

**Course Syllabus**  
**Advanced Machining**  
**William E. Cattin Instructor**

**Course:** Advanced Machining, MET 355, 4 Credits

**Hours:** T Th 8:00AM – 10:50AM

**Room:** Hogue 111—lab 119

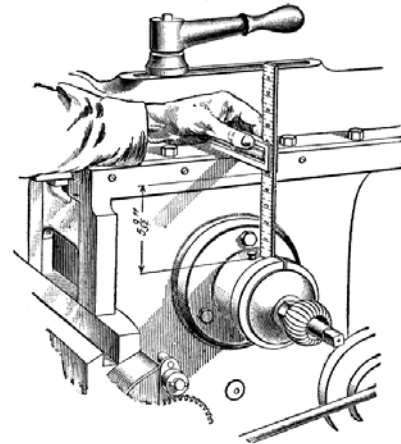
**E-mail:** [cattinw@cwu.edu](mailto:cattinw@cwu.edu)

**Office phone:** (509) 963-1911

**Power Lab phone:** (509) 963-1770

**Office** 301 Hogue Technology Bldg.

**Home:** 962-8370



**Text:** Understanding Mastercam, Kelly Curran & Jon Stenerson; Prentice Hall

Advanced machining and CNC programming builds on concepts introduced in basic machining 255. This course introduces the student to modern methods of machining and manufacturing using advanced manual methods and computer controlled machining through a practical lab experience. Emphasis will be placed on thorough understanding of the principles involved in metal chip removal. Use of CAD/CAM software will be an integral part of instruction provided. Machining will involve working with metallic and non metallic materials using automated equipment. Methods of teamwork and team management will be considered an essential part of this course.

**COURSE OBJECTIVES:**

Upon completing the course, the student will be able to:

1. Demonstrate an understanding of advanced machining operations
2. Demonstrate an understanding of inspection and metrology
3. Demonstrate an understanding of Quality Assurance and Process Control
4. Work effectively in a team
5. Use effectively CAD/CAM software
6. Produce a simple CNC program using manual programming methods
7. Demonstrate an understanding and provide application of machining economics
8. Demonstrate the ability to operate advanced CNC controlled machines



## SPECIAL EQUIPMENT AND SUPPLIES:

**Safety Glasses** (available at bookstore, lumberyards, auto parts store)  
Shop apron or equivalent  
Roll of shop towels (local auto parts retailer)  
Padlock for locker

## GRADING PROCEDURE:

1. All assignments will be turned in on the day designated during class time for the course. No grade will be given for late work.
2. No make-up assignments or examinations will be allowed unless provisions for circumstances are made in advance of the date in question.
3. All written work will be evaluated on the following criteria:
  - a. neatness
  - b. spelling
  - c. content quality
  - d. completeness
4. Please ask questions if assignments are unclear. The final responsibility for misunderstandings and late work rests with the student.
5. Points will be assigned for each student's work. The total points obtained throughout the course will then be evaluated according to the following chart:

A	100-90%
B	90-80%
C	80-70%
D	70-60%
6. Missing class is **not** "OK". Discussion questions, safety instruction, and instruction on equipment and instruments are all valuable and should not be missed. Absences cause expensive wear and tear on equipment, supplies and facility. Demonstrations on equipment and technique will not be given over.
7. Students are expected to perform ongoing cleaning and minor maintenance on equipment in the laboratory. Work areas should be straightened up and clean before leaving the lab area.
8. All written work will be typed or word-processed double-spaced, with 1" margins. Papers will be stapled in the upper left-hand corner.
9. Appointments can be directly made with the instructor or E-Mail.



10. “Close” grades will be determined by attendance patterns, enthusiasm and willingness to learn.

### Course Assignments:

- 500 A. Examination** (2 @ 250 points each). A portion of these points will be earned by completing a professional article summary. It must be from a machining trade periodical, it is not to be from the internet.
- 250 B. Laboratory Experiments.** These will be evaluated on a Mastery Learning basis. Mastery will be judged by actually completing to specifications a portion of the team project. One ongoing project is a Quick change tool holder system for the machining lab equipment. This project will require teamwork and the use of CAD/CAM software (MasterCam, AutoCAD, Rhino and Solidworks), small CNC milling machines (Techno) and large production machines. Other project proposals must be made in writing and approved by instructor.
- 250 C. Project Report** paper including an electronic version e-mailed to the instructor, a hard copy turned in on the due date.
- 100 D. Project Team presentation.** This presentation will be a formal report to the class on the objectives met and missed with the decisions underlying the process used to complete the project.
- 100 E. Homework** will be assigned on a regular basis; the due date will be announced in class.

## Safety

You will be working in an educational laboratory that is well equipped with machine tools and equipment. That a lab of this nature has potential hazards for injury is self evident. It is my goal to prevent all accidents and minimize hazard potential in this course. Therefore **SAFETY** of all students and faculty will be an integral part of this course. Proper use and control of all lab facilities will be taught, demonstrated and practiced by all that use this lab. There are and will be **no exceptions!** Thank you in advance for your cooperation.



## MET 355 Class Schedule Spring 2006

Date	Subject	Home Work Assignment	Due Date
28-Mar	<b>Week 1:</b> Introduction to G & M code	Hand Program Name	4-April
30-Mar	VMC input, Project Description	Read Chap. – 3, 4	6-April
4-April	<b>Week 2:</b> Introduction Mastercam	Draw Part Fig. 4-2	13- April
6-April	Tramming Head, Indicating Vise, Drill pointing	Demonstrate proficiency	20-April
11-April	<b>Week 3:</b> Importing Cad Files	Chapter 9 Mastercam book	2-May
13-April	Lab Demonstration and Practice, Bridgeport operation	Read Section 6 & 7 Machine Tool Technology	
18-April	<b>Week 4:</b> : Sawing, Blade welding Stock cutoff		
20-April	Surface Grinding Darex sharpener, Review	Demonstrate proficiency	27-April
25-April	<b>Week 5:</b> Exam#1	Read handouts on Materials	
27-April	Materials, machining properties		
2-May	<b>Week 6:</b> Manufacturing Processes. Fasteners	Read handouts on Fasteners	
4-May	Dividing heads, Indexers, Rotary tables		
9-May	<b>Week 7:</b> Sine bar, and Sine Plates,	Sine bar problems	16-May
11-May	Surface Plate Inspection		
16-May	<b>Week 8:</b> Machining Economics		
18-May	Directed Lab Work		
23-May	<b>Week 9:</b> Gears & gearing		
25-May	Directed Lab Work		
30-May	<b>Week 10:</b> Directed Lab Work		
1-June	Presentations of Project Due	Last Day to Turn-in Project	
9-June	Final Exam Week	2:00PM—4:00PM Friday	

