

IT 242 - Materials and Processes

Minimum Topics to be Covered

- 1) Nature and properties of materials
 - a) Atomic structures
 - b) Bonding between molecules
 - c) Crystalline and noncrystalline structures
 - d) Mechanical properties
 - e) Physical properties
- 2) Dimensions and Tolerances
- 3) Measurement and Inspection
- 4) Mechanical Assembly
- 5) Ferrous metals and their properties
- 6) Nonferrous metals and their properties
- 7) Ceramics
- 8) Polymers
- 9) Metal Casting / Foundry Processes
- 10) Particulate Processing of Metals and Ceramics
- 11) Metal Forming Processes
- 12) Shaping processes for plastics
- 13) Heat Treatment of metals
- 14) Machining Operations and Machine Tools

Minimum Course Objectives - Students will be able to:

1. Understand the basic atomic structure of many materials used in manufacturing
2. Describe mechanical / physical properties of industrial materials and have a working knowledge of tests used to describe these properties
3. Use basic measurement and inspection tools including micrometers (inch and metric), dial calipers, and vernier measuring instruments.
4. Understand nomenclature and properties of mechanical fasteners such as bolts, nuts, and screws.

5. Understand the production of Ferrous and Nonferrous metals
6. Describe the major alloys used in the production of Ferrous and Nonferrous metals and the properties which will be altered through their use.
7. Describe major categories of polymers used in modern manufacturing and how they are processed.
8. Have a broad understanding of metal casting and foundry processes.
9. Have a broad understanding of metal forming processes.
10. Understand basic heat treatment and a basic understanding of phase diagrams
11. Students will have an introductory knowledge of major machine tools.