MEEN 3100
Manufacturing Processes

Catalog Description: [Credit 3: 2 hrs lecture and 3 hrs lab]
Major manufacturing processes, their capabilities, analysis, and economics. Study of the fundamentals of engineering processes in manufacturing as related to design and production and materials properties. Traditional and non-traditional manufacturing process and selection optimization. Students will be given laboratory assignments in material removal, forming, casting, joining, forging, and computer aided machining.

Prerequisites: ENGR 2332 and ENGR 3450

Lecture Instructor
Dr. Reza A. Mirshams
Office College of Engineering, Discovery Park, F128
Phone 940-565-2594
Email reza.mirshams@unt.edu

Course Information
Meeting Hours TuTh 3:30-5:10 PM
Office Hours TuTh 2-3 PM and Wed. 10:30-11:30 AM
Course webpage UNT Blackboard at https://ecampus.unt.edu/webct. Backboard could be accessed by using EUID and password for the students who have enrolled in the course on the 1st day of class.

Required Textbook:

Additional Reading References:

Objectives:
1. To introduce students to various industrial manufacturing processes and their classification, characteristics, and application.
2. To learn professional team work and task management in product development.
3. To learn the importance of making good decisions at the design stages of part and device development so that desired functionality, manufacturability, time to market, cost, quality, robustness and durability are emphasized.

Course Outcomes:
After completion of the course, student will
a. Demonstrate the ability to state materials properties and apply these properties to manufacturing processes and design.
b. Demonstrate the ability to compare and distinguish the advantages of traditional mechanical manufacturing processes in design process.
c. Demonstrate the ability to interpret product requirements, manufacturing process capability data and apply them to select and/or synthesize suitable manufacturing process(es).
d. Demonstrate the ability to differentiate advanced and non-traditional manufacturing processes.
e. Demonstrate the basis process optimization techniques by understanding the role of economic consideration, materials properties and design constraints in manufacturing processes selection.
Topics to be Covered:

1. Basics:
   1.1 Review of materials and mechanical properties
   1.2 Metrology and surface finish
   1.3 Taxonomy of manufacturing processes

2. Manufacturing Processes:
   2.1 Casting
   2.2 Bulk deformation (forging, rolling, drawing, extrusion)
   2.3 Sheet metal forming
   2.4 Mechanical material removal (cutting, grinding)
   2.5 Non-Mechanical material removal (ECM, EDM, laser, electron beam, water jet)
   2.6 Polymer and polymer composites processing
   2.7 Joining (welding, soldering and brazing, adhesives, rivets)
   2.8 Micro manufacturing methods (MEMS, Micromachining)
   2.9 Rapid Prototyping

3. Manufacturing Engineering:
   3.1 Economic modeling and cost analysis
   3.2 Process selection

Course Instruction and Assignments

1. Attendance is required for all class hours.
2. Backboard will be used for posting the course materials and instructions, assignments, submission of assignments, email communications about the course, and the course grade-book. Be sure to check Blackboard Vista and the course email at least every other day, if not daily.
3. No make-up on quizzes and homework assignments.
4. Discussion and exchange of ideas are important parts of the learning process and I encourage collaboration in a community of scholars. However, you must be sure the work you submit for grading is your own. Submitted works that are copies from solution manuals or website solutions or your classmates will be treated as plagiarism.

Teaching Methodology:
   Lecture: 2 hours/week

Grades:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Class attendance</td>
<td>5%</td>
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<tr>
<td>Quizzes, and case studies</td>
<td>15%</td>
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<td>Midterm exam</td>
<td>25%</td>
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<td>Laboratory</td>
<td>30%</td>
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<td>Final exam</td>
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<td><strong>TOTAL</strong></td>
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Grading Scales:

A: 90 - 100
B: 75 - 89
C: 60 - 74,
D: 55 – 59,
F: Below

Disabilities Accommodation:

The University of North Texas complies with Section 504 of the 1973 Rehabilitation Act and with the Americans with Disabilities Act of 1990. The University of North Texas provides academic adjustments and auxiliary aids to individuals with disabilities, as defined under the law. Among other things, this legislation requires that all students with disabilities be
guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring accommodation, please see the instructor and/or contact the Office of Disability Accommodation at 940-565-4323 during the first week of class.

**Additional Class Policies**

1. Attendance is required for all class hours.
2. The Student Evaluation of Teaching Effectiveness (SETE) is a requirement for all organized classes at UNT. This short survey will be made available to you at the end of the semester, providing you a chance to comment on how this class is taught. I am very interested in the feedback I get from students, as I work to continually improve my teaching. I consider the SETE to be an important part of your participation in this class.
3. The UNT Catalog procedures on cheating and plagiarism will be vigorously enforced. It is the duty of each student to protect their work so it is not available to others for submission as their efforts. This is especially true of files that are generated on the computer. Students that knowingly allow others to use their work are partners in this unethical behavior. All rules relating to academic dishonesty will be enforced in accordance with University policies.
4. State common law and federal copyright laws protect this course lectures and materials. They have my own original expression and revisions to the textbook author(s) and I record them at the same time that I deliver them. Whereas you are authorized to take notes in class, thereby creating a derivative work from my lecture, and/or make a print of my lecture notes/slides. The authorization extends only to making one set of notes for your own personal use and no other use. You are not authorized to record my lectures, to provide your notes to anyone else or to make any commercial use of them without express prior permission from me.
5. This syllabus is subject to change at any time during the semester with changes to be announced during the class hours.
6. Cell phones, iPhones, iPods, iPads, laptops must be turned off or in silent mode before the start of the class and left in your pocket, purse, or book bag.
7. Scheduled topics of the lecture may be adjusted during the semester.
8. Each class meeting may have a mix of lecture, hands-on problem solving, review of homework problems, discussion of case studies, and pop quiz.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Textbook Chapter</th>
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<tbody>
<tr>
<td>1 (January 18, 2012)</td>
<td>Introduction</td>
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<tr>
<td>2</td>
<td>Fundamentals of Materials Mechanical Behavior</td>
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<td>3</td>
<td>Materials Structures and Manufacturing Properties</td>
<td>3</td>
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<td>4</td>
<td>Surface Properties and Tribology</td>
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<td>5</td>
<td>Metal casting</td>
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<td>6</td>
<td>Bulk Deformation Processing</td>
<td>6</td>
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<td>7</td>
<td>Sheet Metal Forming</td>
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<td>8 (March 8, 2012)</td>
<td>Midterm Exam</td>
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<td>9</td>
<td>Machining Processes</td>
<td>8</td>
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<td>10</td>
<td>Advanced Machining Processes</td>
<td>9</td>
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<td>11</td>
<td>Polymers and Prototyping</td>
<td>10</td>
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<td>12</td>
<td>Manufacturing by Powders</td>
<td>11</td>
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<td>13</td>
<td>Joining and Fastening Processes</td>
<td>12</td>
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<td>14</td>
<td>Microelectronics and MEMS Manufacturing</td>
<td>13</td>
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<td>15</td>
<td>Modern Manufacturing</td>
<td>14 &amp; 15</td>
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<td>16 (Wed. May 9, 2012)</td>
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