



## MTT 1210

**Division:** Career and Technical Education

**Department:** Machine Tool Technology

**Course:** MTT 1210

**Title:** Machine Tool II

**Catalog Description:**

This course is for second semester students. It covers advanced machining principles dealing with threads, gear cutting, computer numeric control (CNC), basic metallurgy tool building and design, and includes operation theory of band machines, shapers, grinders, and turret lathes. Students improve skills on engine lathes and vertical milling machines. The course uses lectures, discussions, and demonstrations.

**General Education Requirements:** N/A

**Semesters Offered:** TBA

**Credit/Time Requirement:** Credit: 5; Lecture: 5; Lab: 0

**Clock/Hour Requirements:** 75

**Offered for Non-Credit:** No

**Prerequisites:** MTT 1125, MTT 1150

**Corequisites:** MTT 1225

**Justification:**

This course teaches students advanced application and procedures approved by our program advisory committee and is comparable to UVSC MTT 1210.

**Student Learning Outcomes:**

Upon successful completion of this course, students should be able to:

- make calculations for cutting gears and standard threads
- determine basic metallurgy for hardening and annealing
- from industrial symbols, determine the composition for cutting speeds and other cutting characteristics
- determine grinding stone selection and application for job requirements
- identify critical parts of a CNC program
- determine necessary design and construction components in basic tooling.

**Content:**

Course objectives will be accomplished by providing students with learning experiences in the following subject areas:

- manufacturing job planning
  - jig concepts and work measurement
  - operation planning, MRP systems

- step by step job sequence
  - time standards
- introduction to jigs and fixtures
  - project plans
  - review job plans
  - job planning
- introduction to optical comparator
- introduction to grinding
  - cutting principles and stones
  - cutter grinder
  - surface grinder
- introduction to milling machines
  - vertical milling
  - horizontal milling
  - shaping and broaching
  - milling feeds and speeds
- introduction to threads
  - threads, types and uses
  - thread system and measurement
- introduction to metallurgy
  - materials and grades
  - testing
  - heat treating
- introduction to production turning
  - turret lathes
  - screw machines
- introduction to spur gears
  - gear design
  - gear calculations
  - machine setup
- introduction to worm and helical gears
  - design
  - calculation
  - machine setup
- introduction to production measurement
  - methods
  - production methods
  - measuring machines - computerized coordinate measuring (CCM)
  - process gauge
- introduction to statistical process control
  - methods
  - charts
  - sample charting
- introduction to manufacturing systems
  - group technology
  - flexible manufacturing systems

- automation
- the future in manufacturing
- introduction to computer numerical control
  - principles and systems
  - programming
  - sample programs.

**General Education Outcomes:**

- 4) Retrieve, evaluate, interpret, and deliver information through a variety of traditional and electronic media. Students will research projects through the *Machinery Handbook*, Internet, and company-specific websites. Specifications on material structure, machineability, and other details for a given job will need to be identified, evaluated, and interpreted before being applied to production.
- 7) Apply scientific reasoning to a variety of contexts. Through the machining process, students are required to assess problems for possible solutions. Students will be involved in planning, design, and application of concepts they have learned in order to arrive at a quality-controlled product. Students will need to apply these skills to specific projects in order to arrive at the most efficient solution.

**Key Performance Indicators:**

**In class:**

- Students demonstrate safety practices while working in the shop.
- The student s knowledge and skills are tested by the ability to complete assignments with a required 75% minimum accumulated score.
- Written tests and quizzes are given on major subject areas with a required 75% minimum accumulated score.

**Following class:**

- Upon completion of the course, competency will be demonstrated in subsequent courses and on projects.

**Representative Text and/or Supplies:**

- Walker, John R., *Machining Fundamentals*, current edition, Goodhart/Willcox Company Inc.

**Optimum Class Size:** 10  
**Maximum Class Size:** 20

**Signatures:**

I hereby submit this course syllabus:

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Alan Hart, AAS, Instructor

I hereby find this course consistent with the goals and resources of the Machine Tool Technology Department:

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Alan Hart, AAS, Instructor, Chair

I hereby find this course consistent with the goals and resources of the Career and Technical Education Division:

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Michael P. Medley, MBA, Assistant Professor, Dean

I have discussed the need for library resources related to this class with the person submitting the syllabus:

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Lynn Anderson, MLIS, Technical Services Librarian (Main Campus)

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Michelle Olsen, MLS, Campus Librarian (Richfield Campus)