MTT 1210

Division: Career and Technical Education
Department: Industrial 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: Yes
Prerequisites: MTT 1125, MTT 1150

Corequisites: MTT 1225

Justification:

This course teaches students advanced application and procedures approved by our program advisory committee.

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.

Applied Education Outcomes:

1) Students will acquire entry-level skills specific to and appropriate for employment in their chosen field of study.

Students will learn the theory of Machining Fundamentals and will learn hands on in the lab with required projects to prepare them for entry level jobs on conventional machines.

3) Students will demonstrate safe practices and awareness of potential hazards in their field of expertise.

Students will participate in a weekly safety meeting where they will take their turn as safety chair. Students will demonstrate safety in the lab of those comparable to industry standards.

Key Performance Indicators:

Student Learning Outcomes will be assessed by two or more of the following Key Performance Indicators:

- safety practices while working in the shop
- written tests

- quizzes
- assignments
- competency in subsequent courses and on projects.

Representative Text and/or Supplies:

- *Tooling University Online.* "Machine Tool II" Module. www.toolingu.com (student login required).

Optimum Class Size: 10
Maximum Class Size: 20

Signatures:

I hereby submit this course syllabus:

Alan Hart, AAS, Instructor

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

Alan Hart, AAS, Instructor, Chair

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

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:

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

Michelle Olsen, MLS, Campus Librarian (Richfield Campus)