

**GREAT PLAINS TECHNOLOGY CENTER  
COURSE OF STUDY (Frederick)**

<b><u>Career Cluster:</u></b>	Manufacturing (MN)
<b><u>Career Pathway:</u></b>	Welding and Metal Fabrication
<b><u>State Program:</u></b>	Welding Advanced (MN00116010)
<b><u>Local Program:</u></b>	Combination Welder (MN0070025)
<b><u>Program Hours:</u></b>	Secondary Students: 960 Hours Adult Students: 960 Hours
<b><u>Instructor:</u></b>	Name: Brent Stone Office Number: (580) 355-2010 E-Mail Address: bstone@greatplains.edu
<b><u>Academic Credit:</u></b>	Secondary Students: 3 high school credits per year Adult Students: Transcript
<b><u>Prerequisites:</u></b>	None.

**Program Description:**

This program will teach students to do quality welding for a variety of construction and manufacturing jobs using multiple structural welding techniques. Instruction will cover welding theory and safety, fabrication, layout, print reading, symbols, math, welding codes, metal characteristics/properties and oxyfuel cutting. Students will learn to perform high quality welds in accordance with welding procedure specifications used in a variety of welding occupations. They will also gain an introduction to pipe welding skills, using SMAW, FCAW and GTAW techniques.

**Program Goals:**

Upon successful completion of this program, the student should be able to enter the welding field at the entry level, according to their individual skill and self-motivation.

Upon achieving the goals of this program, students will:

- Become competent in the fundamental skills of the occupation
- Become qualified for entry into the job market
- Pass at least one Occupational State of Oklahoma certification test
- Demonstrate independence in using problem solving and critical thinking techniques in completing all work assignments
- Develop the ability to work with limited or no supervision
- Accept and abide by the rules and regulations established by the school and/or place of employment

**Related Career Opportunities:**

- Structural Welder
- Pipe Welder
- Combo Welder
- Pipefitter
- Welder's Helper
- Production Welder

**Program Objectives:**

After successful completion of this program, the student will be able to:

- Perform various cutting operations with oxy-acetylene cutting equipment
- Perform shielded metal arc welding (SMAW) operations on steel in all standard positions
- Perform gas tungsten arc welding (GTAW) operations on steel in all standard positions
- Perform gas metal arc welding (GMAW) operations on steel in all standard positions
- Perform flux cored arc welding (FCAW) operations on steel in all standard positions
- Interpret welding related blueprints
- Layout and fit a welding project from a sketch or drawing
- Operate welding related equipment commonly found in the welding industry

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**DESCRIPTION OF COURSES**

<b><u>Course #</u></b>	<b><u>Course Name</u></b>	<b><u>HST</u></b>	<b><u>HSL</u></b>	<b><u>ADT</u></b>	<b><u>ADL</u></b>
<b>TI01650</b>	<b>General Safety</b>	<b>30</b>	<b>0</b>	<b>30</b>	<b>0</b>
<p>This is an introduction to basic welding safety, math, hand tools, power tools, blueprints, rigging, communication skills and employability skills. Also, an introduction to uses of safety equipment, protective clothing, and procedures for cutting metals are included. This course includes the OSHA 10-hour General Industry certification. Students who complete this course will receive an OSHA 10-Hour General Industry Course Card. You must complete the training within a six (6) month time period spending no more than 7½ hours (450 minutes) in one (1) calendar day. You must complete all the required modules prior to course completion and viewing the optional modules.</p>					
<b>TI02344</b>	<b>Welding Plans and Symbols</b>	<b>80</b>	<b>40</b>	<b>80</b>	<b>40</b>
<p>This is an introduction to Basic Blueprint Reading for Welders, which will include the ability to interpret a basic drawing with welding symbols. Time will also include reading tape measures and using math formulas to complete basic problems.</p>					
<b>TI02348</b>	<b>Advanced Weld Symbols and Plan Reading</b>	<b>30</b>	<b>0</b>	<b>30</b>	<b>0</b>
<p>This course covers the advanced aspects of Blueprint Reading, Measurement and Math. It also covers the Theory of Pipefitting and Layout. The use of tools used in pipefitting and layout is also covered, as well as the Nondestructive Testing used in the piping industry.</p>					
<b>TI02593</b>	<b>Fundamentals of Metal Fabrication</b>	<b>40</b>	<b>50</b>	<b>40</b>	<b>50</b>
<p>This course is an introduction to metalworking techniques and identifies different cutting processes. This course covers basic layout, measuring, cutting, forming, and assembling metal components using various tools and equipment. The course covers the importance of tools used to clean welds. This course will also cover the use of electrodes and basic electricity.</p>					
<b>TI02347</b>	<b>Advanced Metal Cutting and Fabrication</b>	<b>30</b>	<b>90</b>	<b>30</b>	<b>90</b>
<p>This course identifies oxyfuel cutting, air carbon arc cutting, and plasma arc cutting equipment, set-up procedures and safety requirements for all these cutting processes. Basic lay-out and measurement is also covered. This course introduces open root welds on pipe and covers uphill and downhill welding of pipe in the 2G, 5G, and 6G positions.</p>					

**TI02340 Shielded Metal Arc Welding 20 100 20 100**

This course is an introduction to SMAW and welding safety, how to connect welding current and set up arc welding equipment. The course covers the importance of tools used to clean welds. This course will also cover the use of electrodes and basic electricity. Other areas covered in this course are SMAW beads, fillet welds, welding joint fit-up and adjustments, and weld quality.

**TI02345 Advanced Shielded Metal Arc Welding 10 80 10 80**

This course covers the aspects of SMAW advanced welding practices. This course is an introduction to open V-groove welds and how to set up welding equipment for making an open V-groove weld. Procedures for making flat, vertical, horizontal, and overhead open V-groove welds are covered. It includes the weld quality, destructive testing of welds, and welding blueprints.

**TI02341 Gas Metal Arc Welding 20 100 20 100**

This course covers safety procedures for GMAW and FCAW equipment and explains the filler metals and shielding gases used to perform GMAW and FCAW. It also covers equipment setup and operations. Other areas covered in this course are GMAW, FCAW, and GMA-Pulse welding beads, fillet welds and advanced aspects of GMAW/FCAW welding. The course explains GMAW open V-groove welds and FCAW V-groove with backing. This course covers weld quality, destructive testing welds, and explains welding blueprints.

**TI02343 Gas Tungsten Arc Welding 30 90 30 90**

This course is an introduction to GTAW safety, equipment, filler metals, and shielding gases. Students will be instructed to set-up equipment and shielding gases, prepare base metal and make beads and fillet welds with and without filler metal.

**TI02346 Advanced Gas Tungsten Arc Welding 0 120 0 120**

This course covers the aspects of GTAW advanced welding practices. Instruction will be given on making open-root GTAW welds on plate and pipe using both combo-welding techniques (GTAW and SMAW) and 100% GTAW pipe welding techniques.

<b>Program Total:</b>	<b>Theory</b>	<b>Lab</b>	<b>Total</b>
High School Student: *	290	670	960
Adult Student:	290	670	960

\* High school students may complete this program in an adult enrollment status if necessary. Please see your instructor or counselor for details.

**Evaluation Policy:**

**Employability Grades (100 points per week; 40% of final grade)**

The employability skills grade is based on 20 points per day (which may include: attitude, attendance, safety, punctuality, cooperation, participation, clean-up, class preparation, school/classroom rules, and time management). Points will be deducted if these responsibilities are not met at the instructor's discretion. Students will be allowed to make up unearned employability points for **excused** absences only. Full credit will be given for assignments/tests that have been made up due to excused absences only (see Student Handbook).

**Performance Grades (40% of final grade)**

- While daily grades reflect the student's work attitude, progress chart grades reflect the student's ability to perform the tasks assigned in the various welding processes. Upon completion of each task, the student's performance will be evaluated using a check list provided to each student. No performance grade below 85% will be accepted by the instructor.

### **Test Grades (20% of final grade)**

- Theory tests will be given at regular intervals. These will be objective tests designed to test the student's technical knowledge. All safety tests must pass with 100% accuracy.
- Skill tests will be given at the end of most units to make sure students are developing the skills necessary for entry into the welding field. Skill tests will not only count as weld grades but will also be counted as a test grade. Each will be worth 100 points.
- Students who do not reach skill tests on the progress chart or do not complete them by the end of the grading period will receive a "0" for both weld grade and test grade.
- If a student has time in the next grade period to complete a skill test that was missed, they may do so, but only for competency profile requirements; no test grade will be given.

### **Final Grade**

Semester grade will be calculated by averaging grades in each category and summing each category according to their assigned weight. Progress reports will be sent to home schools at six and twelve-week intervals each semester as required or requested. Grades are accessible on-line at <http://sonisweb.greatplains.edu/studsect.cfm>

### **Grading Scale:**

The grading scale as adopted by the Board of Education is as follows:

A	=	90 – 100
B	=	80 – 89
C	=	70 – 79
D	=	60 – 69
F	=	Below 60
S	=	Satisfactory
W	=	Withdrawn
I	=	Incomplete
N	=	No Grade (Refer to Student Handbook)

### **Make-Up Work Policy:**

**All Make-Up Work Is The Responsibility Of The Student.** Make-up work will be handled as specified in the GPTC Student Handbook and the Welding Student Handbook. Please be sure to read and understand all student policies, especially make-up of assignments, tests and employability due to absences. Students should always arrange for any make-up work with the instructor as per the Student Handbook. Students should keep track of his or her progress and grades.

### **Attendance Policy:**

For specific information related to attendance and tardiness refer to the Student Handbook. Students should keep a written record of their absences and tardiness.

### **Course Requirements and Expectations:**

The general course requirements and expectations include:

- Teaching methods consist of lecture and "hands on" projects.
- The student must demonstrate the ability to apply safety to all aspects of the welding field.
- All students must adhere to the policies and procedures in the GPTC Student Handbook.
- It is highly recommended that the student have purchased or attained the required tools and equipment for employment as a welder. Possessing a valid driver's license will also benefit the student and is recommended.

### **Student Behavior Includes:**

- All students will wear welding class uniforms. Uniforms will be worn from the beginning of the class period to the end of the class period, or until shop cleanup is finished. This includes during any period of time when a student may be out of the shop or classroom 155.
- Overalls will be worn properly and not tied around the waist at any time. Overalls in need of repair will be fixed within 3 days or replaced. Students may not alter their overalls in any way without the specific permission of the instructor. Overalls must fit properly or be replaced.
- Students will also be expected to wear their student ID badge any time they are on campus, this includes break times. Student ID badges will not be altered in any way. Students will wear their overalls properly while on break.
- Students will wear boots that completely cover the feet, laced properly. Students will wear clear safety glasses at all times while in the shop environment. Clear prescription glasses will be permitted. Safety glasses may not be altered without the specific permission of the instructor.
- Shorts will not be permitted at any time. Full length pants are to be worn as this is a working environment. Tank tops or sleeveless shirts are not to be worn at any time. No piercing at all visible shall be worn at any time.

***NOTE: For additional information or questions regarding the GPTC School policies and procedures, please refer to the Student Handbook and/or the Instructor.***

### **Industry Alignments:**

- National Center for Construction Education and Research (NCCER)
- American Welding Society (AWS)
- National Organization for Career and Technical Industry (NOCTI)

### **Certification Outcomes:**

**Tier 1** – Certifications Recognized, Administered and/or Endorsed by Industry

- DOL: Oklahoma Welder Certification (4411) (*6G Fixed Inclined Position – Oklahoma Welder Certification*)

**Tier 2** – Certifications Endorsed by Industry Organizations

- ODCTE: Cutting Process Operator (4305)
- ODCTE: Flux Cored Arc Welder (4303)
- ODCTE: Gas Metal Arc Welder (4302)
- ODCTE: Gas Tungsten Arc Welder (4304)
- ODCTE: Shielded Metal Arc Welder (4301)
- OSHA 10: General Industry (5302)

### **CIP Code and SOC Code Crosswalk:**

- CIP Code – 48.0508
- SOC Code – 51-4121.06

### **OCAS program code:**

- 9707 – Welding MN (first year)
- 9708 – Welding MN (second year)

**Instructional Materials:** *Students are not required to purchase textbooks or supplemental reference materials.*

#### **Textbooks:**

Graves, W.V. The Pipe Fitters Blue Book. 0970832109. Graves Publishing, 1973.

Molnar, George A. Practical Guide to Butt Weld Pipe Fitting. Tech Aid Books, 1982.

National Center for Construction Education and Research (NCCER). Welding Level 1. 0-13-102574-0.

Upper Saddle River: Pearson Prentice Hall, 2003.

National Center for Construction Education and Research (NCCER). Welding Level 2. 0-13-102581-3.

Upper Saddle River: Pearson Prentice Hall, 2003.

Welding Class Student Handbook.