
Instructor

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Instructor
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Office Hours: MWF 11-12
3-4
TR 3-5
Or by appointment

Time and Location

Class: MWF 1:00-1:50
Lab: MWF 2:00-2:50
Industrial Technology Bldg. Room 103

Course Description

The objectives of this course of study are to provide the student with an opportunity to acquire basic knowledge and understanding of the fundamentals of general metalworking. Materials discussed in this course will consist of sheet metal, steel, and aluminum. Processes will include foundry casting, forging, bending, soldering, riveting, separating and combining techniques, and finishing processes. Topics will include: ANNEALING, FASTENERS, FORGING, FOUNDRY (METAL CASTING), IRON BENDING, RIVITING, SHEET METAL TECHNIQUES, TEMPERING, TURNING (introduction only), MILLING (introduction only).

Course Objectives

This course of study was designed as an exploratory course in industrial metals processes. Students will explore problems of pattern development, shearing, cutting, forming, bending, folding, and fabricating sheet steel as related to the sheet metal industry. Investigation of other industrial processes and techniques will be studied. These areas include: industrial foundry processes; cold metal forming using bending, twisting, hammering, combining techniques; forging and tempering techniques. Upon completion of this course the student will be able to:

- Demonstrate safe working habits in the metals facility.
- Develop patterns for sheet metal products in the form of drawings and flat layout developments.
- Transfer developments in the form of patterns to metal.
- Describe in writing the properties of various materials such as black iron, galvanized iron and steel sheets, tin plate, cold rolled steel, hot rolled steel, aluminum, and brass.
- Describe in writing and demonstrate through use in the lab, the proper care and use of various hand and power metalworking tools.
- Identify materials such as black iron, galvanized iron and steel sheets, tin plate, cold rolled steel, hot rolled steel, aluminum, and brass from specimens provided.
- Demonstrate the proper methods of working with materials such as black iron, galvanized iron and steel sheets, tin plate, cold rolled steel, hot rolled steel through the completion of exercises and projects.
- Determine amount of stock required for various selected products.
- Select the correct stock and material for particular assigned and selected projects.
- Read measuring instruments such as scales, micrometers, dial and Vernier calipers, and gage rules.
- Describe and demonstrate the soldering process using soldering coppers.
- Describe, recognize, and demonstrate sheet metal seams including wired edges
- Identify and use various fasteners found in the metalworking industry.
- Complete a simple forging project
- Identify and describe the tools used in the forging process
- Identify and describe the steps in heat treating metals

- Describe, in writing, the foundry process
- Identify the tools used in foundry
- Create a single sided sand casting
- Create a double sided sand casting
- Identify basic milling tools
- Identify basic lathe tools
- Demonstrate the proper use of a tap and die for threading metals

Reading

The text is required for this course is:

Modern Metalworking by John R. Walker. Published by The Goodheart-Willcox Company, Inc. (2000)

There will also be some reading material in the form of handouts that contain additional information. Students will be responsible for that information on tests and quizzes.

Accessibility:

Sul Ross State University is committed to equal access in compliance with the Americans with Disabilities Act of 1973. It is the student's responsibility to initiate a request for accessibility services. Students seeking accessibility services must contact the Counseling and Accessibility Services, Ferguson Hall, Room 112. The mailing address is P.O. Box C-171, Sul Ross State University, Alpine, Texas 79832. Telephone: 432-837-8203.

Attendance

Attendance is necessary! Missing six 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 400 points at the beginning of the semester for class attendance - each absence (regardless of the reason) will cost 10 of those points. In accordance with the Student Handbook, after 9 hours of absences (9 days) the student will be dropped from the course with an 'F'. Attendance will be taken at the beginning of each class period and once taken, will not be changed. If a student is tardy and misses the roll call they will be charged with one absence. Because much of the learning in this course takes place in the form of laboratory activities, time spent, in the lab will also be considered in the final grade. Lab attendance will be taken and a lab sign-in sheet will be available every day. Lab attendance will worth up to 390 points (10 points per hour in the lab). Lab attendance will begin with the third week of class and will be monitored, as much as possible, throughout each day.

Class Structure

This course is designed to be a guided study and not just dissemination of information. It will be run on a lecture\discussion\activity format. Lectures will utilize overheads, power points, demonstrations, videos, and visits to the internet. Lectures will be given primarily to enhance and answer questions about the material that should have been studied prior to the class period. There may be some step-by-step guided practice, individual assistance, and demonstrations during the scheduled class time in areas where there seems to be a need. A great deal of the study will be left to the student to accomplish on their own. It is essential that everyone be in attendance for the scheduled meetings for sharing information, demonstrations, activities, and so questions are answered. Lectures and demonstrations will not be conducted on an individual basis because of missed classes.

Time Commitment

Students should be prepared to spend 4-6 hours per week outside of class on assignments that will Include: Homework, Reading Assignments, Lab work and studying for tests and quizzes.

Phones & Electronic Devices

No electronic devices other than calculators are allowed in the class or lab.

Assignments

Daily work will consist of reading, worksheet pages, written assignments, drawings, metalworking projects, project record sheets, and equipment proficiency demonstrations. There will be several laboratory metalworking 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 projects being made. Instructions regarding the format of the written material will be distributed at the time of assignment.

Due dates: All assignments and projects will be given due dates which must be met. All assignments will be due by 4:30 pm on the assigned day. Assignments and projects will be accepted if they are turned in late. Late assignments will lose ten points per calendar day. Students are responsible for meeting the deadlines even if classes are missed.

Grading: All work will be graded on specific criteria given at the time of the assignment during class. Daily work and laboratory projects will be graded on a point per answer basis, a percentage basis, or simply points for completion. All worksheets or workbook assignments will be graded on a points-per-answer basis with the use of an answer key. Rubrics will be given for all projects with a breakdown of graded criteria. Project grade sheets will be broken into these general categories: accuracy, neatness, content, adherence to standards, safety procedures followed, teamwork (if applicable), and workmanship. All grades are converted to a percentage in the grade book. Percentages will be tallied in the grade book resulting in a final percentage for each of the graded areas of the course. Any other papers and drawings assigned will be graded subjectively on a percentage basis which will include content, presentation, accuracy in style, grammar, format, and clarity.

Grades

Final grades will be determined in the following manner:

10% quizzes and unit tests

10% final exam (comprehensive)

70% daily work broken down as follows

80% projects

25% Sheet metal work

10% Patterns

5% Threading

10% Wrought iron bending

5% Welding

10% Single-sided casting

10% Two-sided casting

10% Forging

5% Heat Treating

5% Mill

5% Lathe

10% workbook pages and other paperwork

10% attendance

10% instructor's discretion, work attitude, shop and tool care

In the event one of the above categories is not completed during the course, that percentage will automatically be divided between the other categories at the same level.

All assignment points will be converted to percentages for individual assignment letter grades.

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

Grades will be earned on the basis that "C" is average work, "B" is above average work, and "A" is well above average work. Barring unusual circumstances, there will be **NO INCOMPLETES** given at the end of this semester.

Grading

All work will be graded on specific criteria using the following guidelines. Any worksheets will be graded on a points-per-answer basis. Any sketches and drawings assigned will be graded on a 100 point (percentage) scale. Criteria for grading will include: accuracy of content, appropriateness of content for assignment, presentation, clarity. Projects in the lab will be graded on accuracy, neatness,

content, adherence to standards, adherence to assignment, and workmanship. Graded items will be broken into specific categories and presented on grade sheets given at the time the assignments are given.

Academic Honesty

All students are expected to do their own work at all times. Any dishonest conduct will be promptly rewarded with an immediate "F".

Lab Time

As with all the Industrial Technology classes, there will be a substantial amount of lab work to be done. Normally 6 hours outside of scheduled class time each week for researching, reading, and general homework is expected for college level work. All of the required research, lab work, and practice will not be able to be completed within the scheduled class time. There may be some release time from class to complete some of the work. There will also be some group work students will have to schedule on their own. The lab will be open for use during open building hours (usually 8 - 5 daily). The lab may occasionally be open other evenings and 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 there may not be a knowledgeable lab assistant available at all times. No regular weekend hours are planned at this time.

Equipment and Supplies

Most of the equipment needed for this course and lab work will be supplied through the department. However, there is not enough equipment for everyone to use at the same time so some work may have to be done in pairs or groups. The equipment will have to be shared. The school equipment will **NOT** be allowed out of the lab, which means all students must find time to be in the lab if the scheduled lab time is not enough to finish the work.

Items you will be required to purchase for the lab include:

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

- Gloves (if desired)

- Lab coat or apron (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 - Students will be responsible for purchasing the supplies they will use in this course. There will be materials fee that will cover the materials you use for your assigned projects. If the issued materials are damaged, the student will be responsible for purchasing the additional material. If anyone wishes to do more than the assigned work they will be responsible for paying for the additional material. Some supplies may be purchased from the department and others must be found elsewhere.

Other materials - finishing materials such as paint are the student's responsibility.

Materials Fee - The materials fee will cover the metals used for assigned projects in this course. However, it only covers the material for one of each project. It is set at **\$25.00** for the Fall 2014 semester based on the average usage and cost of materials. The fee may be paid in the departmental office if paid with cash or check. If a credit card or debit card is used it must be paid in the cashiers' office. You will be required to obtain the account number before you pay your fee 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 with the secretary in the IT main office. You must supply your own lock. Do not leave any of your work or equipment lying around in the lab!

Quizzes

You will not be given notice for quizzes. They will be primarily written in nature. There will be no make-up quizzes.

Tests

Everything discussed and everything in the assigned reading, including laboratory material, is fair game for tests and quizzes. I will try to announce the Unit Tests the day before they will be given. You will have a test schedule to follow so it will be your responsibility to be in attendance the day of scheduled exams. Tests will be written in nature using various styles of questions covering terminology, equipment, processes, and other items discussed. There may also be some practical exercise portions on each exam. Attendance for the tests is mandatory; no makeup tests will be given.

Midterm Exam

There will be no midterm exam given.

Final Exam

The final exam will be Monday, December 8 @ 12:30 pm. The exam will include written, practical, and analytical portions, and will be comprehensive of the entire semester. Do not make any other plans for that day and time.

IT 1306 Beginning Metalwork Technology

Fall 2014

Tentative Reading Schedule

The following is a tentative reading schedule for the semester. The dates provided are the dates the reading is assigned and the reading is to be completed by the following class day.

Date	Reading
Monday August 25 (1)	Chapter 1: Technology and Careers Chapter 2: Classifying Metals Chapter 3: Understanding Drawings Chapter 4: Safety Practices
Monday September 8 (6)	Chapter 5: Measurement Chapter 12: Sheet Metal HANDOUT Seam and hem info
Monday Seprtmber15 (9)	Chapter 6: Layout Work Chapter 7: Hand Tools Chapter 8: Hand Tools That Cut
Wednesday September 24 (13)	Chapter 9: Hand Threading Chapter 10: Fasteners Chapter 13: Soldering and Brazing
Friday October 3 (17)	Chapter 14: Sand Casting Chapter 15: Metal Casting Techniques HANDOUT Lab processes for foundry
Friday October 10 (20)	Chapter 23: Grinding Chapter 24: Drills and Drilling machines Chapter 25: Sawing and cutoff machines
Friday October 22 (23)	Chapter 17: Forging Chapter 18: Heat Treatment of Metals Handout: Heat treating
Friday October 24 (26)	Chapter 16: Wrought Metal
Monday November 3 (29)	Chapter 26: Metal Lathe Chapter 30: Milling Machines

IT 1306 Beginning Metalwork Technology

Fall 2014

Tentative Test Schedule

The following is a tentative test schedule for the semester. The dates provided are the dates the test will be given. You should have all the associated lab work completed by that date because it will be included on the test.

Date	
Test 1 Friday September 12 (8)	Chapter 1: Technology and Careers Chapter 2: Classifying Metals Chapter 3: Understanding Drawings Chapter 4: Safety Practices
Test 2 Monday September 29 (15)	Chapter 5: Measurement Chapter 12: Sheet Metal HANDOUT Seam and hem info
Test 3 Monday October 13 (21)	Chapter 6: Layout Work Chapter 7: Hand Tools Chapter 8: Hand Tools That Cut Chapter 9: Hand Threading Chapter 10: Fasteners Chapter 13: Soldering and Brazing
Test 4 Wednesday October 29 (28)	Chapter 14: Sand Casting Chapter 15: Metal Casting Techniques HANDOUT Lab processes for foundry Chapter 23: Grinding Chapter 24: Drills and Drilling machines Chapter 25: Sawing and cutoff machines
Test 5 Monday November 17 (36)	Chapter 17: Forging Chapter 18: Heat Treatment of Metals Handout: Heat treating
Test 6 Wednesday December 3 (41)	Chapter 16: Wrought Metal Chapter 26: Metal Lathe Chapter 30: Milling Machines
FINAL EXAM	Monday, December 8 @ 12:30 pm
Total number of class days (41)	