



# SUL ROSS STATE UNIVERSITY

A Member of the Texas State University System

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## IT 2307 WELDING TECHNOLOGY Syllabus Spring 2017

Instructor: Mr. Ray Bullock  
Class times: TR 9:30-10:45  
Lab Times: TR 11:00-12:15

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Office Hours: By Appointment

**ACCESSIBILITY:** It is Sul Ross State University policy to provide reasonable accommodation to students with disabilities. Qualified students with disabilities needing academic or other accommodations to ensure full participation in the programs, services and activities at Sul Ross State University should contact the Disability Services Coordinator Grace Petty, Accessibility Services Coordinator, Ferguson Hall Rm. 112, (432) 837-8203.

This course is designed to provide the student with a technical understanding of the equipment, materials, and processes required for oxyacetylene welding, cutting, brazing, and electric arc welding (SMAW). Time permitting, an introduction to GMAW (MIG welding) and GTAW (TIG welding) will be included.

Topics will include the following (though not necessarily in this order):



EQUIPMENT, BRAZING, GAS METAL ARC WELDING (MIG WELDING), GAS TUNGSTEN ARC WELDING (TIG WELDING), GASSES, INSPECTING AND TESTING, OXYFUEL CUTTING, OXYFUEL WELDING, PROTECTIVE CLOTHING, SAFETY, SHIELDED METAL ARC WELDING (ARC WELDING), SHOP ORGANIZATION, SOLDERING, TECHNICAL DATA FOR MATERIALS AND SUPPLIES,

### **ATTENDANCE**

Attendance is necessary! Missing three hours of class is considered excessive. Attendance will be taken each scheduled class period in accordance with University and Departmental Policy. Attendance will count as part of the daily work grade. Everyone starts with 250 points at the beginning of the semester for attendance and each absence (regardless of the reason) will cost 10 points. After 9 hours of absences the instructor may drop a student from the course with a grade of 'F', in accordance with the Student Handbook. Because much of the learning in this course takes place in the form of laboratory activities, attendance in the lab will also be considered in the final grade. Attendance will be taken at the beginning of each class period and once taken will not be changed. If you are tardy and miss the roll call you will be charged with one absence. Labs will count for an additional 250 points in attendance (10 points per hour up to a maximum of 250 points). Additional time spent in the Lab will be considered in the final grade. this time will be accounted for using sign in sheets available in the lab.

## CELL PHONES

Cell phones are not permitted in the classrooms or labs. Leave them in your car or put them in your locker.

## CLASS STRUCTURE

This course is designed to be a guided study and not just dissemination of information. It will be run in a lecture/demonstration/lab format. Lectures will utilize overheads, demonstrations, and power points. The lectures will be the foundation upon which the lab work is built. There may be some step-by-step guided practice, one-on-one assistance, demonstration, and possibly films during the scheduled class time. You will have to study, read, practice, and use your problem solving skills to discern and apply the information assigned. It is essential that you be in attendance for the scheduled meetings so you get your questions answered and the help you need. Some meeting days will also be used as time to work together on laboratory assignments. **It is also important that you plan on working in the lab outside scheduled class time.**

## ASSIGNMENTS



Daily work will consist of reading, worksheet pages, welding practice projects, record sheets, and equipment proficiency demonstrations. Much of the daily work will be completed in preparation for classroom discussions and tests. There will be several laboratory assignments required for this course. Some of the laboratory exercises and projects will be completed together during the scheduled class time. Several of the lab assignments will require written reports, sketches, and drawings pertaining to the processes being utilized. Instructions regarding the format of the written material will be distributed closer to the time of assignment. It is essential that everyone be in attendance for the scheduled meetings because that is where the assignments will be given. It is essential that you keep up with the assignments so they don't pile up at the end of the semester.



**Due dates:** All assignments and projects will be given due dates which **must** be met. All assignments will be due by 8:30 pm on the assigned day. **Assignments and projects will be docked one letter grade for each calendar day they are late.** Work will be accepted after the fourth late day so the records show it was completed, but no grade will be given. You will be responsible for meeting the deadlines whether you miss class or not. All work must be completed and turned in by Thursday November 26.



**Grading:** All work will be graded on specific criteria given at the time of the assignment during class. Welds will be graded on correctness of pattern, neatness, correct preparation, accuracy, weld placement, and workmanship. Some welds will be graded on tested strength. Worksheet pages will be graded on a points-per-answer basis following the criteria specified in the assignment. All worksheet assignments will be graded with the use of an answer key. Any other papers assigned will be graded on a percentage basis (at the instructors discretion) based on content, presentation, accuracy in style, correct grammar, and format. All grades are converted to a percentage in the grade book. That percentage will be tallied in the computer grade book resulting in a final percentage for each of the graded areas of the course. The written portion of any research projects will be graded on a 100-point percentage basis when turned in for the final time. Students will be responsible for meeting all deadlines whether in attendance or not. Remember, the daily work will be the bulk of the final grade.



## GRADES

Final grades will be determined by totals in these areas:  
10% quizzes and unit tests

- 5% final exam (comprehensive)
- 70% daily work: assignments, lab work, and attendance
  - 10% worksheets and paperwork
  - 15% oxy-acetylene cutting assignments
  - 25% oxy-acetylene welding assignments
  - 10% brazing
  - 25% arc welding assignments
  - 5% (MIG) & (TIG) assignments (if assigned)
  - 10% attendance
- 10% required welding project
- 5% instructor's discretion grade to include attitude, lab care, and work ethic

In the event that any of the grade categories are not assigned during the course, its percentage will be distributed evenly between the other categories at the same level. Final points will be converted to percentages for grades.

A= 100 - 90; B= 89 - 80; C= 79 - 70; D= 69 - 60; F= 59 - 0

Final grades will be assigned as follows:

**Grade of A:** All required assignments completed with an average of 90% or better.

**Grade of B:** All required assignments completed with an average of 80% to 89%.

**Grade of C:** Work submitted with an average of 70% to 79%. If any required assignments are not completed a grade of 'C' will be the highest possible grade awarded.

**Grade of D:** Work submitted with an average of 60% - 69%.

**Grade of F:** Work submitted with an average of 59% or less.

There will be **NO INCOMPLETES** given at the end of this semester.

## READING

The text is required for this course:

Welding-Principles and Applications (current edition) by Larry Jeffus. Published by Cengage Learning.

## LAB TIME

As with all Industrial Technology classes, there will be a substantial amount of lab work to be done as a part of this course. What you learn and retain will come mainly from the practical lab work you complete. **A minimum of 6 hours outside of scheduled class time each week** for researching, reading, studying, and lab work is normally expected in any University course. The lab you registered for is considered scheduled time and those hours will be considered in your final grade under attendance. The scheduled lab hours are not considered part of the 6 hours outside study time. You will be able to do some of your lab work within the scheduled class time and you will be given some release time for the lab work. However, there will not be enough time during the scheduled class period for completing all the labs necessary. For any extra time needed, the lab will be scheduled to fit your needs as much as possible.

The lab will be open for your use during open building hours (usually 8 - 5 daily). Lab assistant hours will be posted once they are established. The lab may be open some evenings as well when the lab assistant schedules are complete. Those working during the evenings will be required to leave when the lab assistant leaves. No one will be left in the building without a lab assistant. Be advised that the lab assistant on duty may not be highly skilled in the particular lab in which you are working. No weekend hours are planned at this time.

### EQUIPMENT and SUPPLIES



Most of the major equipment you will need for completing your assignments will be supplied in the lab. However, the equipment will have to be shared by everyone in the class for lab assignments and in some cases there is only one piece of equipment. Please be careful with the equipment.

These you will be required to purchase:

Safety glasses or goggles (may be purchased through the department)

Work Gloves (if desired – things can be hot and sharp)

Lab coat or apron if you want one

Leather welding vest or coat (if desired)

Any other special tools you wish to use that we do not have in the lab

**NOTE:** Safety glasses are **required** any time you are working in the lab.



**Supplies** – The supplies you need will be provided through the department but not by the department. You will be required to purchase some metal blanks for your welding exercises.

You will be required to pay a small materials fee before you can begin working in the lab.



**Materials Fee** - The materials fee is set at **\$25.00** for Fall 2015. This is the fee for the assigned projects, practice, and welding exercises required to complete the course. If you wish to do more than the assigned work, or have to repeat a project you will be responsible for paying for the extra material you use, before you begin. The material fee only covers the assigned projects completed once. The fee may be paid in the departmental office if paid by cash or check; Cashier's office if paid by credit card. (You will be required to obtain the account number before you pay your fee at the cashier's office. If you pay at the cashier's office you will be required to show the receipt to the instructor prior to beginning any lab work.)

### STORAGE

The lockers in the hallway may be checked out and used for storing your equipment and supplies. These lockers must be signed out in the IT main office. You must supply your own lock. You may sign out more than one locker if you need the space for the projects you are working on. **DO NOT LEAVE PROJECTS OR EQUIPMENT OUT ON THE TABLES IN THE LAB! YOU WILL LOSE THEM!**

### QUIZZES

You will not be given notice for quizzes. They will be either written or practical in nature. There will be no make-up quizzes. Quizzes will count as 1/8 a test grade.

### TESTS

Everything discussed in class and everything assigned in the reading could be included on tests and quizzes. Prior notice will be given for all unit tests. They will be written in nature and will cover terminology processes, and lab practices. You must be in attendance for the tests. There will be no make-up tests. Expect 6 unit tests during the semester.

### **MIDTERM EXAM**

There will be no midterm exam this semester.

### **FINAL EXAM**

The final exam will be given at its scheduled time during May. You can expect a 2-hour written exam. The exam will only be given on the day it is scheduled so **DO NOT** make any other plans for that time.

### **AMERICAN WELDING SOCIETY CERTIFICATION**

An AWS Certification test is available at the end of the course. This certification is optional and there is an additional cost payable by the student involved.

### **TEA AFNR Educator Standards**

The teacher understands:

1. And applies mechanical principles and power technology in agriculture,
2. Agricultural construction and metal fabrication, and
3. Technology and the use of computers and related technologies in agricultural production and management.

## **2307 Welding Technology**

### **Objectives**

Industrial Technology 2307 is a beginning course in welding designed to provide students with the basic principles of welding processes. It is designed to give the student the opportunity to learn the fundamentals and manipulative skills required for completing welds using oxyfuel and electroarc welding.

Upon completion of this course the student should be able to:

- Describe the different forms of welding processes and the proper time and place for their use.
- Explain why standards are important in the welding industry.
- Define the following types of welding
  - Oxy-acetylene welding
  - Arc (AC) welding
  - Arc (DC) welding
  - Carbon (arc) welding
  - Inert gas welding
  - Brazing and brass welding
- Select and use the most effective welding technique and equipment for a given scenario.
- Identify the Safety precautions for the following categories as they pertain to welding.
  - Ultra-violet rays
  - Infra-red rays
  - Fire hazards
  - Cylinder use and care
- Demonstrate correct techniques while successfully completing oxyfuel welding without filler, with steel filler, and with brass.
- Demonstrate correct cutting techniques while successfully completing gas cutting assignments.
- Identify the different types of rods, joints, flames, and fluxes used in Oxy Acetylene Welding processes.
- Use the correct terminology when describing cutting and welding torches.
- Identify common welding joints
- Demonstrate correct techniques while successfully completing AC Arc welding practice assignments.
  - Motion of electrode
  - Selection of electrode
- Use the correct terminology when describing AC arc welding in terms of setting up the machine
  - Heat control
  - Accessories
- Demonstrate proper care of equipment
  - Care of leads
  - Care of clamps and holders
- Demonstrate correct techniques while successfully completing DC Arc welding practice assignments.

- Setting the machine according to the job
- Motion of electrode
- Selection of electrode
- Restarting a continuous bead
- Running a bead with a weaving motion
- Running a bead with a shipping motion
- Polarity
- Selection of welding electrodes
- Demonstrate a basic understanding of Inert gas welding by completing introductory projects
  - Describe the operation of a GMAW (MIG) welder
  - Describe the operation of a GTAW (TIG) welder
- Solve welding problems, given as assignments, by selecting the correct processes and describing an appropriate solution.