50-07

TO: The Engineering Faculty

FROM: The Faculty of the School of Materials Engineering

DATE: March 1, 2008

RE: Change in the Course Requirements for the Degree of Bachelor of Science in Materials Engineering

The faculty in the School of Materials Engineering have approved the following modifications to the curriculum for the Bachelor of Science in Materials Engineering resulting in no change in the total of 128 credit hours required for the degree. These degree requirements are effective for students entering the School of Materials Engineering in Spring 2009. This action is now submitted to the Engineering Faculty with a recommendation for approval.

Change 1: Removed CHM 373 (Physical Chemistry – 3 Cr) from graduation requirements.
Reason: The need to introduce relevant thermodynamic content earlier in the curriculum (as MSE 260 and MSE 270 per EFD 49-07 and EFD 46-07) makes degree requirement of CHM 373 impractical due to content, prerequisites, and semester offering of that course.

Change 2: Removed ME 270 (Basic Mechanics – 3 Cr) and NUCL 273 (Strength of Materials – 3 Cr) from graduation requirements.
Reason: The School of Materials Engineering has developed a new course, MSE 250 (EFD 45-07) that covers the most relevant topics for MSE undergraduates covered previously in ME 270 and NUCL 273.

Change 3: Added three new 3-Cr classes to the core curriculum:

Add MSE 250 (EFD 45-07) "Physical Properties in Engineering Systems."
Reason: The School of Materials Engineering wants to provide a fundamental understanding of elements of statics, dynamics, and mechanics earlier in the curriculum.

Add MSE 270 (EFD 46-07) "Atomistic Materials Science."
Reason: The School of Materials Engineering wants to address a new emphasis on developing a fundamental understanding of materials science at the sophomore level.

Add MSE 445 (EFD 47-07) "Materials Engineering Systems Analysis and Design."
Reason: The School of Materials Engineering wants to provide a course that looks at materials engineering problems in a comprehensive manner and incorporates much of the prior curriculum into solving these complex problems.

Change 4: Renumber and switch the sequence of two core MSE courses:

MSE 240 Processing and Properties of Materials has been renumbered to MSE 330 and moved to the junior year from the sophomore year. EFD 48-07 describes the changes.

MSE 350 Thermodynamics of Materials has been renumbered to MSE 260 and moved to the sophomore year from the junior year. EFD 49-07 describes the changes.

Reason: Swapping the sequence of these two courses will provide a more fundamental understanding of thermodynamics in the sophomore year.

Keith J. Bowman, Professor and Head
School of Materials Engineering

APPROVED FOR THE FACULTY
OF THE SCHOOLS OF ENGINEERING
BY THE ENGINEERING
CURRICULUM COMMITTEE
ECC Minutes #7
Date 10/15/08
Chairman ECC RJCipra

Current

Minimum Degree Requirements For Materials Engineering

Credit Hours Required for Graduation: 128

Courses	*Credit Hours*
Mathematics and Physical Sciences	
Calculus: MA 165,166, 261, 265, 266	**18**
Chemistry: CHM 115, 116, 257, 373	**15**
Physics: PHYS 152 or 172, 241, 252	**8**
Communication and General Education	
English Composition:	**3**
Communication: COM 114 or approved Communication elective	**3**
General Education Electives: Humanities and social science elective courses selected with MSE faculty guidance in accordance with the general education requirements of the College of Engineering.	**18**
Seminars	
ENGR 100, MSE 390	**1**
First-year (or other) electives	**2**
Core Engineering Courses	
Computing: ENGR 126	**3**
Basic Mechanics: ME 270, NUCL 273	**6**
MSE Core: 230, 235, 240, 335, 340, 350, 367, 370, 382, 430, 440. Integrated MSE courses, including year-long, industry-sponsored senior design projects, on the structure, properties, processing, and performance of engineering materials.	**33**
Technical Electives A plan of study is designed with the help of a faculty advisor to meet each individual student's professional goals. At least 12 of the 18 credits must be materials-specific courses; the remaining 6 credits may be selected from an approved list of courses, including other academic disciplines.	**18**

Proposed

Minimum Degree Requirements For Materials Engineering

Credit Hours Required for Graduation: 128

Courses	*Credit Hours*
Mathematics and Physical Sciences	
Calculus: MA 165,166, 261, 265, 266	**18**
Chemistry: CHM 115, 116, 257	**12**
Physics: PHYS 172, 241, 252	**8**
Communication and General Education	
English Composition:	**3**
Communication: COM 114 or approved Communication elective	**3**
General Education Electives: Humanities and social science elective courses selected with MSE faculty guidance in accordance with the general education requirements of the College of Engineering.	**18**
Seminars	
ENGR 100, MSE 390	**1**
First-year (or other) electives	**2**
Core Engineering Courses	
Computing: ENGR 126	**3**
MSE Core: 230, 235, 250, 260, 270, 330, 335, 340, 367, 370, 382, 430, 440, and 445. Integrated MSE courses, including year-long, industry-sponsored senior design projects, on the structure, properties, processing, and performance of engineering materials.	**42**
Technical Electives A plan of study is designed with the help of a faculty advisor to meet each individual student's professional goals. At least 12 of the 18 credits must be materials-specific courses; the remaining 6 credits may be selected from an approved list of courses, including other academic disciplines.	**18**

Current MSE Plan of Study

First Year

(32 credit hours)

Sophomore Year

Third Semester

(3) MSE 230 (Structure and Properties of Materials)
(3) MSE 235 (Materials Properties Laboratory)
(3) ME 270 (Basic Mechanics I)
(4) MA 261 (Multivariate Calculus)
(4) CHM 257 (Organic Chemistry)
(0) MSE 390 (Seminar)
(17)

Fourth Semester

(3) MSE 240 (Processing and Properties of Materials)
(3) PHYS 241 (Electricity and Optics)
(1) PHYS 252 (Heat, Elec. & Optics Lab)
(3) MA 265 (Linear Algebra)
(3) MA 266 (Ordinary Differential Equations)
(3) General Education Elective
(0) MSE 390 (Seminar)
(16)

Junior Year

Fifth Semester

(3) CHM 373 (Physical Chemistry)
(3) NUCL 273 (Mechanics of Materials)
(3) MSE 335 (Materials Characterization Laboratory)
(3) MSE 340 (Transport Phenomena)
(3) MSE 370 (Electrical, Optical and Magnetic Properties of Materials)
(0) MSE 390 (Seminar)
(3) General Education Elective
(18)

Sixth Semester

(3) MSE 350 (Thermodynamics of Materials)
(3) MSE 367 (Materials Processing Laboratory)
(3) MSE 382 (Mechanical Response of Materials)
(3) Technical Elective
(3) General Education Elective
(0) MSE 390 (Seminar)
(15)

Senior Year

Seventh Semester

(3) MSE 430 (Materials Processing and Design I)
(3) General Education Elective
(9) Technical Electives
(0) MSE 390 (Seminar)
(15)

Eighth Semester

(3) MSE 440 (Materials Processing and Design II)
(6) General Education Electives
(6) Technical Electives
(0) MSE 390 (Seminar)
(15)

*Students entering the School of Materials Engineering should have completed the sequence of CHM 115 and 116 or the sequence of CHM 123 and 124.

§Eighteen credit hours of general education electives are chosen in accordance with the general education requirements of the Schools of Engineering.

#Eighteen credit hours of technical electives must be selected from lists of courses approved by the faculty of the School of Materials Engineering. At least 12 of the 18 hours are to be selected from an approved list of Materials courses. Up to 6 hours can be chosen from a separate list of courses, which includes other Support Areas.

Note: Of the courses used to satisfy the minimum graduation requirements, the pass/not-pass option may be applied only to general education elective courses.

Proposed MSE Plan of Study

Typical First Year for MSE

(32 credit hours)

First Semester

(4) ENGL 106 (First Year Composition)
(4) MA 165 (Analytic Geometry and Calc. I)
(4) CHM 115 (General Chemistry)
(1) ENGR 100 (First-Year Eng. Lectures)
(3) ENGR 126 (Eng. Prob. Solv. And Comp. Tools)
(16)

Second Semester

(3) COM 114 (Fund. Of Speech Comm.)
(4) MA 166 (Analytic Geometry and Calc. II)
(4) PHY 172 (Modern Mechanics)
(4) CHM 116 (General Chemistry)
(1) First Year or Other Elective
(16)

Sophomore Year

Third Semester

(3) MSE 230 (Structure and Properties of Materials)
(3) MSE 235 (Materials Properties Laboratory)
(4) MA 261 (Multivariate Calculus)
(3) PHYS 241 (Electricity and Optics)
(3) MA 265 (Linear Algebra)
(0) MSE 390 (Seminar)
(16)

Fourth Semester

(3) MSE 250 (Physical Properties in Eng. Systems)
(3) MSE 260 (Thermodynamics of Materials)
(3) MSE 270 (Atomistic Materials Science)
(3) MA 266 (Ordinary Differential Equations)
(1) PHYS 252 (Elec. And Optics Lab)
(3) General Education Elective
(0) MSE 390 (Seminar)
(16)

Junior Year

Fifth Semester

(3) MSE 335 (Materials Characterization Laboratory)
(3) MSE 340 (Transport Phenomena)
(3) MSE 370 (Elec,Opt, and Mag. Props. of Materials)
(4) CHM 257 (Organic Chemistry)
(3) General Education Elective
(0) MSE 390 (Seminar)
(16)

Sixth Semester

(3) MSE 330 (Proc. and Props. of Matls.)
(3) MSE 367 (Materials Processing Laboratory)
(3) MSE 382 (Mechanical Response of Materials)
(3) Technical Elective
(3) General Education Elective
(0) MSE 390 (Seminar)
(15)

Senior Year

Seventh Semester

(3) MSE 430 (Materials Processing and Design I)
(3) MSE 445 (Materials Engineering Systems Analysis and Design)
(6) Technical Electives
(3) General Education Elective
(0) MSE 390 (Seminar)
(15)

Eighth Semester

(3) MSE 440 (Materials Processing and Design II)
(9) Technical Electives

(6) General Education Electives
(0) MSE 390 (Seminar)
(18)

*Students entering the School of Materials Engineering should have completed the sequence of CHM 115 and 116 or the sequence of CHM 123 and 124.

§Eighteen credit hours of general education electives are chosen in accordance with the general education requirements of the Schools of Engineering.

#Eighteen credit hours of technical electives must be selected from lists of courses approved by the faculty of the School of Materials Engineering. At least 12 of the 18 hours are to be selected from an approved list of Materials courses. Up to 6 hours can be chosen from a separate list of courses, which includes other Support Areas.

Note: Of the courses used to satisfy the minimum graduation requirements, the pass/not-pass option may be applied only to general education elective courses.