

Office of the Provost and Vice Chancellor  
for Academic Affairs

Swanlund Administration Building  
601 East John Street  
Champaign, IL 61820



January 6, 2011

Abbas Aminmansour, Chair  
Senate Committee on Educational Policy  
Office of the Senate  
228 English Building, MC-461

Dear Professor Aminmansour:

Enclosed is a copy of a proposal from the College of Engineering to revise the B.S. in Materials Science and Engineering.

This proposal has been approved by the College of Engineering Executive Committee. It now requires Senate review.

Sincerely,

Kristi A. Kuntz  
Assistant Provost

KAK/njh

Enclosures

c: I. Adesida  
P. Braun  
D. Cahill  
J. Leburton  
S. Kamin  
M. Pleck  
J. Ronk  
E. Stovall

UNIVERSITY OF ILLINOIS  
AT URBANA-CHAMPAIGN

College of Engineering  
Executive Committee  
306 Engineering Hall, MC-266  
1308 West Green Street  
Urbana, IL 61801



December 9, 2010

Kristi Kuntz  
Assistant Provost  
217 Swanlund Administration Building  
MC-304

Via: Ilesanmi Adesida, Engineering College

Dear Ms. Kuntz:

The College of Engineering Executive Committee has reviewed and approved the following:

Revision to the Undergraduate Curriculum in Materials Science and Engineering.

Attached is a copy of the request.

Sincerely yours,

Brent J. Heuser, Secretary  
Executive Committee

Approval Recommended:

  
Ilesanmi Adesida, Dean  
College of Engineering

12/13/10  
Date

BJH/jwr

Enclosure

c: David Cahill  
Jean-Pierre Leburton  
Sam Kamin  
Paul V. Braun  
Michael Pleck  
Elizabeth Stovall  
Joyce Ronk



**Senate Educational Policy Committee  
Proposal Check Sheet**

**PROPOSAL TITLE** (Same as on proposal): Revision to the Undergraduate Materials Science and Engineering Curriculum, College of Engineering

**PROPOSAL TYPE** (Please select all that apply below):

A.  **Program and degree proposals**

1. This proposal is for a graduate program or degree

Yes  No

2. **Degree** proposal (e.g. B.S.A.E., M.S.C.E.)

New degree — please name the new degree: \_\_\_\_\_

Revision of an existing degree — please name the existing degree to be revised:  
Bachelor of Science in Materials Science and Engineering

3. **Major** proposal (disciplinary focus, e.g., Mathematics)

New major — please name the new major: \_\_\_\_\_

Revision of an existing major — please name the existing major to be revised: \_\_\_\_\_

4. **Concentration** proposal (e.g. Financial Planning)

New concentration — please name the new concentration: \_\_\_\_\_

Revision of an existing concentration — please name the existing concentration to be revised: (5): Biomaterials, Ceramics, Electronic Materials, Metals, Polymers

5. **Minor** proposal (e.g. Cinema Studies)

New minor — please name the new minor: \_\_\_\_\_

Revision of an existing minor — please name the existing minor to be revised: \_\_\_\_\_

6.  Proposal for renaming an existing degree, major, concentration, or minor

degree       major       concentration       minor

Please provide the current name: \_\_\_\_\_

Please provide the proposed new name: \_\_\_\_\_

7.  Proposal for terminating an existing degree, major, concentration, or minor

Please name the existing degree, major, concentration, or minor: \_\_\_\_\_

8.  Proposal for a multi-institutional degree between Illinois (UIUC) and a foreign institution

Please name the existing Illinois degree or program: \_\_\_\_\_

Please name the partnering institution: \_\_\_\_\_

- B.  Proposal for renaming existing academic units** (college, school, department, or program)

Please provide the unit's current name: \_\_\_\_\_

Please provide the unit's proposed new name: \_\_\_\_\_

- C.  Proposal for reorganizing existing units** (colleges, schools, departments, or programs)

Change in status of an existing and approved unit (e.g. change from a program to department) — please indicate current unit name including status: \_\_\_\_\_

Transfer an existing unit

Please provide the current unit's name and home: \_\_\_\_\_

Please provide the new home for the unit: \_\_\_\_\_

Merge two or more existing units (e.g., merge department A with department B)

Please provide the name and college of unit one to be merged: \_\_\_\_\_

Please provide the name and college of unit two to be merged: \_\_\_\_\_

Terminate an existing unit — please provide the current unit's name and status: \_\_\_\_\_

- D.  Other educational policy proposals** (e.g., academic calendar, grading policies, etc.)

Please indicate the nature of the proposal: \_\_\_\_\_

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## Proposal to the Senate Educational Policy Committee

**PROPOSAL TITLE:** Revision to the Undergraduate Materials Science and Engineering Curriculum, College of Engineering

**SPONSOR:** Professor Paul V. Braun, Chair, Curriculum Committee  
Department of Materials Science and Engineering  
204A Materials Science and Engineering Building  
Ph: 244-7293  
pbraun@illinois.edu

**COLLEGE CONTACT:**  
Charles L. Tucker III, Associate Dean  
206 Engineering Hall  
Ph. 244-3822  
ctucker@illinois.edu

### BRIEF DESCRIPTION:

It is proposed to change the requirements for the B.S. degree in Materials Science and Engineering (MatSE) as summarized below. The revised program will have 128 credit hours required for the degree, a reduction of 3 hours from the existing curriculum. The requirements for all of the Concentrations in the program change as a result.

- 1) Required courses dropped from the curriculum:
  - a) Biomaterials Concentration
    - MSE 473 *Biomolecular Materials Science* (3 hours) is deleted from the list of area specialty courses established by the department, reducing the hours required from 14 to 11. In turn, this reduces the overall Technical Elective requirement from 20 credit hours to 17.
  - b) Metals, Ceramics, Polymers, and Electronic Materials Concentrations
    - The alternatives MSE 403 *Synthesis of Materials* (3 hours) or CHEM 232 *Elementary Organic Chemistry I* (3 hours) is deleted from the MatSE Technical Core, reducing the curriculum requirement from 45 credit hours to 42.
- 2) Required courses restructured
  - o All concentrations
    - MSE 182 *Introduction to MatSE* is changed from 3 credit hours to 2.
    - MSE 395 *Materials Design* is changed from 1 credit hour to 2.

With both courses common to all concentrations in the MatSE Technical Core, the net effect of these two changes on the Technical Core is credit neutral.

- 3) Addition of an alternative to a required course
  - o All concentrations
    - STAT 400 *Statistics and Probability I* (4 hours) is to be allowed as a substitution for IE 300 *Analysis of Data* (3 hours). The additional credit hour of STAT 400 may be used to help meet free elective requirements.

## **JUSTIFICATION:**

The primary impetus for this revision is the recommendation by the College of Engineering Executive Committee, Ad-hoc Subcommittee on Undergraduate Education (February 8, 2008), that all engineering undergraduate programs target 128 hours for graduation while ensuring strength in basic sciences as well as interdisciplinary concepts and engineering systems design. All other B.S. curricula in the College that were not already at 128 hours have adopted this limit.

Within the context of this broad objective, the rationale for the specific changes is as follows, keyed to the Brief Description:

- 1a) When the requirement to take either MSE 403 *Synthesis of Materials* or CHEM 232 *Elementary Organic Chemistry I* in the Metals, Ceramics, Polymers, and Electronic Materials Concentrations was included initially, the coverage of these topics in the Metals, Ceramics, Polymers, and Electronic Materials courses in the department was minimal. Over the years, coverage of materials chemistry in these courses has become more significant, and redundancy now exists. In the effort to reduce to 128 hours, the requirement to take one of these two courses was felt to be the least important among the options discussed.
- 1b) MSE 473 *Biomolecular Materials Science* is no longer deemed essential to a MatSE undergraduate education with a concentration in Biomaterials. The elimination of MSE 473 as a requirement rather than, for instance, an unspecified area elective will permit greater flexibility for the biomaterials students in completing their degree without either unnecessarily restricting the aspect of biomaterials that they study or reducing the number of technical courses they take.
- 2) MSE 182, *Introduction to MatSE*, which currently meets for 3 contact hours/week of lecture-discussion, will introduce a significant laboratory component as part of the course, roughly 12 contact hours overall, replacing current lecture-discussions. Thus we feel it is justified for it to be a 2 credit hour course rather than a 3 credit hour course. Conversely, MSE 395, *Materials Design*, has become a significantly more substantial course as we have expanded the course requirements and will increase the number of contact hours per week under the proposal. Thus, we feel MSE 395 should go from a 1 credit-hour course to a 2 credit-hour course. Course Revision Forms have been submitted for approval of these changes in conjunction with this proposal.
- 3) Over the past few years, we have informally allowed students to take STAT 400 in place of IE 300 due to course conflicts and other reasons. A number of students have found the more mathematically rigorous STAT 400 to be valuable and a good experience. IE 300 is based more on analysis of actual data sets, which a different set of students find a better learning experience. Given that both courses effectively teach statistical analysis, we feel the flexibility offered by accepting either course will allow the students to enroll in the course that best meets their style of learning and interest set.

**BUDGETARY AND STAFF IMPLICATIONS:**

- a. Additional staff and dollars needed: None.
- b. Internal reallocations (e.g., change in class size, teaching loads, student-faculty ratio, etc.):  
We currently plan to continue to offer MSE 403 as an elective. If the enrollment becomes smaller, a teaching assistant may not be needed for this course. The change in credit hours for MSE 182 and MSE 395 will not change the staffing levels.
- c. Effect on course enrollment in other units and explanations of discussions with representatives of those departments:  
*Chemistry* – CHEM 232 is a large lecture course offered every semester. Currently about 25 MatSE students from the Polymers, Metals, Ceramics, and Electronic Materials concentrations annually take CHEM 232, and some will likely continue to do so as an elective. We anticipate this will not have a material impact on CHEM 232. Students in the Biomaterials concentration will continue to take CHEM 232.  
*Statistics* – Currently about 10 MatSE students annually take STAT 400, which we have informally allowed as an alternative to IE 300. We do not expect this number to change significantly once the students officially have the option to take STAT 400 without a waiver. STAT 400 is recognized to be a more difficult course, and is unlikely to be of interest to the majority of our student population.
- d. Impact on the University Library: None.
- e. Impact on computer use, laboratory use, equipment, etc. None.

**DESIRED EFFECTIVE DATE:** Fall 2011

**STATEMENT FOR PROGRAMS OF STUDY CATALOG:** See Appendix.

**CLEARANCES:**

Signatures:

Stymala for David Cabell  
Unit Representative:

10/22/10  
Date:

[Signature]  
College Representative:

12/15/10  
Date:

\_\_\_\_\_  
Graduate College Representative:

\_\_\_\_\_  
Date:

\_\_\_\_\_  
Provost Representative:

\_\_\_\_\_  
Date:

\_\_\_\_\_  
Educational Policy Committee Representative:

\_\_\_\_\_  
Date:



## Appendix. Statement for the Programs of Study Catalog

*The mark-up shows how the Statement will change as a result of the proposal.*

### **Materials Science and Engineering**

[matse.illinois.edu](http://matse.illinois.edu)

Head of Department: David G. Cahill

Department Office: 201 Materials Science and Engineering Building, 1304 West Green, Urbana,  
(217) 333-1441

#### **Curriculum in Materials Science and Engineering**

[matse.illinois.edu](http://matse.illinois.edu)

Fax: (217) 333-2736

#### **For the Degree of Bachelor of Science in Materials Science and Engineering**

Materials science and engineering is the basis for all engineering. Improvements in the quality of life require knowledge of the processing and properties of current materials and the design, development and application of new materials. The Materials Science and Engineering (MatSE) curriculum provides an understanding of the underlying principles of synthesis and processing of materials and of the interrelationships between structure, properties, and processing. Students learn how to create advanced materials and systems required, e.g., for flexible electronic displays and photonics that will change communications technologies, for site specific drug delivery, for self-healing materials, for enabling the transition to a hydrogen-based economy, and for more efficient photovoltaics and nuclear systems for energy production. The curriculum uses concepts from both basic physics and chemistry and provides a detailed knowledge of what makes the materials we use every day behave as they do.

Students in the first two years take courses in general areas of science and engineering as well as courses introducing the concepts in MatSE. In the third year, students study the common, central issues related to MatSE. Seniors focus on application areas of MatSE (e.g., biomaterials, ceramics, metals, polymers, and electronic materials), which provide them with the detailed knowledge to be immediately useful to corporations or to provide an introduction to graduate study.

A combined B.S.-M.S. Materials Science and Engineering degree program is available. Its admission and course requirements are described in the [College of Engineering program information section](#).

#### **Areas of Concentration**

The MatSE program provides five standard areas of concentration as well as the option to design unique programs of interest to the student. Students are encouraged to take technical electives outside of the department in related disciplines of interest to them and of relevance to their career goals.

- **Biomaterials:** A relatively new focus area teaching the science and engineering of materials for use in biological applications, particularly in the human body. This concentration is based on basic and intermediate chemistry along with basic and intermediate biology concepts,

with relatively less use of physics topics. This focus area includes a subset of the standard junior year courses and requires additional chemistry and biology in the junior year.

- **Ceramics:** Studies the science and engineering of ceramic materials, including alloy design, composites, synthesis, and processing methods. This concentration makes significant use of concepts from both basic physics and basic chemistry.
- **Electronic Materials:** Describes the design and engineering of materials primarily for the microelectronics industries. Topics span the ceramics, metals, and polymers areas. Concepts from basic and intermediate physics are used along with basic chemistry.
- **Metals:** Introduces the design and processing of metals and alloys to achieve desired properties. This concentration primarily uses concepts from basic and intermediate physics with relatively less emphasis on chemical concepts.
- **Polymers:** Teaches the methods for molecular design to achieve desired properties in polymer molecules and polymer blends as well as processing methods. This concentration primarily uses concepts from basic and intermediate chemistry with relatively less emphasis on physics concepts.

### Overview of Curricular Requirements

The curriculum requires ~~128~~<sup>131</sup> hours for graduation and is organized as follows.

#### Orientation and Professional Development

These courses introduce the opportunities and resources your college, department, and curriculum can offer you as you work to achieve your career goals. They also provide the skills to work effectively and successfully in the engineering profession.

Hours	Requirements
0	ENG 100—Engineering Orientation <sup>1</sup>
(1)	MSE 183—Freshman Materials Laboratory <sup>1,2</sup>
0	Total

1. External transfer students take ENG 300—Engrg Transfer Orientation instead.

2. This optional course is highly recommended and may be used to help meet free elective requirements.

#### Foundational Mathematics and Science

These courses stress the basic mathematical and scientific principles upon which the engineering discipline is based.

Hours	Requirements
3	CHEM 102—General Chemistry I
1	CHEM 103—General Chemistry Lab I
3	CHEM 104—General Chemistry II



1	CHEM 105—General Chemistry Lab II
4	MATH 221—Calculus I <sup>1</sup>
2	MATH 225—Introductory Matrix Theory
3	MATH 231—Calculus II
4	MATH 241—Calculus III
3	MATH 285—Intro Differential Equations
4	PHYS 211—University Physics: Mechanics
4	PHYS 212—University Physics: Elec & Mag
2	PHYS 214—Univ Physics: Quantum Physics
34	Total

1. MATH 220—Calculus may be substituted, with four of the five credit hours applying toward the degree. MATH 220 is appropriate for students with no background in calculus.

### Materials Science and Engineering Technical Core

These courses stress fundamental concepts and basic laboratory techniques that comprise the common intellectual understanding of materials science and engineering.

#### For All Concentrations

Hours	Requirements
3	CS 101—Intro Computing: Engrg & Sci
3	ECE 205—Elec & Electronic Circuits
3	IE 300—Analysis of Data <b>or</b> <b>STAT 400—Statistics and Probability I<sup>1</sup></b>
<del>2</del> 3	MSE 182—Introduction to MatSE
3	MSE 201—Phases and Phase Relations
4	MSE 206—Mechanics for MatSE
3	MSE 307—Materials Laboratory I
3	MSE 308—Materials Laboratory II
<del>2</del> 1	MSE 395—Materials Design
4	MSE 401—Thermodynamics of Materials

3	MSE 402—Kinetic Processes in Materials
3	MSE 406—Thermal-Mech Behavior of Matls
36	Subtotal for all concentrations. See additional technical core requirements below.

*1. The replacement of IE 300 with STAT 400 is not allowed for students in the Biomaterials Concentration unless one of their area technical electives is deemed by ABET to be an engineering course. The extra hour of credit for this course may be used to help meet free elective requirements.*

**For the Concentration in Biomaterials**

Hours	Requirements
3	CHEM 232—Elementary Organic Chemistry I
4	MCB 150—Molec & Cellular Basis of Life
3	MCB 450—Introductory Biochemistry
3	MCB 252—Cells, Tissues & Development
13	Subtotal
49	Total for the Concentration in Biomaterials

**For the Concentrations in Ceramics, Electronic Materials, Metals, and Polymers**

Hours	Requirements
3	MSE 304—Electronic Properties of Matls
<del>3</del>	<del>MSE 403—Synthesis of Materials or CHEM 232—Elementary Organic Chemistry I</del>
3	MSE 405—Microstructure Determination
<del>69</del>	Subtotal
<del>4245</del>	Total for the Concentrations in Ceramics, Electronic Materials, Metals, and Polymers

**Technical Electives**

These courses stress the rigorous analysis and design principles practiced in the major subdisciplines of materials science and engineering embodied in the MatSE concentrations.

**For the Concentration in Biomaterials**

Hours	Requirements
<del>1144</del>	Area specialty courses selected from the list of <a href="#">area specialty courses</a> established



	by the department.
6	Area specialty courses from a different area; both must be from the same area.
<del>1720</del>	Total

**For the Concentrations in Ceramics, Electronic Materials, Metals, and Polymers**

Hours	Requirements
15	Area specialty courses selected from the list of <a href="#">area specialty courses</a> established by the department.
3	Area specialty course from a different area.
6	Technical electives selected from the <a href="#">list of approved technical electives</a> established by the department.
24	Total

**Liberal Education**

The [liberal education courses](#) develop students' understanding of human culture and society, build skills of inquiry and critical thinking, and lay a foundation for civic engagement and lifelong learning.

Hours	Requirements
6	Electives from the campus General Education social & behavioral sciences list.
6	Electives from the campus General Education humanities & the arts list.
6	Electives either from a list approved by the college, or from the campus General Education lists for social & behavioral sciences or humanities & the arts.
18	Total

Students must also complete the campus cultural studies requirement by completing (i) one western/comparative culture(s) course and (ii) one non-western/U.S. minority culture(s) course from the General Education cultural studies lists. Most students select liberal education courses that simultaneously satisfy these cultural studies requirements. Courses from the western and non-western lists that fall into free electives or other categories may also be used satisfy the cultural studies requirements.

**Composition**

These courses teach fundamentals of expository writing.

Hours	Requirements
4	RHET 105—Principles of Composition

	Advanced Composition (satisfied by completing the sequence MSE 307 and MSE 308 in the Materials Science and Engineering Technical Core )
4	Total

### Free Electives

These unrestricted electives, subject to certain exceptions as noted at the [College of Engineering advising Web site](#), give the student the opportunity to explore any intellectual area of unique interest. This freedom plays a critical role in helping students to define research specialties or to complete minors.

Hours	Requirements
6	Free electives. Additional unrestricted course work, subject to certain exceptions as noted at the <a href="#">College of Engineering advising Web site</a> , so that there are at least <del>128</del> 131 credit hours earned toward the degree.

### Area Specialty Courses

The courses listed below have been approved by the department to satisfy the ~~114~~15 credit hour requirements in each of the five areas of technical concentration.

Hours	Biomaterials Concentration
3	MSE 470—Design and Use of Biomaterials
3	MSE 472—Biomaterials Laboratory
<del>3</del>	<del>MSE 473—Biomolecular Materials Science</del>
5	Two area technical electives <sup>1</sup>

Hours	Ceramics Concentration
3	MSE 420—Ceramic Materials & Properties
3	MSE 421—Ceramic Processing
3	MSE 422—Electrical Ceramics
3	MSE 423—Ceramic Processing Laboratory
3	Area technical elective <sup>1</sup>

Hours	Electronic Materials Concentration
3	ECE 440—Solid State Electronic Devices



3	MSE 460—Electronic Materials I
3	MSE 461—Electronic Materials II
3	MSE 462—Electronic Materials Lab
3	Area technical elective <sup>1</sup>

Hours	Metals Concentration
3	MSE 440—Mechanical Behavior of Metals
3	MSE 441—Metals Processing
3	MSE 442—Metals Laboratory
3	MSE 443—Design of Engineering Alloys
3	Area technical elective <sup>1</sup>

Hours	Polymers Concentration
3	MSE 450—Polymer Science & Engineering
3	MSE 452—Polymer Laboratory
3	MSE 453—Plastics Engineering
6	Two area technical electives <sup>1</sup>

1. Selected from the departmental [list of approved area technical electives](#) for areas of concentration.

### Summary of Topics Courses for Areas of Concentration

Each area of concentration requires at least one course covering each of the topics processing, design, and characterization (senior lab). For the five standard areas of concentration in the MatSE curriculum outlined above, the relevant courses are categorized in the following table.

Area of Concentration	Processing	Design	Characterization (Senior Lab)
Biomaterials	MSE 470*	MSE 470*	MSE 472
Ceramics	MSE 421	MSE 422	MSE 423
Electronic Materials	MSE 460	MSE 461	MSE 462

Metals	MSE 441	MSE 443	MSE 442
Polymers	MSE 453*	MSE 453*	MSE 452

\* same course counts as both topics

## Suggested Sequence

The schedule that follows is illustrative, showing the typical sequence in which courses would be taken by a student with no college course credit already earned and who intends to graduate in four years. Each individual's case may vary, but the position of required named courses is generally indicative of the order in which they should be taken. The first two years of the Suggested Sequence is the same for all MatSE students. The third and fourth years vary with the Area of Concentration chosen. Refer to the appropriate third and fourth year sequence.

### First year

Hours	First Semester
3	CHEM 102—General Chemistry I
1	CHEM 103—General Chemistry Lab I
0	ENG 100—Engineering Orientation
4	MATH 221—Calculus I <sup>1</sup>
<del>23</del>	MSE 182—Intro to Materials Sci and Eng
4-3	RHET 105—Principles of Composition <sup>2</sup> or Liberal education elective <sup>3</sup>
<del>14-</del> <del>13</del> <del>14</del>	Total

Hours	Second Semester
3	CHEM 104—General Chemistry II
1	CHEM 105—General Chemistry Lab II
2	MATH 225—Introductory Matrix Theory
3	MATH 231—Calculus II
(1)	MSE 183—Freshman Materials Laboratory <sup>4</sup>
4	PHYS 211—University Physics: Mechanics



3-4	Liberal education elective <sup>3</sup> <b>or</b> RHET 105—Principles of Composition <sup>2</sup>
16-17	Total

**Second year**

Hours	First Semester
3	CS 101—Intro Computing: Engrg & Sci
4	MATH 241—Calculus III
3	MSE 201—Phases and Phase Relations
4	PHYS 212—University Physics: Elec & Mag
3	Liberal education elective <sup>3</sup>
17	Total

Hours	Second Semester
3	ECE 205—Elec & Electronic Circuits
3	MATH 285—Intro Differential Equations
4	MSE 206—Mechanics for MatSE
2	PHYS 214—Univ Physics: Quantum Physics
3	Liberal education elective <sup>3</sup>
15	Total

**Concentrations in Ceramics, Electronic Materials, Metals, and Polymers**

**Third year**

Hours	First Semester
3	IE 300—Analysis of Data <b>or</b> <b>STAT 400—Statistics and Probability I<sup>5</sup></b>
3	MSE 307—Materials Laboratory I <sup>56</sup>
4	MSE 401—Thermodynamics of Materials
3	MSE 406—Thermal-Mech Behavior of Matls

3	Liberal education elective <sup>3</sup>
16	Total

Hours	Second Semester
3	MSE 304—Electronic Properties of Matls
3	MSE 308—Materials Laboratory II <sup>56</sup>
3	MSE 402—Kinetic Processes in Materials
3	MSE 405—Microstructure Determination
3	Area specialty course <sup>67</sup>
3	Free Elective
18	Total

Fourth year<sup>78</sup>

Hours	First Semester
<del>3</del>	<del>MSE 403—Synthesis of Materials or CHEM 232—Elementary Organic Chemistry I</del>
6	Area specialty courses <sup>67</sup>
3	Area specialty course in a different area <sup>67</sup>
3	Technical elective <sup>89</sup>
3	Liberal education elective <sup>3</sup>
<del>15</del> 18	Total

Hours	Second Semester
1	MSE 395—Materials Design
6	Area specialty courses <sup>67</sup>
3	Technical elective <sup>89</sup>
3	Liberal education elective <sup>3</sup>
3	Free elective

1746 Total

### Concentration in Biomaterials

#### Third Year

Hours	First Semester
3	CHEM 232—Elementary Organic Chemistry I
3	IE 300—Analysis of Data <b>or</b> <b>STAT 400—Statistics and Probability I<sup>5</sup></b>
3	MSE 307—Materials Laboratory I <sup>56</sup>
4	MSE 401—Thermodynamics of Materials
3	MSE 406—Thermal-Mech Behavior of Matls
16	Total

Hours	Second Semester
4	MCB 150—Molec & Cellular Basis of Life
3	MCB 450—Introductory Biochemistry
3	MSE 308—Materials Laboratory II <sup>56</sup>
3	MSE 402—Kinetic Processes in Materials
3	Liberal education elective <sup>3</sup>
16	Total

#### Fourth year <sup>78</sup>

Hours	First Semester
9	Area specialty courses <sup>67</sup>
3	Area specialty course in a different area <sup>67.9</sup>
3	Liberal education elective <sup>3</sup>
3	Free Elective
18	Total



Hours	Second Semester
3	MCB 252—Cells, Tissues & Development
<del>24</del>	MSE 395—Materials Design
<del>25</del>	Area specialty courses <sup>67</sup>
3	Area specialty course in a different area <sup>67,9</sup>
3	Liberal education elective <sup>3</sup>
3	Free elective
<b>1618</b>	<b>Total</b>

1. MATH 220—Calculus may be substituted, with four of the five credit hours applying toward the degree. MATH 220 is appropriate for students with no background in calculus.

2. RHET 105 may be taken in the first or second semester as authorized. The alternative is a social sciences or humanities elective.

3. Liberal education electives must include 6 hours of social & behavioral sciences and 6 hours of humanities & the arts course work from the campus General Education lists. The remaining 6 hours may be selected from a list maintained by the college, or additional course work from the campus General Education lists for social & behavioral sciences or humanities & the arts. Students must also complete the campus cultural studies requirement by completing (i) one western/comparative culture(s) course and (ii) one non-western/U.S. minority culture(s) course from the General Education cultural studies lists. Most students select liberal education courses that simultaneously satisfy these cultural studies requirements. Courses from the western and non-western lists that fall into free electives or other categories may also be used satisfy the cultural studies requirements.

4. This course is highly recommended for freshmen, who may use it to help meet free elective requirements.

5. The replacement of IE 300 with STAT 400 is not allowed for students in the Biomaterials Concentration unless one of their area technical electives is deemed by ABET to be an engineering course. The extra hour of credit for this course may be used to help meet free elective requirements.

65. Satisfies the General Education Advanced Composition requirement.

76. To be selected from list of area specialty courses established by the department to provide an acceptable level of study in the student's chosen area of concentration.

87. Strongly recommended is incorporation of one or more of an internship, co-op position, and a research project during summers or an academic semester, or both. For students who intend to continue in graduate school, recommended additionally is the undertaking of a research project (Senior Thesis) in the senior year. The project may take the place of 4-6 hours of free, technical, or area specialty electives.

98. Selected from the departmental list of approved technical electives.

**Draft Minutes**  
**College of Engineering Executive Committee (EC) Meeting**  
**Tuesday, 1:00 p.m., December 7, 2010**  
**301 Engineering Hall**

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**Present:**

D. Abrams (CEE)	D. Jones (ECE)	M. Stone (PHYS)*
S.-L. Chuang (MNTL)	P. Kalita (ABE)	C. Tucker (Admin)
B. Cunningham (BioE)	S. Kamin (CS)	M. Wong (CSL)
V. Coverstone (Admin)	D. Pack (ChBE)	
B. Heuser (NPRE)	H. Reis (IESE)	

**Absent**

I. Adesida (Admin)	D. Ceperley (Phys)	B. Conway (AE)
J. Weaver (MatSE)		

\* = alternate, \*\* = guest

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The meeting was called to order at 1:05 pm.

1. Opening remarks: No opening remarks were made.
2. Approval of the draft minutes, November 30, 2010.

The minutes were approved unanimously.

3. Course and Program Proposals/Reports

- a. New/Revised Course Outlines and Program Proposals

—CoE Masters of Engineering in Engineering (M. Eng.)

—Graduate concentration in Energy Systems within the CoE M. Eng. “Graduate options within Energy Systems within the Master of Engineering.”

The following subcommittee has been appointed to study and report on the overall concept of a COE M. Eng. Degree and the specific Energy Systems concentration: B. Cunningham (BioE) charge, H. Reis (IESE), S. Kamin (CS), M. Wong (CSL), and D. Abrams (CEE)

The charges to this subcommittee will include:

Weight of benefits versus disadvantages of the M. Eng degree.

The level of autonomy vested at the Department level.

Is the M. Eng. clearly defined and protected at the department level.

The potential influence of the M. Eng. Degree on the reputation of M.S. degrees granted by individual departments within the COE.

The subcommittee should consider other non-thesis M.S. degrees granted in other departments.

—MechSE “Revisions to the Ph.D. in Mechanical Engineering.”

This revision was approved without the appointment of an ad hoc committee.

b. Subcommittee Reports

—ECE 474 “Nanophotonics”

This subcommittee report was unanimously approved.

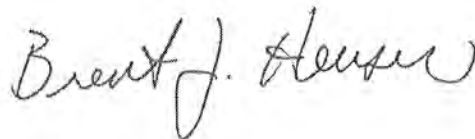
—MatSE “Revisions to the Undergraduate Curriculum”

This subcommittee report was unanimously approved.

4. Adjournment

The meeting adjourned at 2:25 pm.

The minutes have not yet been approved.  
Respectfully submitted,

A handwritten signature in cursive script that reads "Brent J. Heuser".

Brent J. Heuser, Secretary

cc: Samuel Kamin  
Joyce Ronk  
Becky Osgood  
Michael Pleck