Nontraditional Manufacturing

1. Course objectives
   Manufacturing processes that make use of electrical, chemical, ultrasonic, magnetic, and photonic sources of energy are referred to as nontraditional manufacturing technologies. These energy field–assisted processes allow innovative approaches to material processing and improve the productivity and overall quality of the finished product. This course introduces nontraditional manufacturing technologies, explains how products are made, and describes how manufacturing problems are solved.
   Upon completion of this course, students will be able to demonstrate the following:
   1. an understanding of nontraditional manufacturing processes;
   2. the ability to rapidly and accurately perform manufacturing engineering evaluations and analyses; and
   3. the ability to survey, understand, and present advanced knowledge and information following the current trends in manufacturing.

2. Prerequisite
   EML 4321 Manufacturing Engineering or an equivalent course

3. Instructor
   Hitomi Yamaguchi Greenslet
   Office: 226 MAE-B
   Email: hitomiy@ufl.edu
   Telephone: (352) 392-0812
   Office Hours: by appointment

4. Teaching assistants
   Junmo Kang
   Office: 227 MAE-B
   Email: vatkong@ufl.edu
   Office Hours: by appointment

5. Meeting times
   UF EDGE online

6. Meeting location
   UF EDGE online

7. Topics covered
   1. Introduction to Machining Processes
   2. Mechanical Processes (Ultrasonic machining, Water jet machining, Magnetic abrasive machining)
   3. Chemical Processes (Chemical milling, Electropolishing)
4. Electrochemical Processes (Electrochemical machining, drilling, and deburring)
5. Thermal Processes (Electrodischarge machining, Laser beam, electron beam, and ion beam machining)
6. Hybrid Electrochemical Processes
7. Hybrid Thermal Processes

8. Required textbook
   - Hassan El-Hofy, Advanced Machining Processes–Nontraditional and Hybrid Machining Processes
     published by McGraw-Hill, 2005

9. Recommended reading
   - Wenwu Zhang, Intelligent Energy Field Manufacturing: Interdisciplinary Process Innovations
     published by CRC Press. 2010
     ISBN 978-1-4200710-1-6
   - George Tlusty, Manufacturing Processes and Equipment
     published by Prentice-Hall, 2000
     ISBN 0-201-49865-0
     published by John Wiley & Sons, Inc., 2010
     ISBN 978-0-470-46700-8
     published by Pearson Education, Inc., 2008
   - Journals including ASME Journal of Manufacturing Science and Engineering, Annals of the CIRP, Precision Engineering, etc.

10. Tentative course outline (dates are subject to change – this is to serve as a guideline only)
    See the attached sheet.

    Deadline for proctor to return completed Final exam 9 pm (EST) is on Friday, August 5, 2011.
    No early or late Final Exams will be administered.

11. Attendance and expectations
    Class policies
    - Cheating and any other form of academic dishonesty will result in failure and prosecution according to university policies.
    - Students are responsible for all announcements, assignments, etc. made during lectures, including changes in the scheduling of lecture topics, homework assignments, and exams.
    - Any changes in the schedule or assignments will be communicated to the class via email using your Gatorlink (@ufl.edu) email address and the course website. You are responsible for monitoring your mailbox and the website regularly for any class notices.
Homework policies
- Homework must be neat, be legible, and show all major steps.
- Homework must be on 8.5” x 11” paper.
- Homework must have the assignment number, your name, and the date of submission in the upper right-hand corner of the first sheet.
- Homework must have the page number on the bottom right corner of every page.
- Homework must be submitted to Dr. Greenslet (hitomiy@ufl.edu) by e-mail by 9 am (EST) on the due date. In general, late homework will not be accepted.
- You are encouraged to discuss the homework with your classmates. However, every student must provide their solution by themselves. Copying of homework will be treated as academic dishonesty.

Exam policies
- Exams will be given following UF EDGE procedures. http://www.ufedge.ufl.edu/students/taking_exams.php.
- Students will have one week to complete each exam.
- Exams will be open book. In general, a calculator will be required during exams.
- It is the students’ responsibility to communicate their knowledge on the exams. In order to be able to grade your work, it must be neat, legible, and follow logical steps with all work shown. Partial credit may be given for work that can be followed and where the nature and magnitude of the mistake can be identified. No credit will be given for correct answers with insufficient indication of how they were obtained.
- Students should be aware that their work is submitted under the honor code pledge required on all work submitted by UF students. The pledge reads: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." Students can learn more about the UF honor code at the UF Student Government website. (http://www.ufedge.ufl.edu/students/taking_exams.php)

Project (written report and presentation) policies
Written report:
- Each student must choose a subject related to advanced nontraditional manufacturing processes, survey the related literature, and summarize the processes.
- The report must be on 8.5” x 11” paper.
- Use Arial font with a font size of 10 points or larger and a black font color.
- The report must have the page number on the bottom right corner of every page.
- The report must have the date of submission in the upper right hand corner of the first sheet.
- The report must include the title, your name, abstract, introduction, body of the report, conclusions, and at least 10 references.
- The report must be no longer than 6 pages overall.
- The report (PDF file) must be submitted to Dr. Greenslet (hitomiy@ufl.edu) by e-mail by 9 am (EST) on July 15, 2011. In general, late submission will not be accepted.
- Refer to http://www.uflib.ufl.edu/msl/07b/studentplagiarism.html to learn how to prevent misconduct related to plagiarism.
Written presentation:
- Must be prepared on 3 PowerPoint slides (8.5” x 11” size).
- Must include the title, your name, body of the presentation, date of submission, and page number.
- Must indicate sources as needed.
- Must be submitted Dr. Greenslet (hitomiy@ufl.edu) by e-mail by 9 am (EST) on July 15, 2011. In general, late submission will not be accepted.

Feedback on project reports and presentation policies
- Each student chooses one of other students’ project reports and writes comments and suggestion.
- Feedback must be on a single 8.5” x 11” paper.
- Feedback must have the date of submission in the upper right-hand corner of the sheet.
- Feedback must include the title and your name.
- Use Arial font with a font size of 10 points or larger and a black font color.
- Feedback must be submitted to Dr. Greenslet (hitomiy@ufl.edu) by e-mail by 9 am (EST) on July 25, 2011. In general, late submission will not be accepted.

12. Grading
- Midterm exam 25 %
- Final exam 25 %
- Project 30 % (Report: 15 %, Presentation: 15 %)
- Feedback on project reports 5 %
- Homework 15 %

13. Grading scale
The scores of each of the individual items will be weighted as shown above. In general, letter grades will be assigned using the following scale:
- A: 93-100, A-: 90-92.9, B+: 87-89.9, B: 83-86.9, B-: 80-82.9, C+: 77-79.9,
- C: 73-76.9, C-: 70-72.9, D+: 67-69.9, D: 63-66.9, D-: 60-62.9, E: 0-59.9.
However, the instructor reserves the right to adjust individual grades according to a holistic evaluation of the student’s knowledge and effort.

14. Make-up exam policy
The dates and times for the exams are announced in advance. No make-up exams will be given except for valid medical reasons. Please schedule your other activities accordingly.

15. Honesty policy
All students admitted to the University of Florida have signed a statement of academic honesty committing them to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.
16. Accommodation for students with disabilities
Students requesting classroom accommodation must first register with the office of the Dean of Students. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.

17. UF counseling services
Resources are available on campus for students having personal problems or lacking clear career and academic goals. The resources include:
- University Counseling and Wellness Center, 3190 Radio Road, 392-1575, personal counseling.
- Student Health Care Center, Infirmary Building, 1 Fletcher Drive, 392-1161, personal counseling.

18. Software use
All faculty, staff, and students of the University are required to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.
### Course Schedule

**Instructor:** Hitomi Yamaguchi

**Greenslet 5/2/2011**

<table>
<thead>
<tr>
<th>Class #</th>
<th>Date</th>
<th>Day</th>
<th>Textbook</th>
<th>Contents</th>
<th>HWs</th>
<th>Exams and project</th>
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