Course Name: MEC-109 Manufacturing Process for Engineering

Date Updated: 2/2022

Credit Hours/week: Lec. 3, Lab 1 hrs./wk. – 4 cr.

BEGINNING: SPRING 2022

Catalog Description: This course is a study of the methods of prototyping including an introduction to precision measurements, elementary theory of cutting and machining methods with emphasis on the proper operation of the manual lathe and the vertical mill. The course will also provide the student with an introduction to the Computer-Aided Manufacturing (CAM) and the related field of Computerized Numerical Control (CNC). Topics include machine setup, CNC code, both manual and computer assisted, tool offsets and tool changing.

Prerequisite: None

Text: Delmar, Machine Tool & Manufacturing Technology, Krar/Rapisarda /Check, Machinery's Handbook Industrial Press

Supplementary Material: This course needs to run in the "Prototyping Lab" (SH-158/SH-162). Specialized power equipment is required along with the appropriate safety equipment and consumable materials to support the Learning Outcomes.

Specialized equipment, supplies, facilities, for classes limited by enrollment or restricted by accreditation and/or equipment limitations:

Syllabus:

Introduction to Manufacturing, Manufacturing Careers and Safety
Introduction to Machine Shop Math and Print Reading
Measuring instrument, vernier, micrometer, height gage
Layout work and hand tools
Saws and similar metal cutting processes; cutting speeds, tooth patterns, fine vs. coarse teeth
Drill press operations, twist drill geometry, cutting speeds
Basic vertical milling machine, end mills, chip generation
Basic manual lathe operation, single point tooling, cutting speeds
Basic Horizontal Milling Machine, feed per tooth formulas
Advanced lathe processes; threading, tapers, tool geometry
Advanced milling machine fixtures and indicators
Assembly of manufactured parts, fasteners description and applications

Format for Offering this Course: Traditional

Students are expected to adhere to the policies of the County College of Morris. These can be accessed at: (insert link here)

Statement of Expected Course LEARNING OUTCOMES

- Demonstrate the proper calculation of a simple right-angle trigonometry problem used in machine tool setup
- Demonstrate the proper calculation of speed and feed for common machine tools
- Demonstrate the proper operation of a dial-type, micrometer-type and Vernier-type measuring instrument to an accuracy of 0.001 inches and 0.01 millimeters,
- List and describe the nomenclature used for threaded fasteners.
- Demonstrate the safe and proper operation of the manual verticle mill and manual lathe.
- Describe the function and use of various cutting tools, including end mills, twist drills, milling cutters and single-point cutters
- Demonstrate the safe and proper operation of an array of powered tools, including band saws, a drill press and a bench grinder,
- Identify and describe the parts of a CNC program
- Demonstrate the safe and proper operation of a CNC Vertical Mill and/or CNC Lathe

Statement of Relation to Curriculum(s):

This is a first semester course in the Mechanical Engineering Technology (P3700) degree program as well as some of the Certificate of Achievements (COA). The course provides students with tactile application of mechanical engineering technology concepts. This practical exposure will provide a useful link and knowledge building block as students relate to theoretical concepts in later courses.