

IE 220 - MATERIALS AND PROCESSES IN MANUFACTURING **Spring 2016**

Instructor: Dr. Kemal BERKKAN kemal.berkkan@boun.edu.tr

Assistant:

Course Schedule: WWWTh 5676 M 1100 M 1100 M 1100 M 2180

Prerequisites: PHYS 121, CHEM 105

Course Description:

This course is designed to inform students about various manufacturing processes and materials used in these processes. Atomic structure and manufacturing properties of metals are discussed. Followed by principles and classifications of processes in manufacturing; advantages, limitations and comparisons of material processing such as casting, forging, rolling, sheet metal working, plastic forming, machining, additive manufacturing.

Textbook:

"Manufacturing Engineering and Technology" by Serope Kalpakjian & Steven R. Schmid

Topics Covered:

1. Introduction to Manufacturing
2. The Structure of Metals
3. Manufacturing Properties of Materials, Physical Properties of Materials
4. Metal Alloys; Polymers
5. Fund. of metal casting: classification, metallurgical principles, solidification, fluid flow and heat tr.
6. Metal casting processes: sand casting, investment casting, die casting
7. Casting design, materials and economics; Polymer processing: Injection molding
8. Classification of forming processes, Mechanical and metallurgical fundamentals.
9. Bulk and hot-working processes, Rolling, forging, extrusion and drawing,
10. Sheet metal forming. Cutting, Bending, Stamping & Drawing, Presses.
11. Classifications material removal processes, physical essentials. Chip formation. Tools and tool life.
12. Machining processes: Turning, boring, drilling, shaping, planning and machine tools
13. Machining processes: Milling, broaching and machine tools. Abrasive machining processes
14. Nontraditional and modern processes.

Grading:

2 Mid-Terms	50%
Project	10%
Final	40%