

TO: College of Arts and Sciences Curriculum Committee

FROM: Doug Dunham, Chair, Department of Materials Science and Biomedical Engineering

DATE: October 14, 2020

RE: Program Change

We request implementation of the following program change with the next possible *Catalog*.

Name of Program: Materials Science, Comprehensive Major

Program Code: 250-010

Date of Department/Program Approval: October 6, 2020

From Current Catalog Web Page: <https://catalog.uwec.edu/undergraduate/arts-sciences/materials-science/materials-science-comprehensive-major-ba-bs>)

To: (Revisions in red)

Liberal Arts (Code 250-010)

The structure of the major is unique: it integrates an engineering-oriented field into a liberal arts and sciences degree, and is thus deliberately interdisciplinary and broadly defined, consistent with a liberal education approach. Students specialize through a chosen emphasis. The major serves students who plan to enter the workforce after graduation as well as students interested in graduate education in areas such as Materials Science, Engineering, Chemistry, and Physics.

The major is comprised of a minimum of **63** credits, including completion of core courses, at least six credits from courses in the Materials Science electives, and at least six credits in a chosen emphasis. Credits applied toward the electives and emphasis must be unique credits.

#### CORE COURSES

Materials Science

MSE 221 Living in a Materials World 3

MSE 286      Engineering Sophomore Seminar    1  
MSE 315      Materials Characterization    4  
MSE 334      Soft Materials    4  
MSE 350      Thermodynamics of Materials    4  
MSE 357      Phase Transformation & Kinetics    3  
MSCI 384      Materials Science Junior Seminar    1  
Remove MSCI 385  
MSCI 484      Materials Science Capstone I    1  
MSCI 485      Materials Science Capstone II    2

Chemistry  
CHEM 115      Chemical Principles    6  
or

Remove CHEM 103 & 104 option

CHEM 105 General Chemistry I Lecture  
& CHEM 106 and General Chemistry I Laboratory  
& CHEM 109 and General Chemistry II with Lab <sup>1</sup>

CHEM 325      Organic Chemistry I with Laboratory    4

Mathematics  
MATH 114      Calculus I    4  
MATH 215      Calculus II    4

Physics  
PHYS 231      University Physics I    5  
PHYS 232      University Physics II    5

ELECTIVE COURSES    6

MSE 256 Introduction to Computer Aided Design  
MSE 307 Engineering Statistics  
MSE 362 Microelectronic Materials Processing  
MSE 363 Microelectronic Materials Processing Lab  
MSE 367 Macroprocessing of Materials  
MSE 368 Macroprocessing Materials Lab  
MSE 372 Transport Phenomena  
MSE 374 Electrical, Optical and Magnetic Properties of Materials  
MSE 451 Computational Materials Science  
MSE 475 Nanomaterials

MSE 493 Collaborative Internship  
MSE 494 Off-campus Materials Science Internship  
MSCI 395 Directed Studies  
MSCI 399 Independent Study - Juniors  
MSCI 499 Independent Study - Seniors

<sup>1</sup> Only six credits apply to major.

#### NOTES:

1. A maximum of three credits total from MSCI 395, MSCI 399, and MSCI 499 and MSE 493 and MSE 494 may be applied toward the Electives category.
2. MATH 312 is recommended for students planning to attend graduate school.

#### EMPHASIS REQUIREMENTS

Six credits in an Emphasis required. All six emphasis credits must meet the requirements described in either A or B below.

##### A. Defined emphasis

--Be from the same prefix  
--Be from the following prefixes: BIOL, **BME**, CHEM, CS, GEOL, MATH, MGMT, PHYS  
--Be from UWEC courses numbered 300 or above, or from courses appropriate for a major, such as: BIOL 221, BIOL 222, BIOL 223, **BME courses 200 level and above**, CHEM 213, CHEM 218, CS 145, CS 148, CS 163, CS 170, CS 245, CS 252, GEOL 106, GEOL 110, GEOL 115, GEOL 118, and MATH 216

##### B. Distributed emphasis

The student may pursue an emphasis that reflects a thematic area of concentration and intentional connections. Such an emphasis, with approval of the faculty advisor, must draw from courses appropriate for a major in another area distinct from Materials Science or Materials Science and Engineering.

#### Why:

Addition of MSE 286: For materials science majors, internships and research experiences can be an important professional development activity. In order to better prepare students to competitively seek internships and research experiences in the summer between sophomore and junior years, we need to move content from the curriculum in MSCI 384 to the sophomore year. Some content from MSE 385 is also

moved to MSE 286 so it becomes a 1 credit course. MSE 286 becomes the sophomore seminar course that covers internships, resumes, etc. that prepares students for summer internships, research opportunities, and upper level Materials Science courses. The remaining curriculum from the current MSCI 384 and MSCI 385 are combined into an expanded MSCI 384 course. (changed from 0.5 credits to 1.0 credits).

Elimination of MSCI 385: Content from MSCI 385 is moved into MSE 286 and MSCI 384.

Adding 1 credit to the major (62 to 63 credits): Additional content in the two seminar courses will better prepare students for professional development opportunities and for upper level majors courses.

MSE 307 is added to the Materials Science electives: This gives students an additional choice for elective courses. Feedback from alumni and regional employers has indicated that employers need talent that has more experience with the statistical treatment of data.

Addition of BME to emphasis: Courses in biomedical engineering are an appropriate emphasis for students majoring in Materials Science.

Removal of CHEM 103 & 104 option: these courses have been out of the catalog for a number of years. If there is a student who has had these courses, we can always allow them to count for the major.