
MIDDLESEX COUNTY COLLEGE

COURSE SYLLABUS

Department:	Engineering Technologies
Program:	Mechanical Engineering Technology
Course Number:	MEC 130
Title of Course:	Manufacturing Processes and Materials
Curriculum Coordinator:	Rick Schieni
Designation:	Required Course

Course Description:

This survey course provides an introduction to manufacturing processes and materials. The student will review the broad range of materials, technologies, and processes used to manufacture the immense variety of products that most of us take for granted. The lab exercises provide students a chance to get hands-on experience with some common machining and metal treatment processes, and to examine in detail the materials and methods used to manufacture a common consumer product.

Prerequisites:

CIT 105 Statics for Technicians

Co-requisite:

None

Textbook and other required material:

Fundamentals of Modern Manufacturing by Groover, Wiley, 7th Ed
Laboratory handouts provided by the instructor.

Course Learning Outcomes and their relationships to Student Outcomes:

1. Describe the principal mechanical and physical properties of the three basic categories of engineering materials. **(SO c)**
2. Explain how material properties make certain materials well-suited for some design applications and poorly suited for others.
3. Explain how material properties affect their ability to be shaped by various manufacturing processes.
4. Describe the basic principles of the casting processes, including metal casting and injection molding.
5. Describe the basic principles of the machining processes, including turning, milling and drilling.
6. Describe the basic principles of deformation processes, such as forging, stamping and bending.
7. Describe the basic principles of heat treatment for metals, with emphasis on steel.

8. Describe the following machining processes: EDM, Electron Beam Machining, Plasma Arc Cutting, Water Jet Cutting, Laser Beam Machining, and Chemical Machining.
9. Describe the principles of CNC Machining.
10. Perform basic machining operations on a lathe, milling machine and drill press. **(SO a)**

Topics Covered:

- The importance of manufacturing
- The nature of materials
- Mechanical and physical properties
- Dimensions, tolerances, surface finishes
- Metals
- Ceramics and polymers
- Composites
- Fundamentals of Metal Casting
- Casting Processes for Metals
- Shaping Processes for Plastics
- Powder Metallurgy
- Metal Deformation Processes
- Material Removal Processes (Machining)
- Heat Treatments
- Numerical Control Machining (CNC)
- Manufacturing Engineering
- Mechanical Assembly
- Electronic Assembly and Packaging
- Non-Traditional Machining
- Welding

Class/Laboratory schedule. Number of sessions each week and duration of each session:

3 hours of lecture per week for 14 weeks
 3 hours of laboratory per week for 14 weeks

Criteria 5 Contribution:

Technical Content

Prepared By:	A. C. Stickler	Date:	3/29/08
Rev 1:	J. Finne Update mapping of course outcomes to 2014-2015 student outcomes.	Date:	4/28/14
Rev 2:	General Update	Date:	3/15/21