May 19, 2010

MEMORANDUM

TO: Darryll Pines
   Dean, A. James Clark School of Engineering

FROM: Elizabeth Beise
      Interim Associate Provost for Academic Planning and Programs

SUBJECT: Proposal to modify the curriculum of the M.S. in Materials Science and Engineering (PCC log no. 09080)

At its meeting on April 30, 2010, the Senate Committee on Programs, Curricula and Courses approved your proposal to modify the curriculum of the M.S. in Materials Science and Engineering. A copy of the approved proposal is attached.

The changes are effective Fall 2010. The School should ensure that the changes are fully described in the Graduate Catalog and in all relevant descriptive materials, and that all advisors are informed.

MDC/
Enclosure

cc: Alex Chen, Chair, Senate PCC Committee
    Sarah Bauder, Office of Student Financial Aid
    Reka Montfort, University Senate
    Erin Howard, Data Administration
    Donna Williams, Institutional Research & Planning
    Anne Turkos, Archives
    Linda Yokoi, Office of the Registrar
    Thomas Castonguay, Graduate School
    Gary Pertmer, A. James Clark School of Engineering
    Robert Briber, Materials Science and Engineering
THE UNIVERSITY OF MARYLAND, COLLEGE PARK
PROGRAM/CURRICULUM/UNIT PROPOSAL

- Please email the rest of the proposal as an MSWord attachment to pcc-submissions@umd.edu.
- Please submit the signed form to the Office of the Associate Provost for Academic Planning and Programs, 1119 Main Administration Building, Campus.

College/School: Engineering
College/School Unit Code-First 8 digits: 01203200
Unit Codes can be found at: https://hypprod.umd.edu/Html_Reports/units.htm

Department/Program: 1321901 Materials Science and Engineering

Type of Action (choose one):
- Curriculum change (including informal specializations)
- Renaming of program or formal Area of Concentration
- Addition/deletion of formal Area of Concentration
- Suspend/delete program

Italics indicate that the proposed program action must be presented to the full University Senate for consideration.

Summary of Proposed Action:
Masters program – Thesis option: Students will no longer be required to take 3 credits of minor coursework. The total credits for the degree will remain 30 credits.

Masters program – Non thesis option: Students will no longer be required to take 3 credits of minor coursework. Instead, they will take a new course (ENMA 797: Independent Study) to prepare the scholarly paper required for the non-thesis option. In addition, they may count ENMA 688: Seminar for the other specialized/minor course. Currently, ENMA 688 (1 credit) must be taken three times but does not count toward the degree. The total credits for the degree will remain 30 credits.

APPROVAL SIGNATURES - Please print name, sign, and date. Use additional lines for multi-unit programs.

1. Department Committee Chair

2. Department Chair

3. College/School PCC Chair

4. Dean

5. Dean of the Graduate School (if required)

6. Chair, Senate PCC

7. University Senate Chair (if required)

8. Vice President for Academic Affairs & Provost
Masters Degree Requirements

Students wishing to pursue a M.S. degree in materials science must complete at least 30 credits. Courses are categorized as "Core Courses", "Advanced Graduate Courses", and "Graduate Courses in Minor Area". The Core Courses are mandatory--all students must complete them. Advanced Graduate Courses are at the 600 level and above.

<table>
<thead>
<tr>
<th>Category</th>
<th>Minimum Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Thesis Option</td>
</tr>
<tr>
<td>Core Courses</td>
<td>12</td>
</tr>
<tr>
<td>Advanced Materials</td>
<td>9</td>
</tr>
<tr>
<td>Courses</td>
<td></td>
</tr>
<tr>
<td>Minor Courses</td>
<td>3</td>
</tr>
<tr>
<td>Specialized/Minor</td>
<td>--</td>
</tr>
<tr>
<td>Courses</td>
<td></td>
</tr>
<tr>
<td>Thesis Research</td>
<td>6</td>
</tr>
<tr>
<td>Credits</td>
<td>30</td>
</tr>
</tbody>
</table>

In addition, attendance to the Department's Colloquium is required three semesters for all students except by special consent of the Department.

All of the following core courses must be taken by all full and part time Masters students:

- ENMA 650: Nanostructure of Materials
- ENMA 660: Thermodynamics in Materials Science
- ENMA 661: Kinetics of Reactions in Materials Science
- ENMA 671: Defects in Materials or ENMA 620: Polymer Physics

* Students wishing to study polymers or biomaterials are strongly urged to take ENMA 620. This choice must be approved by your research advisor. In addition, ENMA 698M, Mathematical Methods, must be taken by students if so determined by the Department.

Each core course can only be repeated once, unless there is
a special circumstance. In this rare instance the student is required to petition the Graduate Studies Committee for being allowed to take a core course a third time.

The minor requirement is intended to broaden the student's background. The minor should not be directly related to the student's field of interest. The minor course should be a coherent addition selected by the student and his/her advisor. Typical minors would include courses in Electrical Engineering, Mechanical Engineering, Chemical Engineering, Reliability Engineering, Nuclear Engineering, Physics, and Computer Science. The course can be taken with the consent of the advisor and the Department. Materials courses may not be used to fulfill the minor requirement.
Masters Degree Requirements

Students wishing to pursue a M.S. degree in materials science must complete at least 30 credits. Courses are categorized as "Core Courses", "Advanced Graduate Courses", and "Seminar", and, depending on whether the student selects a thesis or non-thesis option, "Thesis Research" or "Independent Study", respectively. The Core Courses are mandatory—all students must complete them. Advanced Graduate Courses are at the 600 level and above.

<table>
<thead>
<tr>
<th>Category</th>
<th>Minimum Credit Requirements</th>
<th>Thesis Option</th>
<th>Non-Thesis Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Courses</td>
<td>12</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Advanced Graduate Courses</td>
<td>9</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Seminar</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Independent Study (ENMA 797)</td>
<td>not required</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Thesis Research</td>
<td>6</td>
<td>not required</td>
<td></td>
</tr>
<tr>
<td>TOTAL:</td>
<td>30</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

All of the following core courses must be taken by all full and part time Masters students:

- ENMA 650: Nanostructure of Materials
- ENMA 660: Thermodynamics in Materials Science
- ENMA 661: Kinetics of Reactions in Materials Science
- ENMA 671: Defects in Materials * or ENMA 620: Polymer Physics *

* Students wishing to study polymers or biomaterials are strongly urged to take ENMA 620. This choice must be approved by your research advisor. In addition, ENMA 698M, Mathematical Methods, must be taken by students if so determined by the Department.
In addition, all students must take:

- ENMA 688: Materials Science and Engineering Seminar

*Attendance to the Department's Seminar course for three (3) semesters is required for all students except by special consent of the Department. Part-time off-campus graduate students can petition the Department to substitute a 3 credit 600 level course for the 3 credit ENMA 688 Department Seminar requirement.*
February 25, 2010

To: PCC Committee Members
    Office of the Associate Provost for Academic Planning and Programs
    University of Maryland

From: R.M. Briber, Professor and Chair
       Materials Science and Engineering Department

The Department of Materials Science and Engineering is submitting a request to change the current Masters of Science program. In addition to the required forms which are required for discussions of curriculum changes, I am writing this letter with more detail on the reason for this request. There are three changes in the proposed curriculum and each are discussed individually.

1. Students enrolled in the Masters Degree program in MSE must take 4 core courses. This will remain the same in the new curriculum. In addition to the core, they took combinations of advanced materials courses and minor and specialized courses. In the proposed new curriculum, students would simply be required to take 3 additional courses in the Masters – Thesis program and 4 additional courses in the Masters – Non Thesis option. These courses will be determined in conjunction with their advisor and allow for more flexibility in their individual degree plans.

2. Students in both options of the Masters under the new curriculum will now be able to count 3 credits of ENMA 688. Under the current program, students are required to take 3 credits of ENMA 688, but it is not applied towards their credit requirements. If students are required to take courses, these courses should apply to their credit requirements.

3. The Department is adding a new course, ENMA 797: Independent Study as a required course for student enrolled in the Masters – Non Thesis option. Addition of this course has been submitted to the College PCC Committee shortly. Students who are pursuing the Masters – Non Thesis option are required to submit a scholarly paper as one of the requirements for this degree. Requiring this course will standardize this submission process.

I have included the current curriculum as well as the proposed new curriculum. There are no courses being deleted from the curriculum. ENMA 797 will be offered each semester so that students will be able to graduate in a timely manner. No other Departments will be impacted by this change. Students enrolled prior to this change will be able to complete their degrees under either curriculum.

If you have any questions, please feel free to contact me.
To: MSE Graduate Students

From: Robert M. Briber, Professor and Chair, Department of Materials Science and Engineering

Subject: New Graduate Program Requirements

Date: December 4, 2009

The MSE Faculty have approved a series of changes in the degree requirements for the Graduate Programs in Materials Science and Engineering. Changes to the programs are summarized in this memo.

Masters Program – Thesis option
Students will now be required to take 12 credits of additional courses beyond the core courses (reduced from 16 credits). In addition, 3 credits of the Department Seminar Course ENMA 688 will now count towards their degree program. No changes were made to the requirement of 6 credits of ENMA 799. Total credits remain at 30. These changes in the thesis M.S. program must be submitted to the University for approval. The proposed date for the change to become effective is Fall 2010.

No changes to the current core course requirements were made.

Notes:
- Part time off campus graduate students can petition the Department to substitute a 3 credit 600 level course for the 3 credit ENMA 688 Department Seminar requirement.

Masters Program - Non Thesis Option
Students will now be required to take 12 credits of additional courses (reduced from 18 credits). Students will also be required to take a new 3 credit course ENMA 797: Independent Study. This course will allow preparation of the required scholarly paper for the non-thesis option. Students will register in their advisor’s section in ENMA 797. They will now count 3 credits of the Department Seminar Course ENMA 688 towards their degree program. These changes in the non-thesis M.S. program must be submitted to the University for approval. The proposed date for the change to become effective is Fall 2010.

No changes to the current core course requirements were made.

Notes:
Ph.D. students who would like to receive a MS non-thesis option “along the way” may use their Ph.D. proposal as their scholarly paper but must still register and complete ENMA 797.

Part time off campus graduate students can petition the Department to substitute a 3 credit 600 level course for the 3 credit ENMA 688 Department Seminar requirement.
University of Maryland Course Proposal Form

Course Prefix and Number: ENMA797

<table>
<thead>
<tr>
<th>Transcript Title: Independent Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title: Independent Study</td>
</tr>
<tr>
<td>Credits:</td>
</tr>
<tr>
<td>Minimum 3 Maximum 3</td>
</tr>
<tr>
<td>Repeatable to a maximum of 0 if content differs</td>
</tr>
<tr>
<td>Hour commitment per week:</td>
</tr>
<tr>
<td>Lecture: 3 Internship: Discussion:</td>
</tr>
<tr>
<td>Laboratory: Seminar:</td>
</tr>
<tr>
<td>Can this course be waived through an AP exam? No</td>
</tr>
<tr>
<td>Has this course been approved to fulfill a CORE distribution requirement? No</td>
</tr>
<tr>
<td>Grading Method: Standard Graduate</td>
</tr>
<tr>
<td>Formerly:</td>
</tr>
<tr>
<td>Prerequisite(s):</td>
</tr>
<tr>
<td>Corequisite(s):</td>
</tr>
<tr>
<td>Recommended course(s):</td>
</tr>
<tr>
<td>Restrictions:</td>
</tr>
<tr>
<td>Crosslisted with:</td>
</tr>
<tr>
<td>Shared with:</td>
</tr>
<tr>
<td>Credit will be given for only one of the following courses:</td>
</tr>
<tr>
<td>Will this course be offered at another location or through an alternate delivery method? No</td>
</tr>
<tr>
<td>Catalog Description: This course is designed to provide students with a directed independent study course in order to prepare the scholarly paper required for the master's degree without thesis degree option.</td>
</tr>
<tr>
<td>Reason for proposal/comments: This course will be required for all MSE students who will complete the MS without thesis option.</td>
</tr>
<tr>
<td>Early Warning Grades: No</td>
</tr>
<tr>
<td>Inclemont Weather Procedures: Yes</td>
</tr>
<tr>
<td>Academic Integrity / Honor Pledge: Yes</td>
</tr>
<tr>
<td>Accomodations for students with disabilities: Yes</td>
</tr>
<tr>
<td>Learning Outcomes: Students will develop a paper of scholarly quality. Students will learn how to formulate a research question, review the publish literature, collect data and develop a research design.</td>
</tr>
<tr>
<td>Assessment Policy: 40% research problem statement</td>
</tr>
<tr>
<td>60% final paper</td>
</tr>
<tr>
<td>Text/Resource Materials:</td>
</tr>
<tr>
<td>Course Pedagogy and Format: This course will be a seminar format. A paper on a specified research topic will be the goal of the course.</td>
</tr>
</tbody>
</table>

For use by Registrar's Office only

Effective Term: _______________________
Repeat Table: _______________________
Prereq pop-up: _______________________
Entered/date: _______________________
Verified: _______________________

1 of 1
Materials Science and Engineering Department
University of Maryland

ENMA 797: Independent Study
3 Credits

**Description:** This course is designed to provide students with a directed independent study course in order to prepare the scholarly paper required for the master's degree without thesis degree option.

**Class Schedule:** Meetings will be scheduled between the student's faculty member and the enrolled student(s) throughout the semester. Meetings will be clustered at the beginning and the end of the semester, as well as scheduled during the remainder of the semester. These meetings will be scheduled at a mutually convenient time.

The completed paper must be submitted to the program graduate program director two weeks prior to the published Graduate School deadline for submission of the Certification of Master's Degree without Thesis form (date varies each semester).

**Course Objectives:** Students will develop a paper of scholarly quality. Students will learn how to formulate a research question, review the published literature, collect data and develop a research design.

**Grading:** This course will be graded as follows:

- 40% research problem statement
- 60% final paper

**Academic Accommodations:** If you have a documented disability, you should contact Disability Support Services 0126 Shoemaker Hall. Each semester students with documented disabilities should apply to DSS for accommodation request forms which you can provide to your professors as proof of your eligibility for accommodations. The rules for eligibility and the types of accommodations a student may request can be reviewed on the DSS web site at [http://www.counseling.umd.edu/DSS/receiving_serv.html](http://www.counseling.umd.edu/DSS/receiving_serv.html).

**Religious Observances:** The University System of Maryland policy provides that students should not be penalized because of observances of their religious beliefs, students shall be given an opportunity, whenever feasible, to make up within a reasonable time any academic assignment that is missed due to individual participation in religious observances. It is the responsibility of the student to inform the instructor of any intended absences for religious observances in advance. Notice should be provided as soon as possible but no later than the end of the schedule adjustment period. Faculty should further remind students that prior notification is especially important in connection with final exams, since failure to reschedule a final exam before the conclusion of the final examination period may result in loss of credits during the semester. The problem is especially likely to arise when final exams are scheduled on Saturdays.

**Academic Integrity:** The University of Maryland has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this
course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit http://www.studenthonorcouncil.umd.edu/whatis.html

The University of Maryland is one of a small number of universities with a student-administered Honors Code and an Honors Pledge, available on the web at http://www.ipo.umd.edu/aca/honorpledge.html. The code prohibits students from cheating on exams, plagiarizing papers, submitting the same paper for credit in two courses without authorization, buying papers, submitting fraudulent documents, and forging signatures. The University Senate encourages instructors to ask students to write the following signed statement on each examination or assignment: “I pledge on my honor that I have not given or received any unauthorized assistance on this examination (or assignment).”

Instructor: ENMA Graduate Program Director
Professor Manfred Wutlig
1110B CHE
Tel: (301) 405-5212
Email: wutlig@umd.edu
Office Hours: By appointment