



www.rmctc.org

The Welding & Metal Fabrication Program

CIP 48.0508

Instructor: Zachary Majors

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Have Questions?
Reading Muhlenberg Career & Technology Center
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READING MUHLENBERG CAREER & TECHNOLOGY CENTER

MISSION STATEMENT

The Reading Muhlenberg Career & Technology Center, in partnership with our diverse community, sponsoring districts, and business and industry, is committed to providing quality career and technical education, resulting in opportunities for students to gain employment, pursue post-secondary education, and develop an appreciation for lifelong learning.

VISION STATEMENT

To empower Reading Muhlenberg Career & Technology Center students with the technical knowledge and skills to confidently pursue a career.

BELIEFS

- We believe in valuing the diversity of each student
- We believe education leads to opportunity
- We believe quality education starts with quality leadership
- We believe a career and technical education is a critical component of workforce development
- We believe technology is vital to learning and will help students connect with a rapidly changing world
- We believe technology must be embraced by teachers as a tool to help prepare students to meet current and future labor market demands
- We believe in providing all students with a positive educational experience
- We believe students should feel proud of what they have accomplished each day
- We believe students will be provided the opportunity to achieve their highest potential
- We believe students will be provided the opportunity to acquire and cultivate leadership skills
- We believe in providing students with a safe school environment
- We believe the success of a student is enhanced by parents and/or other influential adults through their support and involvement
- We believe in encouraging students to maintain a lifelong affiliation with the school
- We believe change is an ongoing process, not an event, and is fundamental for building quality programs of study
- We believe instruction must accommodate individual student learning styles

Congratulations,

Dear Parent/Guardian,

Your child has been accepted into the Welding program at Reading Muhlenberg Career & Technology Center. My name is Zachary Majors and I am the Welding teacher. In my program I try to prepare the students for the workplace. This means working with a wide range of equipment. Not to fear, your child will learn the proper safety procedures for each machine he or she will use. However, there are a few items that your child will be required to purchase. They are listed below:

Clothing Requirements:

1. **WORK BOOTS**- Closed leather tops, steel tipped
NO SNEAKERS, SANDALS, OR STREET SHOES
2. **WORK PANTS**- Full length to go over the top of the boot, Cotton, Jeans are good. NO POLYESTER
NO CUFFS OR BAGGIE PANTS (they catch sparks)

3. **WORK SHIRT**- Long sleeve, cotton or canvas welding jacket NO FLANNEL OR POLYESTER (they burn easily) *NOTE: A canvas-welding jacket ok*

Also Required: Black tee shirt with school logo (Can be order thru school website)www.rmctc.org

*** CLOTHES SHOULD NOT BE TORN OR FRAYED SO AS TO PREVENT BURNS.**

*** POSITIVELY NO CONTACT LENSES. WE WORK AROUND DIRT, DUST, ULTRAVIOLET RAYS, AND HEAT. A SERIOUS EYE PROBLEM COULD RESULT.**

The items below are also required and can be purchased at GTS Welding supply (1800 N. 11th St near Giant food), Harbor Freight (3225 N. 5th St.), and Tractor Supply (5370 Allentown Pike, near Wal-Mart).

Please note that the prices are approximate.

- | | |
|-------------------------------------|--------|
| 1. SAFETY GLASSES WITH SIDE SHIELDS | \$3.50 |
| 2. WELDING GLOVES | \$4.00 |
| 3. WELDING HAT | \$3.50 |
| 4. WELDING WIRE BRUSH. | \$1.25 |
| 5. WELDER'S SLAG HAMMER | \$4.00 |

Approximate Total=\$16.25

Your cooperation is greatly appreciated. Last but not least, I have made my shop as safe as possible; however, if a student chooses not to follow the proper procedures, or is not paying attention to what he or she is doing, an injury could happen. Work clothing and tools are required approximately one week after school starts. I would also suggest a black tee shirt.

Please feel free to contact me if you have any questions about the program at **610-921-7300** or by email at zmajors@rmctc.org.

Respectfully,

Zachary Majors



Welding & Metal Fabrication

- Work in an occupation that is one of the most desired and highest paying trades in American industry.
- Acquire expertise in areas of stick, tig, mig, and oxyacetylene welding and cutting.
- Effectively apply problem-solving and leadership skills in a field that offers a multi-disciplinary approach to welding and manufacturing.
- Learn proper safety procedures in a complex and challenging trade.



CTC knowledge transfers to college credits at:

Clarion University of Pennsylvania
Community College of Allegheny County
Delaware County Community College
Harrisburg Area Community College
Lincoln Technical Institute
Northampton Community College
Pennsylvania College of Technology
Pennsylvania Highlands Community College
Thaddeus Stevens College of Technology
Triangle Technology
Welder Training and Testing Institute
Westmoreland County Community College

Student Certifications

NOCTI – National Occupational Competency Testing
Institute Certification
* Welding
AWS – American Welding Society
OSHA – Safety Certification

Job Titles – Career Pathway

47-2152 Plumbers, Pipefitters, and Steamfitters
49-9042 Maintenance and Repair Workers, General
51-2041 Structural Metal Fabricators and Fitters
51-4121 Welders, Cutters, Solderers, and Brazers
51-4199 Metal Workers and Plastic Workers, All Other
LOCAL Welder Helper

Accreditations

WTTI – Welder Training & Testing

Program Planning Tool

Program Title: CIP 48.0508 WELDING & METAL FABRICATION

Student Name: _____

This document has been designed as a tool to facilitate student placement decisions and provides important information about the program. The chart on the reverse side is designed to assist in the identification of necessary skills, present educational levels, and supports, if any, that are needed to foster program success.

Program Completion Requirements

A successful student will...

- Secondary Academic Course Requirements: The PA Dept. of Education's focus is to ensure every student is college and career ready, therefore all students are recommended to follow a college prep sequence of academic classes. Courses such as applied math or general science are not appropriate for this program. PDE's goal is to have all students perform at the competent or advanced level on the Keystone Exams and Program of Study end-of-program assessment (NOCTI).
- Complete an Occupational Competency Assessment (i.e. NOCTI end-of -program exam) and score at the "competent" or "advanced" level. This end-of -program exam will cover the full scope of the program of study curriculum and includes (1) a multiple choice test and (2) a performance test consisting of occupational related tasks scored and evaluated by industry judges.
- Earn a minimum of one industry recognized certification. Students will be encouraged and expected to earn all recognized industry certifications that make up the scope of the curriculum. Accommodations are not permitted for industry certifications. These include: OSHA, AWS L1 and AWS L2. The program conforms to the standards of the American Welding Society and students are expected to become certified welders.
- Complete the approved program curriculum and earn a minimum of one RMCTC Job Title aligned with the student's career objective. Job titles are identified on the program task list, aligned with local workforce needs and high priority employment occupations, and annually reviewed and approved by the program's occupational advisory committee.
- Successful completion of Keystone Exams as determined by sending school district.
- Maintain a 95% attendance rate or better.
- Transition on to a post-secondary institution, military or related fulltime employment aligned to their CTC program of study.

Instructional Process/Specifications

A successful student will...

- Perform a wide variety of tasks in a laboratory environment with equipment consistent with industry standards. Up to 25 students are assigned to work "independently" and in "small teams". Students progress through using learning guides in a self-directed manner. Working in the laboratory, students will be required to use hand and power tools including grinders, drill presses, blow torches and other welding equipment, shears, band saws, chop saws, belt sanders, and pipe cutters.
- Students are required to perform oxyacetylene cutting & welding, shielded metal arc welding, gas metal arc welding, gas tungsten arc welding. Students are required to properly handle chemicals and gases associated with each welding technique. Use equipment that requires self-discipline and strict adherence to rules to ensure safety of self and others. Lab simulates a real working environment therefore students will be exposed to the noise levels, dust, debris, and fumes associated with the welding profession.
- Participate in classroom theory and laboratory applications for generally 2 ½ hours each day; students will spend 40% of their time in classroom theory and 60% of their time doing laboratory applications and live work.
- Complete written and performance tests. Students will be evaluated weekly on occupational skill performance using rubrics. In addition, students will be evaluated daily on work ethics. Progress is measured by test performance, task completion and work ethic.
- Participate in Career & Technical Student Organizations including SkillsUSA and/or National Technical Honor Society.
- Participate in a paid or unpaid work based learning related to the Program of Study (cooperative education, clinical internship, and/or job shadowing).
- Read and study textbooks and technical manuals. Most textbooks are written at a 10th to 11th grade reading level and most technical manuals are written at a higher level.
- Complete homework on time. Homework typically involves chapter or workbook assignments, on line research assignments and writing assignments.
- Purchase appropriate work and safety attire, tools, and equipment. Following is an estimated breakdown of costs: UNIFORM: Welding Gloves \$5, Safety Glasses \$3

Program Planning Tool

CTE Requirements	Present Educational Ability/Level	Support Needs
Program Completion – Strong self-determination skills and understanding of personal strengths and weaknesses. Ability to meet industry established standards of performance, complete the program of study without curriculum modifications, and earn industry certifications without testing accommodations.		
Reading Level- Text and manuals written on a 10-11 th grade reading level. Proficient on end-of-course exam (Keystone). Ability to analyze engineering drawings, blueprints, specifications, sketches, work orders, and material safety data sheets to plan layout, assembly, and welding operations. NOCTI assessment and industry certification exams require a proficiency in English language skills.		
Math Level - At grade level and proficient on end-of-course exam (Keystone). Knowledge of arithmetic, algebra, geometry and their applications. Ability to do precise measuring and dimensioning according to blueprints and drawings. Ability to use math to solve problems.		
Aptitude – Mechanical aptitude, visualization, deductive reasoning, inductive reasoning, oral comprehension, oral expression, critical thinking, complex problem solving and trouble shooting skills, selective attention.		
Safety & Physical – Hand-eye coordination. Arm-hand steadiness, near vision, controls precision, manual dexterity, multi-limb coordination, static strength, trunk strength. Frequent standing, bending and lifting required. Self-discipline and focus are needed for safety using welding equipment, hand tools, power tools and other equipment found in the industry. Able to lift 50lbs, ability to work independently, read and follow directions, good eye/hand coordination, stamina to stand for long periods of time.		
Interpersonal/ Social – Ability to work independently and in a team. Good overall communication skills and the ability to relate well to customers and coworkers. Self-discipline a must due to safety issues.		
Other Occupational/Program Considerations - Exposed to the noise levels, dust, debris, and fumes associated with the welding profession. Stamina for long periods of standing. Tolerance to working in hot environments.		

Scope and Sequence Welding & Metal Fabrication 48.0508



3Academic Subjects – Career success and postsecondary education success require the same level of college prep coursework. The Pennsylvania Department of Education’s (PDE) focus is to ensure that every student is prepared for college and a career. Academic courses such as applied math or general science cannot be listed on the program’s scope and sequence. PDE’s goal is to have all students perform at the competent or advanced level on the PSSA, and earn the Pennsylvania Skills Certificate on the end-of-program assessment.

Subject (Hours)	Secondary School				Postsecondary Institution			
	Grade 9 (Hours)	Grade 10 (Hours)	Grade 11 (Hours)	Grade 12 (Hours)	First Semester	Second Semester	Third Semester	Fourth Semester
Technical		Welding Safety	Shield Metal Arc Welding	Gas Tungsten Arc Welding	WEL 113: Oxy-Fuel Welding and Cutting I	CSC 110: Intro to Info Technology	QAL 247: Non-destructive Testing II	WEL 230: Shielded Metal Arc III
		Oxyacetylene Welding and Cutting	Gas Metal Arc & Flux Core Arc Welding	Pipe Welding	WEL 114: Shielded Metal Arc I	QAL 237: Non-destructive Testing I	WEL 210: Flux-Cored and Sub Arc I	WEL 234: Shielded Metal Arc V

48.0508 - Welding & Metal Fabrication

100 - OCCUPATIONAL ORIENTATION AND SAFETY
101 - Complete time or job sheet, reports, or records.
102 - Perform housekeeping duties daily.
103 - Follow verbal instructions to complete work assignments and rules.
104 - Follow written instructions to complete work assignments and rules.
105 - Inspect and use Personal Protection Equipment (PPE) daily.
106 - Maintain proper organization and operation of work area.
107 - Demonstrate proper use of ventilation equipment.
108 - Discuss proper hot work operation.
109 - Demonstrate knowledge of proper work actions for working in confined spaces.
110 - Identify Safety Data Sheets (SDS) and precautionary labeling.
111 - Inspect welding and thermal cutting equipment for safe operation.
112 - Display familiarity with industrial and OSHA safety standards.
113 - Identify oxyfuel safety procedures.
114 - Identify arc welding/cutting safety procedures.
115 - Follow emergency action plan.
200 - PRINCIPLES OF WELDING
201 - Identify major types of metals (ferrous and nonferrous) used in welding.
202 - Describe the basic principles of heat, expansion, and contraction as they relate to metals.
204 - Describe the industry accepted welding codes, standards, and procedures and their use.
205 - Identify various joint designs (joint geometry).
206 - Clean and prepare materials for welding and/or cutting.
207 - Demonstrate proper use of hand tools.
208 - Demonstrate proper use of standard measuring and layout tools.
209 - Demonstrate proper use of power equipment.
300 - WELDING, DRAWING, AND WELD SYMBOL INTERPRETATION
301 - Interpret basic elements of a drawing or sketch.
302 - Interpret welding symbol information.
303 - Fabricate parts from a drawing or sketch (class project).
304 - Identify structural materials used in the metal fabrication field.
305 - Perform basic metric conversion.
400 - VISUAL EXAMINATION, INSPECTION, AND TESTING
401 - Evaluate cut surfaces and edges of prepared base metal parts for testing.
402 - Identify and evaluate weld discontinuities as per accept/reject criteria.
403 - Perform visual inspection, destructive, and non-destructive testing.
500 - SHIELDED METAL ARC WELDING (SMAW)
501 - Perform safety inspections of SMAW equipment.
502 - Make minor external repairs to SMAW equipment.
503 - Set up and operate SMAW equipment.
507 - Perform qualification test.
508 - Pass fillet weld performance test in flat position.
509 - Pass fillet weld performance test in horizontal position.
510 - Pass fillet weld performance test in vertical position.
511 - Pass fillet weld performance test in overhead position.
512 - Pass groove weld performance test in flat position.
513 - Pass groove weld performance test in horizontal position.
514 - Pass groove weld performance test in vertical position.
515 - Pass groove weld performance test in overhead position.
600 - GAS METAL ARC WELDING (GMAW)
601 - Perform safety inspections of GMAW equipment.

602 - Make minor external repairs to GMAW equipment.
603 - Set up and operate GMAW equipment.
606 - Pass performance test.
607 - Pass fillet weld performance test in flat position.
608 - Pass fillet weld performance test in horizontal position.
609 - Pass fillet weld performance test in vertical position.
610 - Pass fillet weld performance test in overhead position.
611 - Pass groove weld performance test in flat position.
612 - Pass groove weld performance test in horizontal position.
613 - Pass groove weld performance test in vertical position.
614 - Pass groove weld performance test in overhead position.
700 - FLUX CORED ARC WELDING (FCAW)
701 - Perform safety inspections of FCAW equipment.
702 - Make minor external repairs to FCAW equipment.
703 - Set up and operate FCAW equipment.
705 - Pass performance test.
707 - Pass fillet weld performance test in flat position.
708 - Pass fillet weld performance test in horizontal position.
709 - Pass fillet weld performance test in vertical position.
710 - Pass fillet weld performance test in overhead position.
711 - Pass groove weld performance test in flat position.
712 - Pass groove weld performance test in horizontal position.
713 - Pass groove weld performance test in vertical position.
714 - Pass groove weld performance test in overhead position.
800 - GAS TUNGSTEN ARC WELDING (GTAW)
801 - Perform safety inspections of GTAW equipment.
802 - Make minor external repairs to GTAW equipment.
803 - Set up and operate GTAW equipment.
805 - Pass performance test on ferrous materials.
806 - Set up and operate GTAW on nonferrous materials.
808 - Pass performance test on nonferrous materials.
809 - Pass fillet weld performance test in flat position on ferrous materials.
810 - Pass fillet weld performance test in horizontal position on ferrous materials.
811 - Pass fillet weld performance test in vertical position on ferrous materials.
812 - Pass fillet weld performance test in overhead position on ferrous materials.
813 - Pass fillet weld performance test in flat position on nonferrous materials.
814 - Pass fillet weld performance test in horizontal position on nonferrous materials.
815 - Pass fillet weld performance test in vertical position on nonferrous materials.
816 - Pass fillet weld performance test in overhead position on nonferrous materials.
900 - MANUAL OXYFUEL GAS CUTTING (OFC)
901 - Perform safety inspections of OFC equipment.
902 - Make minor external repairs to OFC equipment.
903 - Set up for manual OFC operations on steel.
904 - Operate manual OFC equipment.
905 - Perform straight cutting operations on steel.
906 - Perform shape cutting operations on steel.
907 - Perform bevel cutting operations on steel.
908 - Perform piercing operations on steel.
1000 - MECHANIZED OXYFUEL GAS CUTTING (OFC)
1001 - Perform safety inspections of mechanized OFC equipment.
1002 - Make minor external repairs to mechanized OFC equipment.

STUDENTS OCCUPATIONALLY & ACADEMICALLY READY



- *Earn college credits which will save you money on tuition*
 - *Shorten college attendance*
 - *Get on the right career path*
 - *Enter the job market prepared*
 - *Get a consistent education*
- *See your CTC School Counselor for More Information*

TO QUALIFY CTC STUDENTS MUST:

1. Earn a high school diploma, achieve a minimum 2.5 GPA on a 4.0 scale in your CTC program and complete the PDE approved Program of Study.
2. Earn the industry certifications offered by your program (if applicable).
3. Achieve Competent or Advanced on the NOCTI End of Program Assessment.
4. Achieve proficiency on ALL of the Program of Study Competency Task List.
5. Provide documentation to Postsecondary Institution that you have met all of the requirements!

Find out more about the colleges offering course credits you can earn while attending RMCTC. Go to collegetransfer.net, search: PA Bureau of CTE SOAR Programs, and find your program by CIP Code.



**To receive college credits, qualifying students have three years from their date of graduation to apply and matriculate into the related career and technical program at a partnering institution.*

WELDING SAFETY AND FIRST AID

STUDENT SAFETY PLEDGE FOR WELDING

_____, who is enrolled in welding studies at Reading Muhlenberg Career and Technology Center, will, as a part of the training program, operate machines and equipment. This activity requires the written permission of a parent or guardian.

It is understood that each student will be given proper instruction in the safe use of machines and equipment before being allowed to operate the machines or equipment alone. Further, the student will be instructed in rules and regulations and safety requirements for classroom and shop activities. The student must assume responsibility for conducting himself/herself in a safe manner, and it is requested that the student sign the following student safety pledge.

1. I PROMISE TO ABIDE BY ALL SHOP SAFETY RULES AS FOLLOWS:

- a. To use hand tools and power tools only after proper instruction and only with the instructor's permission
- b. To use all tools and equipment only for their intended purposes, and to wear safety glasses at all times in the shop area
- c. To exhibit a concern for tools and equipment by returning them to proper storage areas after use
- d. To contribute to good housekeeping requirements and to keep the shop area clean and safe
- e. To abide by all fire regulations and to respect no smoking signs or areas
- f. To avoid horseplay at all times
- g. To follow all rules and regulations of the school

2. I WILL REPORT ALL ACCIDENTS TO THE INSTRUCTOR IMMEDIATELY

Date _____ STUDENT'S SIGNATURE _____

As parent or guardian of _____, I hereby give consent for my son/daughter to operate all machines and equipment necessary for carrying out the requirements of the welding course in which he/she is enrolled (Not required for Adult Education students.)

DATE _____

PARENT OR GUARDIAN SIGNATURE _____

(NOTE: Parents are cordially invited to visit the school and inspect the welding program at any convenient time.)

CAREER & TECHNICAL STUDENT ORGANIZATIONS (CTSO)

All students enrolled in Reading Muhlenberg Career & Technology Center have the opportunity to participate in at least one Career & Technical Student Organization (CTSO) while enrolled at the CTC. Students who become members in these co-curricular organizations have the opportunity to participate in team building, leadership, community service and social events.

Students also have the opportunity to attend skill competitions where the skills they have learned are "put to the test" against other competitors. These competitions include testing of knowledge and hands-on skills in a variety of trade and leadership events. Students who are fortunate enough to win their events at a district or state competition are able to compete at the national level and travel to locations such as Louisville, KY, Kansas City, MO, San Diego, CA, Orlando, FL, and Cleveland, OH.

SkillsUSA



<http://skillsusa.org>

SkillsUSA is a national organization of students, teachers and industry representatives who are working together to prepare students for careers in technical, skilled and service occupations. SkillsUSA provides quality education experiences for students in leadership, teamwork, citizenship and character development. It builds and reinforces self-confidence, work attitudes and communications skills. It emphasizes total quality at work, high ethical standards, superior work skills, life-long education, and pride in the dignity of work. SkillsUSA also promotes understanding of the free-enterprise system and involvement in community service.

Home Builders of America (HBA)



<http://www.pabuilders.org/>

The purpose of the HBA Student Chapter Program is to give students first hand exposure to the "real world" of the building industry and an invaluable complement to their academic studies.

National Technical Honor Society (NTHS)



www.nths.org

NTHS is the acknowledged leader in the recognition of outstanding student achievement in career and technical education. Over 2000 schools and colleges throughout the U.S. and its territories are affiliated with the NTHS. Member schools agree that NTHS encourages higher scholastic achievement, cultivates a desire for personal excellence, and helps top students find success in today's highly competitive workplace.

NTHS members receive: the NTHS membership certificate, pin, card, window decal, white tassel, official NTHS diploma seal, and three personal letters of recommendation for employment, college admission, or scholarships. Students will have access to our online career center including these valuable services: MonsterTRAK, Wells Fargo, Career Safe, and Career Key.

READING-MUHLENBERG CAREER & TECHNOLOGY CENTER

WORK BASED LEARNING Cooperative Education & Internships

RULES / GUIDELINES

1. All Work Based Learning (WBL) students must have school WBL forms completed and sign up for the school Remind App before starting the job/internship. Any student who is less than 18 years of age must also have a transferable work permit.
2. **ABSENT FROM SCHOOL????? – NO WORK!!!!!!!**
 - If you are absent from school in the morning, you may **NOT** go to work in the afternoon. **YOUR JOB IS PART OF YOUR SCHOOL DAY**. If you are at a **medical, social service, or court appointment** in the AM, you **may** go to work that day. However, you must bring a note **from the agency where you were**, to your attendance secretary, the next school day.
 - If you are ill, **YOU** must call your employer to inform him/her that you will not be reporting for work.
 - **IMPORTANT**: If your name is going to appear, for any reason, on your sending school absentee list, you must also **report off to Mrs. Albarran @ 610-921-7301. Failure to report off may result in removal from WBL.**
 - If **school is closed** for a holiday, in-service day, or a snow day, you **DO** go to work on those days, if you are scheduled. If you are not scheduled, you can work additional hours if your employer allows you to work. Labor Laws need to be followed.
 - If you are suspended **out of school**, you may not work at your WBL job. This includes jobs that are scheduled with after school hours.
 - **REPETITIVE ABSENCES** at school or work will result in your removal from Work Based Learning.
3. All WBL students are required to **report to the CTC every Monday**. Any additional classroom time is at the discretion of your program area teacher. You are responsible for communicating this to your employer. On the **first Monday of each month or the first day, you are at RMTC for the month**, you must report to the **Work Based Learning Office**, where you will sign in with Mrs. Hughes. Co-op students will record hours and earnings, and then return to your program area for the remainder of the school day. **Do not forget to bring your check stubs to record your hours and earnings!** Internship students will record hours. **If you miss two monthly meetings, you will be removed from WBL.**
 - Any violations of these rules will result in the following
discipline action: 1st violation – VERBAL WARNING
2nd violation – REMOVAL FROM WORK BASED LEARNING
4. When at work, you are guided by and are responsible to your employer. Be sure to follow all of the Employers' rules and regulations because you will be terminated for the same reasons as any other employee. Upon your first week of work, obtain a contact number in case you need to call your supervisor.
5. If your work experience is terminated for any reason, you must return to school the next day, and inform your CTC teacher and the Work Based Learning Coordinator.
6. If you wish to terminate your employment, you must discuss this with your teacher and the Work Based Learning Coordinator, and leave the job properly by giving the employer a two-week notice and a letter of resignation.
7. If you have any questions concerning the rules and guidelines of Work Based Learning, please contact the WBL coordinator at 610-921-7337.

STUDENT SIGNATURE

PARENT/GUARDIAN SIGNATURE