

**Central Maine Community College
Auburn, Maine**

Precision Machining Technology
Spring 2016
2 Credits

PMT 280 3 Dimensional CNC Milling
Instructor: Devin Watson

Sections of the Syllabus

A. Why the online format?

The hybrid format was created as part of the Advanced Machining Certificate. This model allows students to access online video lectures, demos, and course material at their own pace. Once milestones with this work have been achieved they can then contact the instructor to schedule machine time to complete projects. There is a provided schedule to finish the class in a semester but a student has the option to finish early if they choose too.

B. Purpose and Organization:

This course will provide students the opportunity to program, set-up, and operate 3 axis CNC Milling Centers for advanced milling operations with an emphasis on three dimensional milling. Students will have to use spindle probes to pick-up work offsets and CMM's for part verification.

C. Course Objectives:

This course will provide students the opportunity to:

1. Set-up and operate 3 axis Vertical CNC Milling Center to machine 3 dimensional parts
2. Identify correct tooling to complete a job
3. Inspect first piece parts on the CMM and make necessary adjustments
4. Produce parts to print tolerances on CNC equipment

D. Student Learning Outcomes:

At the conclusion of this course students will be able to:

1. Demonstrate the set-up and operation of advanced 3 axis CNC milling operations.
2. Understand programming and program editing for 3-D milling applications.
3. Describe and demonstrate how spindle probing works

E. Course Topics in Sequential Order:

- Spindle Probing for Part Set-up
- In Machine tool presetting
- 3-Dimensional Machining overview
 - Roughing
 - Applications
 - Tooling
 - Machine Requirements
 - Finishing
 - Applications
 - Tooling
 - Machine Requirements
- Calculating Surface Finish

**Central Maine Community College
Auburn, Maine**

- Radial Chip Thinning
- Ball Nose Radial Chip Thinning
- High Speed Machining
 - Machine Capacities
 - Tooling Capacities
 - Programming Concepts
- Spindle probing for part verification
 - Dimensional part checks

F. Textbook and Required Supplies:

- Students are required to wear OSHA approved safety shoes and OSHA approved safety glasses while working in the machine shop.
- Tools and work material furnished by Central Maine Community College.

G. A Note About You and This Course:

This is a hybrid class. All material needed (Lectures, Demos, Resources) will be available online. If you do not understand the information please contact the instructor via e-mail, phone, or by stopping by the lab.

There is a schedule provided to complete the class in eight weeks. Please remember to schedule machine time accordingly. Please do not wait all semester to schedule machine time to make all of your parts, remember that there are other students in the class and availability could become limited.

Because of the hybrid class format you also have the ability to finish the class ahead of the schedule that is outlined below.

H. Contact the Instructor:

Contact the instructor by email to dwatson@cmcc.edu. I will respond to any email inquiries within 24 hours during the school week, Mon–Fri, and 48 hours over the weekend, Sat and Sun. I will make every effort to post any project or test grades before the following weeks assignment is due.

I. Contact Classmates:

There is no grade for student post for this class. Most of you will not see each other during lab time as you will all be coming in at different times to set-up and run projects. I do encourage that you use the discussion board page to talk with each other about the issues and successes you had on the projects you will be working on.

J. Course Activities:

1. Watch and listen to the online lecture for each tutorial
2. Watch the demo's that correspond with each project
3. Complete each assigned lab project
4. Complete each test before the deadline

**Central Maine Community College
Auburn, Maine**

K. Grades:

<u>Letter Grade</u>	<u>Raw Score</u>
A	95-100
A-	93-94
B+	91-92
B	87-90
B-	85-86
C+	83-84
C	79-82
C-	77-78
D+	75-76
D	70-74
F	0-69

Course Activities	Total # of Activities	Pts. per Activity	Total Pts.
Projects-	7	8 pts.	56 pts.
Homework Questions-	7	2 pts.	14 pts.
Tests-	2	15 pts.	30 pts.

Tests:

Tests will be a cognitive written test. This will test your knowledge of the material that has been covered in Lecture assignments. They will be administered through CMConnect and will be timed. Tests will be open for the week but once the test is started the time will begin. Tests will close on the last day of the week. Students who have not taken the test before it closes will receive a 0 for the assignment.

Homework:

Homework questions will be over the Lecture assignments. These questions will be uploaded to the CmConnect webpage and can be printed off and filled out or filled out electronically. Either way I will need to receive the completed questions the week they are due. Questions not completed that week will receive a 0 for the assignment.

Projects:

There will be a total of 7 projects that will need to be made for this class. The projects are designed to evaluate your application of lectures and demos in the lab setting. They will also evaluate your ability to set-up and operate the machine tool. See attached rubric for project grade breakdown. There will be not late grade for projects not passed in on time.

Probe/Presetter Lab

280-1

280-2

**Central Maine Community College
Auburn, Maine**

280-3

280-4

280-5

In Machine Probing lab

L. Navigational Aids:

When you log onto CMconnect you will find a “My Courses” button on the left side of the main page screen, midway down the page. When you open up “My Courses”, you will see a link to the PMT 330 course. Click on the PMT 330 link to enter this course site. Most of the course content is located on pages that you can access from the buttons on the upper left side of the main page. **DO NOT USE THE BACK BUTTON** when navigating from one page to the next; you will be kicked out of the CMconnect program. On the main page you will find some introductory information that will help you get started in this course.

M. Getting to Class:

Students will need to access CMconnect to view the weekly assignments. All of the class lectures, demos, and related work will be done through this site. Lectures (Both video and audio PowerPoint) will be available here.

Machine time will be scheduled when students are ready to try a project. When a student schedules machine time it is expected that they have completed all lectures, watched all online machine demos, and have questions ready when they come into the lab.

Please refer to the calendar on CMconnect to find out and schedule machine availability.

N. Schedule:

Since most students are taking PMT 276, 278, and 280 at the same time I have provided an eight week schedule to complete this class. This course will run concurrent to PMT 276. Most of the projects due for this class will be programmed in the 276 class before/ the same week they are needed for this class. If you are not taking the PMT 278 class you can divide this schedule out over 15 weeks.

**Central Maine Community College
Auburn, Maine**

Date	Topic	Assignment/reading/activity	Approximate time on task
Week 1	-Course Intro -Probing -Presetting	<input type="checkbox"/> Watch Course Intro Lecture <input type="checkbox"/> Study Probing Lecture <input type="checkbox"/> Study Presetting Lecture <input type="checkbox"/> Lab Project 1- Probe/Presetter Set-up <input type="checkbox"/> Probe/Presetter Lab Questions	1 hr. 2 hr. 2 hr. 6 hr. 1 hr.
Week 2	-3-D Overview -Calculating Surface Finish	<input type="checkbox"/> Study 3-D Overview Lecture <input type="checkbox"/> Study Surface Finish Lecture <input type="checkbox"/> Week 2 Lecture Questions	2 hr. 2 hr. 2 hr.
Week 3	Radial Chip Thinning	<input type="checkbox"/> Study Radial Chip Thinning Lecture <input type="checkbox"/> Week 3 Lecture Questions <input type="checkbox"/> Lab Project 2- 280-1	2 hr 2 hr 6 hr.
Week 4	3-D Roughing	<input type="checkbox"/> Study 3-D Roughing Lecture <input type="checkbox"/> Week 4 Lecture Questions <input type="checkbox"/> Program 330-3 part (watch video for overview) <input type="checkbox"/> Lab Project 3- 280-2	2 hr. 2 hr. 4 hr. 6 hr.
Week 5	Test 3-D Finishing	<input type="checkbox"/> Test over Week 1-4 Lectures <input type="checkbox"/> Study 3-D Finishing Lecture <input type="checkbox"/> Week 5 Lecture Questions <input type="checkbox"/> Lab Project 4-280-3	3 hr. 2 hr. 2 hr. 8 hr.
Week 6	High Speed Machining	<input type="checkbox"/> Study HSM Lecture <input type="checkbox"/> Week 6 Lecture Questions <input type="checkbox"/> Lab Project 5- 280-4	2 hr. 2 hr. 8 hr.
Week 7	Spindle Probes for Verification	<input type="checkbox"/> Study Spindle Probing for Part Verification Lecture <input type="checkbox"/> Week 7 Lab Questions <input type="checkbox"/> Lab Project 6-280-5	2 hr. 2 hr. 8 hr.
Week 8	Test	<input type="checkbox"/> Test 2 <input type="checkbox"/> Lab Project 7- Probing Lab <input type="checkbox"/> Make-up and work not yet done	3 hr. 6 hr.

O. Disability Access Statement

If you are a student with a documented disability and plan to request an academic or other accommodation, you must register as soon as possible with the Central Maine Community College Disabilities Coordinator, Jennifer Lyons. Visit the Coordinator's office in Lapoint Center or call for an appointment 755-5277.

**Central Maine Community College
Auburn, Maine**

P. Affirmative Action Statement

Central Maine Community College is an equal opportunity/affirmative action institution and employer. For more information, please call 207-755-5233.

Q. Ethical Behavior Statement

Central Maine Community College requires all students to adhere to high standards of integrity in their academic work. Activities such as cheating on exams and plagiarizing the intellectual work of others are not acceptable and will be subject to severe disciplinary actions up to and including dismissal.

L Policy

Students who are absent for three consecutive weeks of class for a fifteen week course or two consecutive weeks of class for an eight week course are awarded a grade of L for leaving the class. The faculty member will input the L grade with the last date of attendance. **Online/hybrid courses must have a process in place to track participation and if a student does not participate in the course for three consecutive weeks, the L grade is to be awarded.**

Above is the school's L policy. Since this is an online class if you are not passing in work weekly then I will need an e-mail each week stating that you are still in class. Three consecutive weeks passing in no homework or sending an e-mail will result in a L grade for the class.