

**Virginia Western Community College**  
**MEC 113**  
**Materials and Processes of Industry**

**Prerequisites**

None

**Corequisites**

MTH 111 (Not Intended for Transfer) -Provides a foundation in mathematics with emphasis in arithmetic, unit conversion, basic algebra, geometry, and trigonometry. This course is intended for CTE programs.

**OR**

MTH 167 Pre-Calc (For Transfer) Presents topics in power, polynomial, rational, exponential, and logarithmic functions, systems of equations, trigonometry, and trigonometric applications, including Law of Sines and Cosines, and an introduction to conics.

**Course Description**

Studies engineering materials and accompanying industrial manufacturing processes. Investigates the nature of materials structure and properties from a design standpoint. Analyzes the effects of various processes on materials, and the processes themselves. Includes machining, casting, forming, molding, hot/cold working, chip less machining, and welding. Addresses quality assurance and inspection procedures.

**Semester Credits: 3 Lecture Hours: 3 Lab Hours: 0**

**Required Materials****Textbook:**

None

**Software:**

CES Edupack 2016 Materials Selection Software provided by college via network

**Other Required Materials:**

Teacher will provide required text

**Course Outcomes**

At the completion of this course, successful students will

- Understand how the elements are the building blocks for engineering materials
- Select a material for an application based on the use environment and manufacturing method.
- Know basic chemistry, the nature of the atom, and how the elements combine; and the establishment of language of materials
- Possess a broad knowledge of the methods used to manufacture metals and plastics into finished products
- Understand how engineering materials, metals, polymers, ceramics, and composites are related in origin and structural characteristics
- Recognize the properties that must be reviewed when making material selections
- Know how properties apply to different material systems
- Understand the pitfalls to avoid in performing property tests and in using property data
- Understand the difference among the properties of stiffness, strength, and toughness
- Know the methods used to produce metals from ore to finished raw material.
- Recognize the methods and benefits of the strengthening and processing heat treatments.
- Understand the differences between casting and advanced material shaping and forming processes

### **Topical Description**

- Introduction to Materials
- Material Classification and Properties
- Mechanical Properties of Metal
- Metal Manufacturing
- Metal Classification
- Ferrous Metals and Alloys
- Nonferrous Metals
- Plastic Properties & Processes
- Ceramics
- Composites
- Material Selection

### **Notes to Instructors**

Beginning Fall 2020, VWCC will require students to have a computer or reliable access to a computer, capable of participation in an online format. Online courses at Virginia Western require a significant amount of interaction with Canvas, the Learning Management System, and many require real-time class sessions using the Zoom web-conferencing tool. To be successful in online classes, students

must have substantial access to a computer with hi-speed internet connectivity. The expected requirements are listed on the college webpage.