

Manufacturing Processes Lab: Spring 2012
Course #MFG K103
Technologies Department

Course Description:

This course provides laboratory emphasis on common metal cutting tools and lathe operations, as well as on associated precision measuring tools and instruments. The labs will involve set-ups and procedures for milling machines, lathes, grinders, drill presses, and some measuring instruments. The objective is to become familiar with machine tool operations. Students will fabricate aluminum and steel parts to high tolerance using metal lathes, vertical mills, bandsaws, hand tools and precision measuring equipment.

Instructor:

PROF Patrick H. Knowles Jr. Room C-160 ph: 885-2379 pknowles@trcc.commnet.edu

Text Book:

1. Manufacturing Processes Lab – Knowles, P.H. ISBN 0-390-56824-4

Procedure:

Create three parts, using both the lathe and the mill, which when assembled together, will create a working device that one student may keep. As time allows, additional refinements can be made.

Lecture & Lab Outcomes:

- Students will practice the skills needed to work effectively in teams and as an individual.
- Students will demonstrate the ability to use appropriate mathematical and computational skills needed for engineering technology applications.
- Students will combine oral, graphical, and written communication skills to present and exchange information effectively and to direct manufacturing activities.
- Students will know of a professional code of ethics.
- Students will describe concepts relating to manufacturing quality, timeliness, and continuous improvement
- Students will describe how the concepts of metal manufacturing, statistics, process automation, computer-aided design and manufacturing, and organizational management affects manufacturing operations.
- Students will illustrate an ability to think critically and identify, evaluate and solve complex technical and non-technical problems; demonstrate creativity in designing problem solutions; and conduct and interpret experimental data and outcomes.
- Students will recognize the need to be lifelong learners.

Lab Lecture & Lab Performance Criteria:

The above outcomes will be assessed using these performance criteria:

- Working in teams-
 - ✓ Produce research information for a team
 - ✓ Demonstrate understanding of team roles when assigned
 - ✓ Share in work of team
 - ✓ Demonstrate good listening skills
- Mathematical and computational skills-
 - ✓ Ascertain problem conditions by identifying known and unknown quantities in formulating a problem for solution
 - ✓ Demonstrates the correct selection and application of pertinent formulae, principles and concepts.
 - ✓ Pursue solutions in a methodical, logical manner with results correctly explained with sufficient detail and properly documented
 - ✓ Submit problem solutions with a minimum of computational errors, identifying and selecting the correct dimensional units
- Use of communication skills-
 - ✓ Identify the reader / audience, assess their previous knowledge & information needs, and organize / design information to meet these needs
 - ✓ Provide content that is factually correct, supported with evidence, explained with sufficient detail and properly documented
 - ✓ Test reader /audience response to determine how well ideas have been relayed.
 - ✓ Submit work with a minimum of errors in spelling, grammar & usage
- Know Code of Ethics-
 - ✓ Demonstrate knowledge of a professional code of ethics / conduct
 - ✓ 2 Evaluate the ethical dimensions of professional engineering, mathematical and scientific practices
- Concepts relating to manufacturing quality, timeliness, and continuous improvement-
 - ✓ Identify the factors that influence manufactured products quality; cost, and timeliness
 - ✓ Demonstrate familiarity with concepts of 'waste' and waste reduction processes as related to manufacturing
 - ✓ Determine systems required to ensure products / services are designed & produced to meet / exceed customer requirements
 - ✓ Apply the fundamentals and concepts of lean, just-in-time and kanban during manufacturing system design
- Describe how the concepts affects manufacturing operations-
 - ✓ Identify the elements of manufacturing automation commonly found in manufacturing enterprises; including CAD/CAM, CNC, machine vision & automated inspection, automated material handling and storage, and robotics.
 - ✓ Demonstrate familiarity with typical manufacturing processes -integrated manufacturing systems;
 - ✓ Show knowledge of key drivers of manufacturing system performance
 - ✓ Perform geometric modeling using CAD software; prepare a simple CNC program and produce a sample part
- Illustrate an ability to think critically and identify-
 - ✓ Show the ability to evaluate the credibility of sources of information
 - ✓ Demonstrate the ability to refine generalizations, establish rational & pertinent assumptions, and avoid oversimplifications.
 - ✓ Exhibit the ability to generate, analyze / evaluate, and assess multiple engineering problem solution options
 - ✓ Produce documentation that reflects organization and application of engineering principles in specifying solution to an engineering problem
- Lifelong learning-
 - ✓ Demonstrate an awareness of what needs to be learned; formulate questions based on research need
 - ✓ Develop a research plan appropriate to the investigative method
 - ✓ Identify, retrieve and organize information
 - ✓ Use a variety of methods and emerging technologies to keep current in the field

Instructor Assistance:

Seeking help from the instructor outside of class is encouraged if you are having difficulty understanding course material. Feel free to Email/call for an appointment during office hours.

Academic Integrity:

Academic integrity is essential to a useful education. Failure to act with academic integrity severely limits a person's ability to success in the classroom and beyond. Furthermore, academic dishonesty erodes the legitimacy of every degree awarded by the College. In this class and in the course of your academic career, present only your own best work; clearly document the sources of the material you use from others; and act at all times with honor.

Comprehension Quizzes:

Comprehension quizzes will be conducted each week. The quiz material is from the assigned reading and lectures. The quizzes will be posted on Blackboard Vista. Each quiz will have an expiration date by which it must be completed

Attendance:

Attendance will be taken and although it is not intended to be use for grading purposes, it may be used for decision on the part of the final grade.

Grading Policy:

On time attendance, completion of parts, maintaining a safe work environment (no injuries), good attitude, and passing the quizzes. As the beginning of each class will include a related machine tool operation demonstration, late arrival to class will cause an unsafe working condition and an undesirable grade:

Quiz Average	45%
eMachine Shop Project	20%
Job Hunt Project	20%
Machining Project	15%

Withdrawal:

A student who finds it necessary to discontinue a course must complete a "Withdrawal Request Form" available in the Registrar's office within the time limits of the semester calendar. Students who do not withdraw, but stop attending will be assigned an "F" signifying a failing grade. The last day to withdraw from classes is 7May2012.

Disabilities Statement:

If you have a question regarding a disability that may affect your progress in this course, please contact one of the college's Disability Service Providers as soon as possible. Chris Scarborough (892-5751) generally works with students who have learning disabilities or attention deficit disorder. Kathleen Gray (885-2328) generally works with students who have physical, visual, hearing, medical, mobility, and psychiatric disabilities. Matt Liscum (860/383-5240) also works with students who have disabilities.

If you will need accommodations for this class, you must contact the Disabilities Counseling Services. To avoid any delay in the receipt of accommodations, you should contact the counselor as soon as possible. *The instructor cannot provide accommodations until an accommodation letter from the Disabilities Counselor is received.*

Date	Class #	Topic	Reading
1/23	1	Measurement Tools Exercise	Handout
1/30	2	Micrometer Exercise	Handout
		Lathe Familiarization Exercise	Handout
2/6	3	Safety Lathe/Turning	Lab Pre-Test Unit 11-1 thru Unit 11-3 (Lab Quiz 1)
2/13	4	Lathe/Turning	Unit 11-4 thru Unit 11-6 (Lab Quiz 2)
2/27	5	Lathe/Turning	Unit 11-7 thru Unit 11-8 (Lab Quiz 3)
3/5	6	Mills/Milling	Unit 12-1 thru Unit 12-2
3/12	7	Mills/Milling	Unit 12-3 thru Unit 12-4 (Lab Quiz 4)
3/19	8	Science of Measuring	Unit 6-1 thru 6-2
3/26	9	Science of Measuring	Unit 6-3 (Lab Quiz 5)
4/2	10	Measuring Tools	Unit 7-1 thru 7-2
4/9	11	Measuring Tools	Unit 7-3 thru 7-5 (Lab Quiz 6)
4/16	12	Cumulative Lab Quiz	

Lab Pre-Test

Start: January 23, 2012 5:00 PM

End: January 30, 2012 5:00 PM

Lathe Quiz

Start: January 30, 2012 5:00 PM

End: February 6, 2012 5:00 PM

Lab Quiz 1

Start: February 6, 2012 5:00 PM

End: February 13, 2012 5:00 PM

Lab Quiz 2

Start: February 13, 2012 5:00 PM

End: February 27, 2012 5:00 PM

Lab Quiz 3

Start: February 27, 2012 5:00 PM

End: March 5, 2012 5:00 PM

Lab Quiz 4

Start: March 5, 2012 5:00 PM

End: March 12, 2012 5:00 PM

Lab Quiz 5

Start: March 12, 2012 5:00 PM

End: March 26, 2012 5:00 PM

Lab Quiz 6

Start: March 26, 2012 5:00 PM

End: April 2, 2012 5:00 PM

Lab Quiz Final

Start: April 2, 2012 5:00 PM

End: April 16, 2012 5:00 PM