Metal Arc Welding

Week 9, 10, 11, 12, 13 CS3 BM 1 2 3 CS4 BM 1 2 3 4 5 CS5 BM 1 2 3 4

What is Gas Metal Arc Welding? **Week 9, 10**

Define and identify different Gas Metal Arc Welding modes
 DC + DC- AC **Week 9**

Define what safety and Gas Metal Arc Welding have in common **Week 10**

Personal Protective Equipment (PPE)/Equipment/Others/Surroundings
 Properly Identify Tools/Setup/Proper usage/Maintenance/storage **Week 10**

Explore Different weld designs and Processes **Week 11**

Practice Pad/Open Root/Air tight Box/Sculpture **Week 11, 12, 13**

Personal Project **Week 11- 19**

Brazing

Week 14, 15, 16 CS3 BM 1 2 3 CS4 BM 1 2 3 4 5 CS5 BM 1 2 3 4

What is Brazing? **Week 14, 15, 16**

Define and identify different Brazing modes **Week 14, 15, 16**

Dissimilar metals/reduced distortion

Define what safety and Brazing have in common **Week 14, 15, 16**

Personal Protective Equipment (PPE)/Equipment/Others/Surroundings

Properly Identify Tools/Setup/Proper usage/Maintenance/storage **Week 14, 15, 16**

Explore Different Brazing designs and Processes
3 Runs with and without flux/decorative processes

Week 16, 17, 18

Montana Content Standards/RST

The grades 6–12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them. The Standards set requirements not only for English language arts (ELA) but also for literacy in History/social studies, science, and technical subjects.

RST 11.12 .3

RST 11.12 .9

Content Standard 1: Students experience various career opportunities and assess personal career pathways.

Content Standard 2: Students demonstrate an understanding and apply principles of Resource Management (i.e., financial, time, personal management).

Content Standard 3: Students acquire and utilize personal and leadership skills to become successful, productive citizens.

Content Standard 4: Students acquire and demonstrate current technical skills leading to an occupation.

Content Standard 5: Students know and demonstrate the requirements of the workplace through authentic application.

MONTANA STANDARDS FOR CAREER AND VOCATIONAL TECHNICAL EDUCATION

Content Standards indicate what all students should know, understand and be able to do in a specific content area. Benchmarks define our expectations for students' knowledge, skills and abilities along a developmental continuum in each content area. That continuum is focused at three points—at the end of grade 8, the end of one high school course, and the completion of six units of vocational coursework.

CS1 BM 1 2 3

CS2 BM 2 34

CS3 BM 1 2 3

CS4 BM 1 2 345

CS5 BM 1 2 34

MONTANA STANDARDS FOR WORKPLACE COMPETENCIES

Content Standards indicate what all students should know, understand and be able to do in a specific content area. Benchmarks define our expectations for students' knowledge, skills and abilities along a developmental continuum in each content area. That continuum is focused at three points—at the end of grade 4, the end of grade 8, and grade 12.

CS1 BM 2 3

CS2 BM 12 345
CS3 BM 1 2 34
CS4 BM
CS5 BM 1 2 345
CS6 BM 1 2 346

Evaluation

Career and Vocational/Technical Education Performance Standards: A Profile of Four Levels

The Career and Vocational/Technical Education Performance Standards describe students' knowledge, skills, and abilities in the Career and Vocational/Technical content areas on a continuum from kindergarten through grade 12. These descriptions provide a picture or profile of student achievement at the four performance levels: advanced, proficient, nearing proficiency, and novice.

AdvancedThis level denotes superior performance.

ProficientThis level denotes solid academic performance for each benchmark. Students reaching this level have demonstrated competency over challenging subject matter, including subject-matter knowledge, application of such knowledge to real-world situations, and analytical skills appropriate to the subject matter.

NearingThis level denotes that the student has partial mastery or prerequisite knowledge and **Proficiency** skills fundamental for proficient work at each benchmark.

NoviceThis level denotes that the student is beginning to attain the prerequisite knowledge and skills that are fundamental for work at each benchmark.

Upon Graduation Workplace Competencies

Advanced A graduating student at the advanced level in Workplace Competencies demonstrates superior performance. He/she:(a) independently identifies, organizes, plans and allocates workplace resources of time, money, human resources, material and facilities; (b) consistently practices workplace skills to identify, analyze, and evaluate procedures, policies, and individual team members' strengths; (c) competently communicates, interprets, and evaluates information; **10/00** -10- (d) independently evaluates and redesigns a variety of complex systems to improve system performance; (e) consistently selects, uses, and evaluates appropriate technologies and troubleshooting protocol in all learning situations; and (f) purposefully develops, evaluates and adjusts life and career plans and effectively demonstrates workplace readiness skills.

Proficient A graduating student at the proficient level in Workplace Competencies demonstrates solid academic performance. He/she: (a) identifies, organizes, plans and allocates workplace resources of time, money, human resources, material and facilities; (b) practices workplace skills to identify, analyze, and evaluate procedures, policies, and individual team members' strengths; (c) competently communicates, interprets, and evaluates information;(d) evaluates and redesigns a variety of complex systems to improve system performance; (e) selects, uses, and evaluates appropriate technologies and troubleshooting protocol in all learning situations; and(f) develops, evaluates and adjusts life and career plans and demonstrates workplace readiness skills.

Nearing Proficiency A graduating student at the nearing proficiency level in Workplace Competencies demonstrates partial mastery of the prerequisite knowledge and skills fundamental for proficiency in Workplace Competencies. He/she: (a) sometimes identifies, organizes and plans workplace resources of time, money, human resources, material and facilities, but has difficulty allocating these resources effectively; (b) sometimes practices workplace skills to identify and analyze procedures, policies, and individual team members' strengths; and, with assistance, evaluates the results;(c) communicates basic workplace information and, with assistance, interprets and evaluates basic workplace information; (d) sometimes evaluates and with assistance redesigns a system to improve system performance;(e) sometimes selects and uses appropriate technologies in learning situations and, with assistance, uses troubleshooting protocol; and (f) develops life and career plans and, with assistance, evaluates and makes adjustments; demonstrates workplace readiness skills.

Novice A graduating student at the proficient level in Workplace Competencies is beginning to attain the prerequisite knowledge and skills that are fundamental in Workplace Competencies. He/she: (a) identifies, but has difficulty organizing, planning, or allocating workplace resources of time, money, human resources, material and facilities; (b) seldom practices workplace skills; (c) seldom communicates, interprets, or evaluates information; (d) seldom evaluates and has difficulty redesigning a basic system to improve system performance; (e) seldom selects or uses technologies or troubleshooting protocol in learning situations; and (f) rarely develops, evaluates, or adjusts life and career plans; but, with assistance, demonstrates workplace readiness skills.

Resources

Montana Content Standards/RST

Resources

Montana Content Standards/RST

English Language Arts and Literacy in History/Social Studies, Science,
and Technical Subjects Grade-Level November 2011
Grades 11-12

Reading Standards for Literacy in Science and Technical Subjects

MONTANA STANDARDS FOR CAREER AND VOCATIONAL TECHNICAL EDUCATION

Career and Technical Education (CTE)

http://opi.mt.gov/Programs/CTAE/CTE.html#gpm1_13

MONTANA STANDARDS FOR WORKPLACE COMPETENCIES

Career and Technical Education (CTE)

<http://opi.mt.gov/pdf/Standards/ContStds-Workplace.pdf>