Portland Community College
OMIC Training Center

MCH 121 Manufacturing Processes /Pre-Trades

Fall 2022

Instructor: Rick Luff
Email: Richard.luff15@pcc.edu (Preferred)
Phone: 971-722-8145
Lab Hours: Monday through Friday 8:00 - 12:00am

Course Description: A technical elective course in the Associate of Applied Science Degree in the Machine Manufacturing Technology program. An introductory course in material removal operations emphasizing drilling, milling and lathe processes with emphasis on production speeds and feeds on manual machinery.

Addendum to Course Description: Students will complete 11 modules exploring a variety of industry standard approaches and practices involved in machining. There will be a course question packet (to be completed first) , measurement quiz, and three required machining projects consisting of a Drill Gauge, 1-1/4" Parallel, and Ball Peen Hammer. **These projects are to be completed in the MMT manufacturing lab, on manual machinery, and under direct supervision of the instructors.**
http://www.pcc.edu/ccog/default.cfm?fa=ccog&subject=MCH&course=121

Required Materials:

- *Machining and CNC Technology*
- Safety glasses, 6" digital calipers
- Students NOT enrolled in MMT will be loaned the necessary tools and items.

Course Schedule: This course is structured in a hybrid lecture/lab format. Students enrolled in this course need to choose either the A.M. or P.M. open lab session to attend for the duration of the term. Changing between sessions will only be permitted due to documented emergencies and at instructor's discretion. Please set aside approximately 9 hours per week to complete the required coursework and projects.

MCH 121 may be completed earlier than the recommended schedule. However, all coursework and projects must be done in the following order:

1. Coursework Packet (weeks 1 thru 3)
2. Measurement Quiz (week 3)
3. Drill Gauge (week 4)
4. 1-1/4" Parallel (weeks 4 and 5)
5. Ball Peen Hammer (weeks 6 thru 10)

The **Coursework Packet** needs to be obtained directly from the instructor during the orientation session.

It must be completed, graded by the lab tech, then turned in to the instructor and exchanged for the **Measurement Quiz.** The completed measurement quiz must be turned in to the instructor and exchanged for the **Project Workbook** which contains the final 3 projects.

The final day to work on projects will be the Monday of finals week. Tuesday of finals week is set aside for **mandatory** shop cleanup.

Attendance/Make-up: A time clock is located just inside the entrance to AM113. Timecards will be used each day the student enters and leaves the lab facility. Missed seminars need to be scheduled in advance via instructor's email.

Course Success: This course is structured with flexibility built in for the student to schedule lab time at their convenience. Students may work through the modules at an accelerated pace as long as modules are completed sequentially and in the AM 113 lab on manual machines. The Ball Peen Hammer will be the final project. All other course work must be completed before beginning this project. Students who complete the course early will be given full credit for seminar attendance.

Safety/Cleanup: The MMT lab in AM113 is a production lab environment posing many potential risks of injury. The lab environment structured and staffed with several instructors at all times. We are here to help facilitate your safety and success. Machine set-up and use is permitted only after receiving direct instruction on the proper techniques and safety precautions for the particular planned use. When finished for the day, have an instructor inspect your machine and sign off on cleanup. These procedures will be followed at all times.

Course Outcomes: This course is based on competency mastery. Each section is assigned to a specific competency. Sections may be independent or dependent on other sections. The following competency profile is based upon industry standards that have been established for this course:

- Given a print, work piece, drill press, layout tools, and drills, the student will set up the drill press and drill holes according to the print specifications +/- 1/64.
- Given the necessary tools, materials, and equipment the student will face and center-drill both ends of the work piece on a lathe.
- Using the lathe and accessories, the student will perform rough and finish turning operation according to print specifications**.**
- Given the necessary materials, tools, and equipment, the student will machine an external taper, a radius, and chamfers.
- Given the necessary materials, tools, and equipment, the student will knurl a work piece to print specifications.
- Given the necessary materials, tools and equipment, the student will use the lathe to cut external threads to print specifications with the use of a Geometric Thread Chasing Head.
- Given the operators manual, .001 test indicator, Indicol holder, parallels, a surface plate, fly cutter, end mills, and step by step instructions, the student will square and size a block of aluminum to print specifications.
- Given the necessary tools indicated by the operations on a print, the student will machine a workpiece to print specifications.

Course Modules:

1. **Machine Tool Safety**
2. **Layout & Micrometer**
3. **Speeds & Feeds**
4. **Vertical Bandsaw**
5. **Drilling on the Drill Press & Drill Gauge**
6. **Vertical Milling Machine & 1-1/4" Parallel**
7. **Facing on the Lathe**
8. **Parallel Turning & Filing on the Lathe**
9. **Cutting External Radii & External Tapers on the Lathe**
10. **Knurling on the Lathe**
11. **Ball Peen Hammer**

Grading Criteria: Student performance measurements are based on established industry standards. The focus of evaluation will be the following six categories.

Coursework Packet:	30%	(Due Thursday of 3rd week)
Measurement Quiz:	5%	(Due Thursday of 3rd week)
Drill Gauge:	5%	(Due Thursday of 4th week)
1-1/4" Parallel:	15%	(Due Thursday of 5th week)
Ball Peen Hammer:	40%	(Due Monday of finals week)
Cleanup & Safety:	5%	

A 90-100%
B 80-89%
C 70-79%
D 60-69%
F 0-59%

Standards for Credit Courses:

- Students who have a documented disability and require a classroom adjustment or accommodation should contact Disability Services www.pcc.edu/resources/disability
- Code of Student Conduct www.pcc.edu/about/policy/student-rights/student-rights.pdf#code-of-student-conduct
- PCC Grading Guidelines www.pcc.edu/resources/academic/standards-practices/AcademicStandardsandPractices-GradingGuidelines.html
- Academic Integrity Statement: Students are required to complete this course in accordance with the Student Rights and Responsibilities Handbook. Dishonest activities such as cheating on exams and submitting or copying work done by others will result in disciplinary actions including but not limited to receiving a failing grade. See the Academic Integrity Policy for further details. www.pcc.edu/about/policy/student-rights/student-rights.pdf#academic-integrity
- Flexibility Statement: The instructor reserves the right to modify course content and/or substitute assignments and learning activities in response to institutional, weather, or class situations.

This Oregon SCC Grant Consortium product is funded by a $5 million Strengthening Community Colleges Employment and Training Administration Grant from the U.S. Department of Labor. The product was created by the grantee and does not necessarily reflect the official position of the U.S. Department of Labor. The U.S. Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timeliness, usefulness, adequacy, continued availability, or ownership. This product is copyrighted by the institution that created it.