THE UNIVERSITY OF THE BIG BEND

IT 2306
Machine Shop Technology
Spring 2026

Instructor
Mr. Terrence Ross
Instructor
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Office Hours: by appointment

Time and Location
Class times: MW 13:00 – 15:50 Jan.14,2026 – May 06,2026
Lab Times: MW 13:00 – 15:50
Industrial Technology Bldg. Room 103 / Room 100 Lab

Course Description
The course is an introductory course in the use of precision measuring instruments and metal working machines. This course is intended to be an introduction to the machine shop practices of industry. Shop and machine safety, hand tool and machine operation, materials characteristics, are a few of the topics covered in this course.

Course Objectives
Course Overview / Shop Safety
Outside Micrometer Caliper Overview / Lathe Nomenclature and Lathe Drives
Outside Micrometer Caliper Review / Lathe Safety and Lathe Tooling Systems.
Lathe Basics and Determining Lathe Cross Slide & Compound Slide
Leadscrew Constants Using a Dial Indicator
Outside Micrometer Caliper Test / Lathe Turning with A Four Jaw Chuck
Using A Hermaphrodite Caliper and Fractional Rule / Lathe Tailstock Adjustments
Further Lathe Turning Using Leadscrew Constant Details and Tailstock Adjustments
Feeds and Speeds Calculations / Finish Turning with A 3 Jaw Scroll Chuck
Lathe Collet System Overview. Introduction to Small Lathes. Tool Bit Grinding.
Feeds and Speeds Review / Small Lathe Turning Exercise
Groove Cutting and Measurement. Vernier Calipers. Dial Calipers
Angle Conversions / Groove Cutting Practice
Surface Plate Basics. Test Indicator Basics. Gage Block Basics.
Calculating Gage Block Stack Heights / Assembling Gage Block Stacks
Feeds And Speeds Test Due / Plane Trigonometry Introduction / Angle Measurement
Sine Function and Sine Bar Theory / Sine Bar Setups
Trigonometry Test Due / Sine Bar Lab Exercises
Taper Calculations. Sine Bar Test Due / Taper Attachment. Turning A Taper
Taper Cutting Practice. Taper Inspection
Gage Block Test Due. Taper Test Due / Compound Rest Taper Cutting
Thread Nomenclature and Calculations / Cutting Threads On the Lathe
More Thread Calculations / Thread Cutting Practice
Milling Machine Introduction. Milling Machine Safety
Milling Machine Feeds and Speeds Calculations / Milling Machine Cutters
Milling Machine Operations Theory / Milling Machine Operations Demonstration
Thread Calculations Test Due / Milling Operations Practice
Tap Nomenclature. Drill Nomenclature. Drilling Speed Calculations. / Drilling and Tapping in the

Milling Machine. Drilling and Tapping Practice.
Trigonometry Functions for Hole Locations / Piece Part Pick Up Methods in The Mill
Feeds and Speeds Test Due / Piece Part Pick Up Practice
Drilling A Hole Pattern Using Lead Screw Dials and Digital Readouts.
Surface Plate Layout Theory / Surface Plate Layout Practice. Pick Ups and Checking
Hole Locations Test Due / Hole Boring in The Milling Machine
Hole Boring Practice. Surface Plate Inspection Practice
Gears and Gearing Calculations / Surface Grinder Theory and Practice
Project Analysis and Planning / Cutting Tapered Treads. Tread Cutting Practice.
Our Shop Projects Analysis / Machining Our Shop Projects
Gearing Test Due / Machining Our Shop Projects
Lead Screw Test Due / Machining Our Shop Projects
Advanced Angle Inspections. Dovetail Calculations / Creating Angles in The Milling Machine
Groove Cutting Test Due. Dovetail Test Due / Lathe Attachments. Attachment Practice.
Mechanical Design Analysis / Use of Special Lathe Tools
Mechanical Design Project Due / Course Material Review

Reading

Text required for this course is: Technology of Machine Tools / Steve F. Krar - 7th ed.
Publisher – McGraw-Hill Copyright 2011
ISBN 978-0-07-351083-5

Additional reading material will be provided.

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 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 in a lecture\discussion\lab format. Lectures will utilize demonstrations. Lectures will be given primarily to enhance and answer questions about the material that should have been studied prior to the class period. The student will be responsible for asking questions when they run across something they do not understand. The student will be expected to use their problem solving skills in coming up with solutions to the lab problems. There may be some step-by-step guided practice, one-on-one assistance, and demonstration during the scheduled class time in areas where there seems to be a need. It is essential that you are in attendance for the scheduled meetings so you get your questions answered and do not miss the shared information and demonstrations. Several of

the scheduled class times may be scheduled as lab time as well. It is also important that you plan on working in the lab outside scheduled class time.

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 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 by totals in these areas:
25% Take home tests and exercises.
5% Final exam (comprehensive)
35% daily work: To be determined.
And Lab proficiency tests and setup.
30% Attendance
5% instructors discretion grade to include attitude, lab care, and work ethic/
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 major equipment you will need for completing your assignments will be supplied in the lab. . Please be careful with the equipment. These you will be required to purchase:

- Safety glasses or goggles
- Gloves (things can be hot and sharp)
- 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.

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 Spring 2015 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!

Tests Take-home
Everything discussed and everything in the assigned reading, including laboratory material, is fair game for tests. 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. No makeup tests will be given.

Midterm Exam

There will be no midterm exam given.

Final Exam

The take home final exam will be made available. The exam will include written, practical, and analytical portions, and will be comprehensive of the entire semester. Take home final will be due on last day of final exam period or before, no exceptions.

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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
TBD	

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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	
TBD	
Final Exam	5/9/26