

**George W. Woodruff School of Mechanical Engineering**  
**Georgia Institute of Technology**  
**Design, Materials, and Manufacture**

**ME3210 A/SOUP**

**Summer 2020**

**Specific Course Information:**

Brief Description of the Course Content (Catalog Description):

Major manufacturing processes, capabilities, and costs. Interaction between design, materials and manufacturing process selection.

Prerequisites or Co-requisites:

ME 2110 Creative Decisions and Design, MSE 2001 Engineering Materials, COE 3001 Mechanics of Deformable Bodies

This is a required course in the ME program.

- Outcomes:**
- 1) To understand the major manufacturing processes – students shall demonstrate the ability to identify and describe the major manufacturing processes, and their capabilities and limitations.
  - 2) To understand the interactions between design, materials, and manufacturing – students shall demonstrate the ability to convert design requirements into constraints and objectives for selection of materials and manufacturing processes.
  - 3) To be able to select the appropriate manufacturing processes given single and multiple design and material constraints – students shall demonstrate the ability to select manufacturing processes under single and multiple constraints and objectives. In addition, students shall demonstrate the ability to use process capability information to select and/or synthesize manufacturing processes and systems.

**Instructors:** Dr. Steven Y. Liang, Phone: 404-894-8164, Fax: 404-894-9342, MARC 459, steven.liang@me.gatech.edu, Office Hours: TuTh 9:15am-11:00am. Open door always

**Grader:** To be announced

**Text:** *Manufacturing Processes for Engineering Materials*, Serope Kalpakjian and Steven R. Schmid, 6<sup>th</sup> edition, Pearson Prentice-Hall, 2016.

*Materials Selection in Mechanical Design*, Michael F. Ashby, 4<sup>th</sup> edition, Butterworth-Heinemann, 2011

**References:** *Fundamentals of Modern Manufacturing: Materials, Processes, and Systems*, Mikell P. Groover, Prentice Hall, 2012

*Materials and Processes in Manufacturing*, E. Paul DeGarmo, J. T. Black, Ronald A. Kohser, 2011

**Grading:** The final semester grade will be determined based on the following items:

Homeworks (4 or 5)	10%
1 <sup>st</sup> Midterm Exam, 6/5, Fri, 2:00 – 3:00 pm (60 minutes)	25%
2 <sup>nd</sup> Midterm Exam, 7/6, Mon, 2:00 – 3:00 pm (60 minutes)	25%
Final Exam, 7/29, Wen, 2:40 – 4:10 pm (90 minutes), Cumulative	40%

**Policies:** Homeworks shall be done on individual basis and will be considered cheating otherwise.

Prior to the due dates, instructor can only clarify the homework problem statements but will not discuss how the homeworks are to be solved. Late homework will not be accepted no matter what. Note that homeworks might be assigned on new material covered during the week preceding midterm and final exams. During lectures the use of electronic device (including phone, computer, ipod, ipad, etc) will lead to a 2-point deduction each time. It is student's responsibility to look up, with or without notifications, all materials and instructions posted on Canvas. All exams will be closed books/notes, with one sheet of formula/notes no larger than 8½" by 11" and calculator (without memory and communication such as smart phones or computers) allowed. Absence from a class (due to official GT business) with instructor's prior approval will receive make-up for missed exam, however it is the student's responsibility to learn the missed lecture content in preparation for subsequent homework and exams. Even with an official class absence, relevant homework still needs to be submitted on the scheduled due date. Absence from any exam without PRIOR approval from the instructor will result in a zero point for that test. Personal travel is not a permissible reason for rescheduling an exam. All acts of cheating will lead to a zero point for that grading item plus a 10-point reduction of the overall semester grade, and will be reported to the VP/Dean of Students without exception. Any discussion with the instructor regarding the grades in this semester shall be made before Monday, 5/24/2021.

**Schedule:**

<b>Week</b>	<b>Mondays</b>	<b>Wednesdays</b>	<b>Fridays</b>
<b>1</b>	March 11 (Lecture 1) Syllabus and Introduction	March 13 (Lecture 2) Key Manufacturing Considerations	March 15 (Lecture 3) Design for Manufacturing and Assembly
<b>2</b>	March 18 (Lecture 4) Design for Manufacturing and Assembly	March 20 (Lecture 5) Design for Manufacturing and Assembly	March 22 (Lecture 6) Material Variety and Functionalities
<b>3</b>	March 25 Holiday	March 27 (Lecture 7) Material Variety and Functionalities y	March 29 (Lecture 8) Material Variety and Functionalities
<b>4</b>	June 1 (Lecture 9) Surface and Quality	June 3 (Lecture 10) Surface and Quality	June 5 1 <sup>st</sup> Midterm
<b>5</b>	June 8 (Lecture 11) Casting	June 10 (Lecture 12) Casting	June 12 (Lecture 13) Casting
<b>6</b>	June 15 (Lecture 14) 3-D Printing	June 17 (Lecture 15) Powder Metallurgy	June 19 (Lecture 16) Joining
<b>7</b>	June 22 (Lecture 17) Forming	June 24 (Lecture 18) Forming	June 26 (Lecture 19) Forming
<b>8</b>	June 29 (Lecture 20) Machining	July 1 2 <sup>nd</sup> Midterm	July 3 School Break
<b>9</b>	July 6 (Lecture 21) Machining	July 8 (Lecture 22) Machining	July 10 (Lecture 23) Non-Traditional Machining
<b>10</b>	July 13 (Lecture 24) Electronics Manufacturing	July 15 (Lecture 25) Electronics Manufacturing	July 17 (Lecture 26) Polymer Manufacturing
<b>11</b>	July 20 (Lecture 27) Composites Manufacturing	July 29 Final Exam	