Catalog Description:

Prerequisite by Topic:
General understanding of material science

Textbook:
2- Lecture notes on WEB: http://me.emu.edu.tr/majid/classes.htm

References:
2. Benjamin W. Niebel, Alan B. Draper and Richard A. Wysk Modern Manufacturing Process
3. E.P. DeGarmo, J.T. Black and R. Kohser, Material and processes in Manufacturing, Prentice Hall,
   1997.

Course Objectives:
1- To gain an understanding and appreciation of the breadth and depth of the field of manufacturing and
   the related processes.
2- To learn and apply the basic terminology associated with these fields.
3- To become familiar with the basic principles and theories used to describe the manufacturing
   processes.
4- To compare the advantages and limitations of manufacturing processes.
5- To develop an ability to solve homework and design projects in a team environment.

COURSE OUTLINE
Week 1-2  **Manufacturing and production systems: (2weeks)**
Roles of engineers in manufacturing, new Manufacturing systems, properties of materials and material selections

Week 3-4  **Hot and cold working processes: (2 weeks)**
Rolling, forging, extrusion, drawing, bending.

Week 5-6  **Metal casting processes: (2 weeks)**
Sand casting, expanded polystyrene process, ceramic shell modeling (investment casting), die-casting, design for casting and casting quality

Week 7-8  **Properties of polymer melts: (2 weeks)**
extrusion, injection molding, blow molding, casting

Week 9-11  **Chip formation in machining: (3 weeks)**
Material removal, tool materials and tool life, cutting speed and Feed, optimization of the cutting process, abrasive machining, ECM, EDM, CNC programming

Week 12-13  **Joining processes and equipment: (2 weeks)**
Solid states, Liquid states, Liquid/solid states.

Week 14  **Manufacturing in a competitive environment: (1 week)**
Group Technology, FMC, FMS and CIM

**Computer Usage:**
Students are encouraged to use internet to search for various topics, including contents of similar courses offered elsewhere. Students can reach teaching material on the allocated Web sites.

**Teaching Techniques:**
Over-head projectors are used in class rooms. Tutorials are organized to establish a closer contact with students.

**Laboratory/Studio Works:** Laboratory sessions are organized in parallel to theoretical study given in classrooms. Students perform at least 4 different experiments and submit reports for evaluation

**GRADING POLICY**
Design projects: 15 % Students are required to participate in two team projects (three to five students). The first project is given at the beginning of the semester. The second project is given after first mid-term exam. On completion of each project, a presentation will be given in class. Evaluation of the project is based on performance of team building skills through groups, working and communication,
through individual and group presentations of the design project in class. The list of projects will be announced at beginning of each semester.

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<tbody>
<tr>
<td>Mid-term Examination</td>
<td>30%</td>
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<td>Lab</td>
<td>10%</td>
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<td>Final Examination</td>
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(Only one examination)