



College of Engineering

122 Hitchcock Hall
2070 Neil Avenue
Columbus, OH 43210-1278

Phone 614-292-2651
FAX 614-292-9379
E-mail engosu@osu.edu

Date: 22 September 2010

To: Randy Smith
Vice Provost, Office of Academic Affairs

From: Ed McCaul 
Secretary College of Engineering Committee on Academy Affairs (CCAA)

Subject: Semester Conversion Proposals for the BS/MS, MS, and PhD Degrees
in Materials Science and Engineering

Attached is a letter from, Yogesh Sahai, Acting Department Chair of Materials Science and Engineering, a letter their External Advisory Committee, as well as semester conversion proposals for their BS/MS, MS, and PhD degrees.

These proposals were reviewed by a subcommittee of CCAA. After reviewing the proposals and having some changes made to them the subcommittee recommended to the full committee that they be approved. After a discussion, CCAA unanimously approved the proposals on the 16th of September 2010 and requested that I forward the proposals to you for consideration by CAA. If you have any questions concerning these proposals please let me know.



Department of Materials Science and Engineering

Rudolph G. Buchheit
Professor and Chair
177 Watts Hall
2041 College Rd.
Columbus, OH 43210
phone: 614-292-6085
fax: 614-292-9857

To: The Office of Academic Affairs

From: Yogesh Sahai, MSE Acting Department Chair

A handwritten signature in black ink that reads "Y. Sahai" with a horizontal line underneath.

Date: 8 September 2010

Re: Semester Program Proposal for *Graduate Degrees in Materials Science and Engineering*

On behalf of faculty members of the Materials Science & Engineering Program, I am pleased to submit the proposed curriculum for the graduate degrees in Materials Science & Engineering under the semester calendar.

The MSE Department currently administers the following graduate degree programs.

- PhD
- MS with Thesis
- MS without Thesis
- Combined BS-MS

All MSE graduate degree programs have been converted to semesters. The attached proposed semester curriculum is a direct conversion of the current curriculum, which went into effect in Autumn 2008, after a thorough review by the Faculty.

The MSE faculty has discussed the curriculum conversion and the final vote (on 4/16/2010) was unanimously in favor of the proposal. Student support has been confirmed through a general anonymous survey with 88% of the respondents approving both the conversion and the transition policy. The proposal was also discussed with the MSE External Advisory Committee (4/23/2010) and their support is expressed in the attached letter.

The quarter-to-semester transition of the graduate MSE degree programs is designed, and guaranteed by policy, to go smoothly for all students in the program. The proposed semester curriculum is a straightforward conversion of courses, credit hours and requirements in the current curriculum. Thus, students enrolled in the program at the Autumn 2012 switch will be able to convert their earned credits and fulfilled requirements directly into the semester system

without any loss. To avoid any delays, pre-Candidacy students will be advised to complete the three Primary Core courses by Spring 2012. This scheduling will allow ample opportunity for taking one Secondary Core course (from a list of four), and taking the Candidacy Examination without any forced delay. Any rare events that cannot be covered by the standard conversion and timing policies will be handled through the petition process. All options, including substitutions and waiving of courses and other requirements will be available, subject to the discretion of the Graduate Studies Committee, so as to ensure that students suffer no loss or delay as a result of the conversion to the semester calendar.

We are confident that the proposed curriculum addresses the need of the changing and emerging trends of the MSE discipline, and will serve the need of our students, their employers, and other stakeholders. I recommend that the proposal be approved.

cc: S. A. Dregia, MSE
R. G. Buchheit, MSE



GE
Aviation

Robert E. Schafrik, PhD
General Manager
Materials & Process Engineering

One Neumann Way, M/D H85
Cincinnati, OH 45215
U.S.A.

T 513 243 0167
F 513 243 3526
robert.schafrik@ge.com

The Ohio State University
Materials Science and Engineering Department
177 Watts Hall, 2041 College Rd.
Columbus, Ohio 43210

September 7, 2010

Dear Professor Buchheit:

The changes to the graduate curriculum in Materials Science and Engineering (MSE) were presented to the MSE External Advisory Committee (EAC) at our Spring meeting on April 23, 2010 by Suliman Dregia. The curriculum changes were essentially a straightforward conversion from quarter hour credits to semester hour credits: (a) 4 quarter hour credits will be equivalent to 3 semester hour credits, and (b) 3 quarter hour credits will be equivalent to 2 semester hour credits. No revamping of the course content was done.

The EAC agrees with these changes. The focus remains strongly on preparing graduate students to deepen their understanding of the fundamentals in materials science and engineering, and to synthesize this knowledge through innovative solutions to MS&E challenges, with a higher degree of scholarship required of the PhD students.

A consistent comment by graduate students made during our annual Fall meeting has been the desire for additional frequency of some specialty courses, especially those that are taught only every two years. The EAC is pleased the department is considering novel options to offer these courses more frequently, such via the internet. These proposals need further effort to define and gain faculty support. And it would be reasonable to conduct a pilot course to gauge student interest.

Sincerely Yours,

Robert E. Schafrik & Vincent J. Russo
Co-chairmen, External Advisory Committee

Quarter to Semester Conversion Proposal MSE Graduate Program

GENERAL PROGRAM INFORMATION

1. Name of Program:

Materials Science and Engineering (MSE)

2. Names of Degrees:

- Doctor of Philosophy (Ph.D.)
- Master of Science-with Thesis (M.S.)
- Master of Science-without Thesis (M.S.)
- Combined BS-MS

3. Responsible Academic Unit:

Department of Materials Science and Engineering

4. Type of Program

Graduate Degree Programs
(PhD, MS and Combined BS/MS)

5. Semester Conversion Designation

Direct conversion with minimal changes

PROGRAM REQUIREMENTS

The goals for the PhD and MS programs are provided separately below. In addition, the individual degree requirements are listed in comparative tables (Table 1-4) for the quarter and semester calendars. Note that the MSE Program requirements listed below are in addition to the general degree requirements set by the Graduate School.

6.1 PhD Program Learning Goals

The MSE PhD program prepares students to:

- Synthesize scientific and engineering fundamentals to advance materials science and engineering through creative scholarship.
- Identify, analyze and critically evaluate contemporary challenges in materials research, and propose original and innovative solutions.
- Develop the capacity to impact the field as research scholars and leaders in industrial and academic settings.
- Communicate effectively in written and spoken forms.
- Develop skills in teaching and technical instruction.

6.2 MS Program Learning Goals

The MS programs prepare students to:

- Acquire advanced knowledge and skills in order to engage in independent scholarly activities as MSE practitioners and researchers.
- Develop capacities to plan, analyze, and implement innovative solutions to complex problems in MSE practice.
- Communicate effectively in written and spoken forms.

7. Degree Requirements

The courses and other components of the requirements for the PhD and MS degrees are listed separately in Tables 1-4.

Table 1. Ph.D. Degree Requirements

Requirement	Quarter Courses	Semester Courses
<p>Graded Graduate Credits</p> <p>I. Primary Core: Take I.1, I.2 & I.3 before Candidacy</p> <p>I.1 <i>Structure & Defects in Materials</i> I.2 <i>Thermodynamics of Materials</i> I.3 <i>Diffusion & Interface Kinetics</i></p> <p>II. Secondary Core: Take II.1, II.2, and (II.3a or II.3b) before graduation, at least one before Candidacy</p> <p>II.1. <i>Mechanical Behavior of Materials</i> II.2. <i>Electronic Properties of Materials</i> II.3a <i>Princ. of Characterization of Materials</i> II.3b <i>Computational Modeling of Materials</i></p> <p>III. MSE Electives Graded Graduate Credits in MSE</p> <p>IV. Free Electives Graded Graduate Credits in Science or Engineering (in or out of MSE).</p>	<p>MSE-747, 4 cr. MSE-730, 4 cr. MSE-737, 4 cr.</p> <p>MSE-765, 3 cr. MSE-777, 3 cr. MSE-715, 3 cr. MSE-756, 3 cr.</p> <p>MSE, level \geq 6xx, 12 cr.</p> <p>12 cr.</p>	<p>MSE 6747, 3 cr. MSE 6730, 3 cr. MSE 6737, 3 cr.</p> <p>MSE 6765, 2 cr. MSE 6777, 2 cr. MSE 6715, 2 cr. MSE 6756, 2 cr.</p> <p>MSE, level \geq 5xxx, 9 cr.</p> <p>6 cr.</p>
Subtotal, Graded Course Credits	45 cr.	30 cr.
<p>Non-Graded Courses</p> <p>MSE Seminar Thesis Research Instructional Assistance</p> <p>PhD. Candidacy Exam</p> <p>Written: Critical assessment of literature & unresolved issues in research area of thesis.</p> <p>Oral: Defense of written document, general competence in MSE.</p> <p>Dissertation Overview</p> <p>Form Dissertation Committee, Research Progress Report & Finalize Dissertation Plans</p> <p>Final Dissertation & Defense</p>	<p>MSE-795, 1 cr. per qtr MSE-999, variable cr. MSE-793, 4 cr.</p>	<p>MSE-6795, 1 cr./sem. MSE-8999, variable cr. MSE-6193, 3 cr.</p>
Minimum Total Credits	120 cr.	80 cr.

Table 2. Degree Requirements for MS with Thesis

Requirement	Quarter Courses	Semester Courses
Graded Graduate Credits Graded Graduate Credits in MSE Electives (Science or Engineering, in or out of MSE)	MSE, level \geq 700, 6 cr. MSE, level \geq 600, 9 cr. 6 cr.	MSE \geq 6000, 6 cr. MSE \geq 5000, 3 cr. 6 cr.
Subtotal, Graded Course Credits	21 cr.	15 cr.
Non-Graded Courses MSE Seminar Thesis Research Instructional Assistance	MSE-795, 1 cr. per qtr. MSE-999, variable cr. MSE-793, 2 cr.	MSE-6795, 1 cr./sem. MSE-8999, variable cr. MSE-6193, 2 cr.
Final Thesis & Defense		
Minimum Total Credits	45 cr.	30 cr.

Table 3. Degree Requirements for MS without Thesis

Requirement	Quarter Courses	Semester Courses
Graded Graduate Credits Graded Graduate Credits in MSE Electives (Science or Engineering, in or out of MSE)	MSE, level \geq 700, 6 cr. MSE, level \geq 600, 12 cr. 15 cr.	MSE \geq 6000, 6 cr. MSE \geq 5000, 6 cr. 9 cr.
Subtotal, Graded Course Credits	33 cr.	21 cr.
Non-Graded Courses MSE Seminar Individual Studies (Final Project)	MSE-795, 1 cr. per qtr. MSE-793, 12 cr.	MSE-6795, 1 cr./sem. MSE-6193, var. up to 9 cr.
Final Oral Exam		
Minimum Total Credits	45 cr.	30 cr.

Table 4. Degree Requirements for Combined BS-MS

Requirement	Quarter Courses	Semester Courses
Eligibility: MSE Junior, 135 cr. and GPA \geq 3.5/4.0		
Graded Graduate Credits		
Graded Graduate Credits in MSE	MSE \geq 700, 6 cr. MSE \geq 600, 9 cr.	MSE \geq 6000, 6 cr. MSE \geq 5000, 3 cr.
Free Electives (Science or Engineering, in or out of MSE)	6 cr.	6 cr.
Double Counted Credits from BS	MSE courses at level \geq 600, up to 15 cr.	MSE courses at level \geq 5000, up to 9 cr.
Subtotal, Graded Course Credits	21 cr.	15 cr.
Non-Graded Courses		
MSE Seminar	MSE-795, 1 cr. per qtr	MSE-6795, 1 cr./sem.
Thesis Research	MSE-999, variable cr	MSE-8999, variable cr.
Instructional Assistance	MSE-793, 2 cr.	MSE-6193, 2 cr
Final Thesis & Defense		
Minimum Total Credits	45 cr.	30 cr.

8. Curriculum Summary Sheets

See Tables 1-4 above.

9. Curriculum Map

Not Available (optional for graduate programs).

10. Rationale for Program Changes

The proposed changes have been kept to a minimum, amounting to a direct conversion of courses and degree requirements to within ± 2 credit hours. Our graduate degree requirements had undergone a thorough review by the MSE faculty, and the resulting curricular revisions were instated in Autumn 2008. Therefore, no major revisions were justified at this time.

11. Credit Hour Changes

Comparisons of current and proposed credit hour requirements are presented separately for the graduate degrees in Tables 5-9.

Table 5. Credit Hour Comparison for PhD Program

Program Credit Hour Requirements	A.) Current Number (Qtr.)	B.) Calculated Number	C.) Proposed Number (Sem.)
Total credit hours required for completion	120	80	80
Prerequisite credit hours	0	0	0
Required credit hours offered by Unit	108	72	74
Required credit hours offered outside Unit	0	0	0
Double counted credit hours	0	0	0
Free elective credit hours	12	8	6

Table 6. Credit Hour Comparison for MS-with-Thesis

Program Credit Hour Requirements	A.) Current Number (Qtr.)	B.) Calculated Number	C.) Proposed Number (Sem.)
Total credit hours required for completion	45	30	30
Prerequisite credit hours	0	0	0
Required credit hours offered by Unit	39	26	27
Required credit hours offered outside Unit	0	0	0
Double counted credit hours	0	0	0
Free elective credit hours	6	4	3

MSE Graduate Program, Quarter-to-Semester Conversion Proposal, 1/12/11

Table 7. Credit Hour Comparison for MS-without-Thesis

Program Credit Hour Requirements	A.) Current Number (Qtr.)	B.) Calculated Number	C.) Proposed Number (Sem.)
Total credit hours required for completion	45	30	30
Prerequisite credit hours	0	0	0
Required credit hours offered by Unit	33	22	21
Required credit hours offered outside Unit	0	0	0
Double counted credit hours	0	0	0
Free elective credit hours	12	8	9

Table 8. Credit Hour Comparison for Combined BS/MS

Program Credit Hour Requirements	A.) Current Number (Qtr.)	B.) Converted Number	C.) Proposed Number (Sem.)
Total credit hours required for completion	45	30	30
Prerequisite credit hours	0	0	0
Required credit hours offered by Unit	45	30	30
Required credit hours offered outside Unit	0	0	0
Double counted credit hours from BS	Up to 15	Up to 10	Up to 9
Free elective credit hours	0	0	0

12. Rationale for Credit Hour Changes

Not Required. Columns B and C are within 2 credit hours, for all degrees and subcategories.

TRANSITION POLICY

13. MSE Policy Statement

The quarter-to-semester transition of the graduate MSE degree programs is designed, and guaranteed by policy, to go smoothly for all students in the program. The proposed semester curriculum is based on a straightforward conversion of courses, credit hours and requirements in the current curriculum, which have been in effect since Autumn 2008. Thus, students enrolled in the program at the Autumn 2012 switch, will be able to convert their earned credits directly into the semester system without any loss. Also, because of the one-to-one correspondence of quarter and semester requirements, the students will not suffer any loss on that scale.

The course credit requirements are flexible, being generally based on broadly defined electives, e.g. MSE courses numbered above a certain level. The only specifically required courses are the six Core Courses for the PhD degree, and only four of these (3 Primary-Core and 1 Secondary-Core courses) have to be taken in advance of the Candidacy Examination. Over the longer time of a PhD degree, it is expected that most students will have time to get caught up on their required courses. However, to ensure a timely transition for pre-Candidacy students, they will be advised to complete the three Primary Core courses by Spring 2012. This scheduling will allow more chances for taking one Secondary Core course (from a list of four), and taking the Candidacy Examination without any forced delay.

Any rare events that cannot be covered by standard conversion and timing policies will be handled through the petition process. All options, including substitutions and waiving of courses and other requirements will be explored, subject to the discretion of the Graduate Studies Committee, so as to ensure that students suffer no loss or delay as a result of the conversion to the semester calendar.

ASSESSMENT CONVERSION

14. Modification of Current Practices

Not Applicable.

15. Assessment Plan on File with OAA?

No.

15.b Preliminary Assessment Plans

i. Program Learning Goals

The MSE PhD program prepares students to:

- Synthesize scientific and engineering fundamentals to advance materials science and engineering through creative scholarship.
- Identify, analyze and critically evaluate contemporary challenges in materials research, and propose original and innovative solutions.
- Develop the capacity to impact the field as research scholars and leaders in industrial and academic settings.
- Communicate effectively in written and spoken forms.
- Develop skills in teaching and technical instruction.

The MS programs prepare students to:

- Acquire advanced knowledge and skills in order to engage in independent scholarly activities as MSE practitioners and researchers.
- Develop capacities to plan, analyze, and implement innovative solutions to complex problems in MSE practice.
- Communicate effectively in written and spoken forms.

ii. Planned Means of Evaluation

DIRECT MEASURES, including

- Classroom tests, writing assignments, and oral presentations
- Candidacy Exams
- Thesis/Dissertation oral defense and oral presentations
- Thesis/Dissertation written document
- Publications in peer-reviewed journals and research conference proceedings

INDIRECT MEASURES, including

- Periodic student surveys on learning goals and objectives
- Continuous student evaluation of instruction in all courses

- Student interviews and focus groups
- Periodic Peer review of program
- Periodic review by the MSE External Advisory Committee
- Periodic curriculum review by the MSE Faculty
- Syllabus review
- Grade review

iii. Planned Uses of Evaluation Data

- Advisors meet with students regularly to discuss their performance
- GSC periodically confirms that current curriculum and courses are facilitating student attainment of program goals. This will be done by periodic student surveys that target the learning goals and objectives directly.
- GSC will analyze and discuss assessment trends with MSE Faculty
- Provide feedback to individual course instructors, to make improvements in course content, delivery and learning activities.
- Make improvements in curricular requirements (e.g., add, subtract courses, improve timing, etc.)
- Make improvements in research facilities and instruments

iv. Projected Date of Full Plan Submission

June, 2012.

MSE Graduate Program, Quarter-to-Semester Conversion Proposal, 1/12/11

Attachment 1: List of MSE Courses at Level 6000 and Higher

Course	Title	Cr. Hrs.
MSE-6711	Solidification Science	2.0
MSE-6715	Principles of the Characterization of Materials (PhD Secondary Core Course)	2.0
MSE-6730	Thermodynamics of Materials (PhD Primary Core Course)	3.0
MSE-6731	Physical Properties of Glass	2.0
MSE-6732	Materials Chemistry	3.0
MSE-6735	Corrosion Science and Materials Electrochemistry	3.0
MSE-6736	High Temperature Corrosion	2.0
MSE-6737	Diffusion and Interface Kinetics (PhD Primary Core Course)	3.0
MSE-6741	Transmission Electron Microscopy Laboratory	1.0
MSE-6747	Structure and Defects in Materials (PhD Primary Core Course)	3.0
MSE-6750	Nuclear Materials and Degradation	2.0
MSE-6756	Computational Materials Modeling (PhD Secondary Core Course)	2.0
MSE-6765	Mechanical Behavior of Materials (PhD Secondary Core Course)	2.0
MSE-6774	Polymer Membranes	2.0
MSE-6777	Electronic Properties of Materials (PhD Secondary Core Course)	2.0
MSE-6795	Graduate Seminar and Colloquium	1.0
MSE-7818	Advanced Topics in Corrosion Science	2.0
MSE-7835	Point Defects in Crystalline Materials	2.0
MSE-7845	Solid Surfaces and Interfaces	2.0
MSE-7850	Structural Transformations	2.0
MSE-7855	Electron Diffraction	2.0
MSE-7861	Plasticity	2.0
MSE-7862	Microstructural Elasticity	2.0
MSE-7863	Elevated Temperature Deformation	2.0
MSE-7894	Theoretical Methods in Materials Science	2.0