



**Course Name: MEC-110 Materials for Engineering Technology**

Date Updated: 4/2022

Credit Hours/week: 4 hrs./wk. – 4 cr.

BEGINNING: SPRING 2022

Catalog Description: This course covers metallic, plastic and ceramic materials that are important to manufacturing. Topics include: molecular and microscopic structures in relationship to material properties, testing of mechanical and thermal properties with reference to ASTM standards, equilibrium diagrams and physical metallurgy emphasizing steel and aluminum, heat treatment of steel, molding and forming methods for plastics. A brief study of ceramics and composites is included.

Prerequisite: MAT-007 – Foundations of Algebra

Text: Essentials of Material Science and Engineering, 4th Edition, Askeland and Wright

Supplementary Material: Check Blackboard for Notes

Syllabus:

Period	Topics
1	Introduction
2	Chapter 2: Atomic Structure
3	Chpt 3: Atomic Arrangements Chpt 4: Imperfections
4	Chapter 6: Mechanical Properties
5	Chapter 7: Mechanical Properties
6	Non-Destructive Testing
7	Review/Midterm Exam
8	Chapter 8: Strain Hardening
9	Chapter 10: Solid Solutions
10	Chapter 11: Dispersion Strengthening
11	Chapter 12: Dispersion Strengthening
12	Chpt 13: Heat Treatment Chpt 14: Non-ferrous metals
13	Chapter 15: Ceramics
14	Chapter 16: Polymers
15	Chapter 17: Composites
16	Review/Final Exam

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**

- Identify various engineering materials and determine their mass densities.
- Determine the mechanical properties of materials using hardness testers, universal testing machine, impact tester and fatigue strength testing machine.
- Study the effect of cold working on metals
- Learn non-destructive testing of metals using the Magnaflux, Penetrant, Ultrasonic and X-ray tests
- Study cooling curves of metals and alloys
- Analyze micro-structure of metals
- Classify metals using ASTM and other standards
- Study the effect of heat treatment on the properties of steel
- Understand solution heat treatment and age hardening of aluminum
- Determine mechanical properties of plastics and composites
- Learn properties of ceramics and composites and their industrial application.