Engineering Faculty Document No. 7-14

TO: The Engineering Faculty

FROM: The Faculty of the School of Materials Engineering

DATE: October 14, 2013

RE: Change in Minimum Degree Requirements for Materials Engineering (B.S.MSE)

The faculty of the School of Materials Engineering has approved the following changes in the minimum degree requirements for the B.S. degree in Materials Science and Engineering. This action is now submitted to the Engineering Faculty with a recommendation for approval.

These changes are in response to already implemented changes in the College of Engineering General Education Program and the First-Year Engineering Program. Changes are effective for MSE students who enter Purdue in the Fall of 2013 or later.

(1) The minimum number of credit hours required for graduation is reduced from 128 to 126. The current requirement: "First-year (or other) electives" for two credit hours is removed.

Reason: The published FYE Plan of Study requires 30-33 credit hours depending upon specific course selections. The first-year requirements (including specific MSE requirements) can be completed in a minimum of 30 credit hours. If first-year MA or ENGL courses are used that exceed the minimum requirement (example: MA16100 (5 cr.) vs. MA16500 (4 cr.)) , the extra credit(s) will not reduce other curriculum requirements.

(2) ENGR 12600 and ENGR 10000 are removed and replaced by ENGR 13100 and 13200 or ENGR 14100 and 14200 to correctly incorporate the current first-year program.

(3) The General Education Program is modified to correctly incorporate the revised College of Engineering General Education Program.

Reason: The College of Engineering General Education Program has been modified (EFD #43-13) to satisfy the university–wide core curriculum (University Senate Document 11-7) . The MSE implementation satisfies the Foundational Learning Outcomes and Programmatic Requirements. Programmatic Requirements include:

- Students must earn a C- or better in courses that satisfy Foundational Learning Outcomes.
- At least six credit hours must be at the 30000 level or above, or from courses with a required prerequisite in the same department.
- No more than six credit hours from the Colleges of Engineering, Science, and Technology.
- The remaining 9 hours (to meet the total 24 credit requirement) of General Education electives are humanities and social science electives selected from the existing General Education List (EFD 55-98) as updated.

David F. Bahr, Professor and Head
School of Materials Engineering

APPROVED FOR THE FACULTY
OF THE SCHOOLS OF ENGINEERING
BY THE ENGINEERING
CURRICULUM COMMITTEE

ECC Minutes #4 11-8-13

Date 11/15/13

Chairman ECC

Current (EFD 50-07)

Minimum Degree Requirements For Materials Engineering

Credit Hours Required for Graduation: 128

Courses	*Credit Hours*
Mathematics and Physical Sciences	
Calculus: MA 16500,16600, 26100, 26500, and 26600	**18**
Chemistry: CHM 11500, 11600, 25700	**12**
Physics: PHYS 17002, 24100, 25200	**8**
Communication and General Education	
English Composition: ENGL 10600 or equi.	**3**
Communication: COM 11400 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 10000, MSE 39000	**1**
First-year (or other) electives	**2**
Core Engineering Courses	
Computing: ENGR 12600	**3**
MSE Core: 23000, 23500, 25000, 26000, 27000, 33000, 33500, 34000, 36700, 37000, 38200, 43000, 44000, and 44500. 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**

Proposed

Minimum Degree Requirements For Materials Engineering

Credit Hours Required for Graduation: 126

Courses	*Credit Hours*
Mathematics and Physical Sciences	
Calculus: MA 16500,16600, 26100, 26500, and 26600	**18**
Chemistry: CHM 11500, 11600, 25700	**12**
Physics: PHYS 17200, 24100, 25200	**8**
General Education Program	
Foundational Learning Outcomes: (Courses approved by the Undergraduate Curriculum Council)	
Written Communication/Information Literacy: ENGL 10600 or equiv.	**3**
Oral Communication: COM 11400	**3**
Humanities	**3**
Behavior/Social Science	**3**
Science, Technology, & Society	**3**
General Education Electives: Electives are selected from approved lists with MSE faculty guidance subject to the programmatic requirements of the College of Engineering General Education Program.	**9**
Seminars	
MSE 39000 (semesters 3-8)	**0**
Core Engineering Courses	
ENGR 13100, 13200 or ENGR 14100 and 14200	**4**
MSE Core: 23000, 23500, 25000, 26000, 27000, 33000, 33500, 34000, 36700, 37000, 38200, 43000, 44000, and 44500. 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 approved materials-specific courses; the remaining 6 credits may be selected from an approved list of courses, including other academic disciplines.	**18**

Plan of Study for the B.S. MSE Degree

Freshman Year (30 credits)

Sophomore Year

Third Semester

(3) MSE 23000 (Structure and Properties of Materials)
Pre-CHM 11500, MA 16500

(3) MSE 23500 (Materials Properties Laboratory)
Pre-CHM 11500, MA 16500, Co-MSE 23000

(4) MA 26100 (Multivariate Calculus)

(3) PHYS 24100 (Electricity and Optics)+

(3) MA 26500 (Linear Algebra)

(0) MSE 39000 (Seminar)

(16)

Fourth Semester

(3) MSE 25000 (Physical Properties in Eng. Systems)
Pre-PHYS 17200, Co-MSE 23000, MA 26500

(3) MSE 26000 (Thermodynamics of Materials)
Pre-MA 26100, Co-MSE 23000

(3) MSE 27000 (Atomistic Materials Science)
Pre-MA 26100, MA 26500, Co-MSE 23000

(3) MA 26600 (Ordinary Differential Equations)

(1) PHYS 25200 (Elec. And Optics Lab)

(3) General Education Elective

(0) MSE 39000 (Seminar)

(16)

Junior Year

Fifth Semester

(3) MSE 33500 (Materials Characterization Laboratory)
Pre-MSE 23500

(3) MSE 34000 (Transport Phenomena)
Pre-MA 26600

(3) MSE 37000 (Elec,Opt, and Mag. Props. of Materials)
Pre-MSE 23000, MSE 27000, PHYS 24100

(4) CHM 25700 (Organic Chemistry)

(3) General Education Elective

(0) MSE 39000 (Seminar)

(16)

Sixth Semester

(3) MSE 33000 (Proc. and Props. of Matls.)
Pre-MSE 26000

(3) MSE 36700 (Materials Processing Laboratory)
Co-MSE 33000

(3) MSE 38200 (Mechanical Response of Materials)
Pre-MSE 25000, MA 26500

(3) Technical Elective

(3) General Education Elective

(0) MSE 39000 (Seminar)

(15)

Senior Year

Seventh Semester

(3) MSE 43000 (Materials Processing and Design I)
Pre-MSE 33500 and 36700

(3) MSE 44500 (Materials Engineering Systems Analysis)
Pre-MSE 33000, 34000, Co-MSE 43000

(6) Technical Electives

(3) General Education Elective

(0) MSE 39000 (Seminar)

(15)

Eighth Semester

(3) MSE 44000 (Materials Processing and Design II)
Pre-MSE 33500, 34000, 37000, 43000

(9) Technical Electives

(6) General Education Electives

(0) MSE 39000 (Seminar)

(18)

Students entering the School of Materials Engineering should have completed the sequence of CHM 11500 and 11600 or the sequence of CHM 12300 and 12400.

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.

Of the courses used to satisfy the minimum graduation requirements, the pass/not-pass option may be applied only to the 9 credits of unspecified general education electives.

Phys 25200 is a 1-cr hour lab course. It may be replaced by another 1-cr hour stand-alone science lab course such as Chem 25700L (which compliments Chem 25700, a required course for MSE) or Chem 26300. Another possibility is to take PHYS 27200, a 4-cr hour course which will count for PHYS 24100 (3-cr hour) and PHYS 25200 (1-cr hour).