



RANGER COLLEGE
STEPHENVILLE, TEXAS

COURSE SYLLABUS

Precision Tools and Measurement

MCHN 1320

3 credit hours

Fall 2019

INSTRUCTOR:

Jeff Snow

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OFFICE: RCEC ATC
PHONE: (254) 968-1075
HOURS: [8-5 M-R]

I. Texas Core Curriculum Statement of Purpose

Through the Texas Core Curriculum, students will gain a foundation of knowledge of human cultures and the physical and natural world, develop principles of personal and social responsibility for living in a diverse world, and advance intellectual and practical skills that are essential for all learning.

II. Course Description

An introduction to the modern science of dimensional metrology. Emphasis on the identification, selection, and application of various types of precision instruments associated with the machining trade. Practice of basic layout and piece part measurements while using standard measuring tools.

III. Required Background or Prerequisite

None

IV. Required Textbook and Course Materials

Item	Title	Author	Publisher	Edition	ISBN
1	Tooling U	Tooling U	ToolingU/SME	Ver 1.0/2.0	

V. Course Purpose

The main goal of this course is to provide a deep understanding of the fundamental machining skills needed for career success in a manufacturing environment, and an in-depth knowledge as a base for strong foundational skills without becoming difficult to comprehend or retain.

VI. Learning Outcomes

Perform common methods of measurement conversion; determine the degree of precision measurement required; identify various types of precision instruments and their applications; list maintenance procedures on various types of measuring instruments; interpret and confirm blueprint requirements; convert between English and metric units; compute total tolerances of

parts; calibrate various types of precision measuring instruments to a standard; and select and use precision measurement tools.

VII. Core Objectives

This course meets the following of the six Core Objectives established by Texas:

[FOR CORE CLASSES: Check all of the **required** core objectives for the course, as shown on the Table of Foundational Component Areas (provided separately). If you choose to check any **optional** core objectives, be sure to justify this elsewhere in the syllabus by indicating the nature of the coursework that addresses these optional objectives.]

FOR ELECTIVE CLASSES]

- Critical Thinking Skills (CT)** – Creative thinking, innovation, inquiry, and analysis; evaluation and synthesis of information
- Communication Skills (COM)** – effective development, interpretation and expression of ideas through written, oral, and visual communication
- Empirical and Quantitative Skills (EQS)** – The manipulation and analysis of numerical data or observable facts resulting in informed conclusions
- Teamwork (TW)** – The ability to consider different points of view and to work effectively with others to support a shared purpose or goal
- Social Responsibility (SR)** – Intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national, and global communities
- Personal Responsibility (PR)** – The ability to connect choices, actions, and consequences to ethical decision-making

VIII. Methods of Instruction

Will include online (tooling u) lectures, assigned readings, discussions, demonstrations, and hands on projects, videos, electronic documents, PowerPoints, and more.

IX. Methods of Assessment

Test: (40%) (CT, EQS, PR) Include all Tooling-U test grades (14)

Labs: (40%) (CT, EQS, PR) includes all Lab exercises (10)

Professionalism: (10%) (CT, COM, PR, TW) Being on time, prepared to work. Great attitude. NO foul language, No use of cell phones. Student following directions, leaving the work areas clean and organized.

Final: (10%) will consist of one final Lab test and it will make up 10% of the students final grade.

Grading scale: A = 90-100% B = 80-89 C = 70-79 D = 60-69 F = Below 60

X. Course/Classroom Policies

The following rules and guidelines about classroom behavior are to be memorized, internalized, and strictly adhered to. Failure to do so will negatively impact your experience of this class, not to mention your grade.

1. Attendance

WARNING—READ CAREFULLY! If you accumulate unexcused absences exceeding 10% of the total sixty four clock-hours required for this course as set forth by the Texas Higher Education Coordinating Board, you will be dropped from class. You will receive the grade of **W**. If the final semester withdrawal date has passed, you will receive the grade of **F**. (This means you will be denying yourself credit for the course if you miss any combination of 6.4 hours of class and/or lab times.)

Excessive absences result in (1) your failure to progress towards the objectives of the course, (2) unfair demands on your instructor's time by taking him/her away from responsible students in order to catch you up on missed assignments, and most important (3) you become an increased safety risk due to your diminished familiarity with hazardous equipment and safety protocols.

Lateness/Tardiness

Any student coming to class or laboratory more than **three** minutes from the scheduled start time will be counted as absent

RC Policy on Attendance:

Regular and punctual attendance in all classes and labs is required of all students.

Unexcused absences are counted from the first day of class as listed in the college calendar, regardless of the date of the student's registration

The only excused absence is an authorized college activity. All work and/or assignments missed because of an excused absence must be completed within one week or the excused absence will be counted as unexcused. An excused absence during the one-week period does not extend the deadline for the completion of assignments

Classes and laboratories starts at the scheduled time, you have three additional minutes to be in your seat, prepared for class. If you show up to class or lab more than three minutes late you will receive an unexcused absence for the day! Any student leaving class or lab early will need to visit with the instructor before returning to class or lab. If the early departure is not justifiable, the student may be marked absent for the class or lab for that instructional time.

2. Class Participation

Each student is encouraged to participate in classroom discussions and in lab. You are here to learn and the best way to learn is by hands-on and participation. Always remember: safety comes first.

3. Missed Exams/Assignments/Make-up Policy

All assignments and missed exam (s) are to be made-up within one week of the assignment or exam. Please get with the Instructor to set-up a time to make it up.

4. Lab safety/health

Safety lectures are done every day, before any equipment is used. **Safety is the #1 factor when working at home, school or industry.**

Safety Regulations

Machining can become very dangerous—even fatal—if you are careless and neglect safety precautions. Most accidents occur when people get in a hurry, so learn to pace yourself and move cautiously and deliberately. The College endeavors to provide you with proper training and a safe environment, but you must also do your part by abiding by the following rules. *If you persistently violate these rules, you will be considered a safety risk and will be withdrawn from class.*

5. Other Course Policies

1. *No eating or drinking in classrooms or labs*
2. *Turn cell phones off, no iPods or other electronic devices*
3. *Do not use internet for any activity other than online tutorials.*
4. *Do not operate any equipment in the lab without the instructor being present.*
5. *Return to class promptly after breaks.*
6. *Respect other student's tools, equipment and personal space.*
7. *Return all tools to their proper place as soon as you are finished with them.*
8. *It is your responsibility to clean up any area or machine you use.*
9. *Assignments must include students name, assignment title and date.*
10. *It is a privilege (for those who have paid) to work in the lab areas, not a Right.*

Note: Scheduled assignments are subject to change without notice at the discretion of the Instructor.

XI. Course Outline/Schedule

WEEK	LEC/LAB	TOPIC/ASSIGNMENT
1	LEC:	Discuss the purpose of this course and its importance in Manufacturing Set-up Tooling U accounts

	<p>Safety LAB; Safety and Conduct</p>
2	<p>LEC: Introduce the basic measuring devices used in manufacturing to ensure part quality. Complete all test for Tooling-U lesson “Basic Measurement 101” LAB: Rules and combination square set English/ Metric (Lab kit #1)</p>
3	<p>LEC: Provide a basic introduction to the importance of calibrating measuring instruments. Complete all test for Tooling-U lesson “ Calibration Fundamentals 111” LAB: Gage Blocks (Lab kit # 2)</p>
4	<p>LEC: Provides a comprehensive overview on part tolerance. Complete all test for Tooling-U lesson “Basics of Tolerance 121” LAB: Vernier Calipers (Lab kit # 3)</p>
5	<p>LEC: Introduce the use and importance of blueprints. Complete all test for Tooling-U lesson “Blueprint reading 131” LAB: Micrometers (Lab kit # 4)</p>
6	<p>LEC: Describe information on surface finish and methods involved for its inspection. Complete all test for Tooling-U lesson “Surface Texture and Inspection 201” LAB: Vernier Micrometers (Lab kit # 4)</p>
7	<p>LEC: Explain the purpose and methods of measuring systems analysis, including measurement variation and gage repeatability. Complete all test for Tooling-U lesson “Measuring system analysis 300” LAB: Dial Calipers (Lab kit # 5)</p>
8	<p>LEC: Introduce Geometric Dimensioning and Tolerance. Complete all test for Tooling-U lesson “Intro to GD&T 200” LAB: Midterm Test (Measuring with Rules, Combination Square, Vernier Calipers, Micrometers, and Dial Calipers.) (Lab midterm test kit)</p>
9	<p>LEC: Provide a comprehensive introduction to hole inspection using contact instruments. Complete all test for Tooling-U lesson “Hole standards and inspection 141” LAB: Direct reading and transfer hole inspection gages (Lab kit # 6)</p>
10	<p>LEC: Explains thread standards, inspection, measurement and various parts of threads. Complete all test for Tooling-U lesson “Thread standards and inspection 151” LAB: Thread measurement tools (Lab kit # 7)</p>
11	<p>LEC: Measuring and inspecting cylindrical parts explains the measurement, methods, and inspection tools necessary to confirm that a cylindrical part meets its requirements. Complete all test for Tooling-U lesson “Inspecting a cylindrical part 331” LAB: Cylindrical part measurement (Lab Kit # 8)</p>
12	<p>LEC: An overview and use of the optical comparator and measurement capabilities. Complete all test for Tooling-U lesson “Inspecting with optical comparators 351” LAB: Surface plates and height gages (Lab kit # 9)</p>
13	<p>LEC: Provides an overview of the functions and mechanics of the coordinate measuring machine. Complete all test for Tooling-U lesson “Inspecting with CMMs 361”</p>

	LAB: Visit Local Manufacturing Company
14	LEC: Calibration and documentation details the calibration of measuring instruments and its necessary documentation. Complete all test for Tooling-U lesson “ Calibration and documentation 371 ” LAB: Instrument and gage calibration (Lab kit #10)
15	LEC: Review for Lab Final LAB: Lab final

XII. Non-Discrimination Statement

Admissions, employment, and program policies of Ranger College are nondiscriminatory in regard to race, creed, color, sex, age, disability, and national origin.

XIII. ADA Statement

Ranger College provides a variety of services for students with learning and/or physical disabilities. Students are responsible for making initial contact with the Ranger College Counselor, Gabe Lewis (glewis@rangercollege.edu). It is advisable to make this contact before or immediately after the semester begins.