

**EXECUTIVE COMMITTEE
BOURNS COLLEGE OF ENGINEERING
REPORT TO THE RIVERSIDE DIVISION
MAY 21, 2019**

To be adopted:

**PROPOSED CHANGES TO THE MATERIALS SCIENCE AND ENGINEERING MAJOR
REQUIREMENTS**

PRESENT:

PROPOSED:

College Requirements

See The Marlan and Rosemary Bourns College of Engineering, Colleges and Programs section.

No change.

The Materials Science and Engineering major uses the following major requirements to satisfy the college's Natural Sciences and Mathematics breadth requirement.

1. One course in the biological sciences chosen from an approved list
2. CHEM 001A, CHEM 001LA
3. MATH 008B or MATH 009A
4. PHYS 040A, PHYS 040B

Major Requirements

1. Lower-division requirements (72 units)
 - a) CHEM 001A, CHEM 01LA, CHEM 001B, CHEM 01LB, CHEM 001C, CHEM 01LC
 - b) ~~CS-030~~
 - c) EE 001A, EE 01LA
 - d) MATH 009A, MATH 009B, MATH 009C, MATH 010A, MATH 010B, MATH 046
 - e) ME 010
 - f) MSE 001
 - g) PHYS 040A, PHYS 040B, PHYS 040C
 - h) CHEM 008A, CHEM 08LA
2. Upper-division requirements (72 units)
 - a) BIEN 140A/CEE 140A
 - b) ~~CEE-135~~
 - c) ~~CHE-100~~
 - d) ~~EE-138~~
 - e) ~~ENGR-180W~~

Major Requirements

1. Lower-division requirements (72 units)
 - a) CHEM 001A, CHEM 01LA, CHEM 001B, CHEM 01LB, CHEM 001C, CHEM 01LC
 - b) CS 009M or CS 009P
 - c) EE 001A, EE 01LA
 - d) MATH 009A, MATH 009B, MATH 009C, MATH 010A, MATH 010B, MATH 046
 - e) ME 010
 - f) MSE 001
 - g) PHYS 040A, PHYS 040B, PHYS 040C
 - h) CHEM 008A, CHEM 08LA
2. Upper-division requirements (72 units)
 - a) BIEN 140A/CEE 140A
 - b) CHE 100
 - c) EE 138
 - d) ENGR 180W
 - e) ME 110, ME 114, ME 156

f) ~~ME 110, ME 114, ME 156~~
g) ~~MSE 160, MSE 161, MSE 175A, MSE 175B~~
h) ~~STAT 155~~

f) MSE 134, MSE 135, MSE 160, MSE 161, MSE 175A, MSE 175B
g) STAT 155

i) ~~Technical Electives (20 units): chosen from BIEN 140B/CEE 140B, CEE 147, EE 133, EE 136, EE 137, EE 139, ME 113, ME 116, ME 138, ME 153, ME 180, MSE 197~~

h) Technical Electives (20 units): chosen from BIEN 110, BIEN/MSE 136, BIEN 137, BIEN 140B/CEE 140B, CEE 147, CHE 105, CHE 161, EE 133, EE 136, EE 137, EE 139, EE 162, ME 153, MSE 155, MSE 197

Visit the Student Affairs Office in the College of Engineering or student.engr.ucr.edu for a sample program.

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JUSTIFICATION:

Introduction to Computational Science and Engineering was renumbered from CS 030 to CS 009M. Each affected department and program is required to make the appropriate changes to its courses with the renumbered course(s) as prerequisites.

CS 009P was included as an equivalent course to CS 009M to satisfy the Introduction to Computational Science and Engineering requirement.

The following Technical Electives courses were removed from the approved Technical Electives list as the MSE faculty found these courses did not have enough Materials Science and Engineering relevant content compared to existing and newly available Technical Electives:

- ME 113 Fluid Mechanics
- ME 116 Heat Transfer
- ME 138 Transport Phenomena in Living Systems
- ME 180 Optics and Lasers in Engineering

The following Technical Electives courses were added to the approved Technical Electives list as the MSE faculty found these classes had sufficient Materials Science and Engineering relevant content:

- BIEN 110 Biomechanics of the Human Body
- BIEN 136/MSE 136 Tissue Engineering
- BIEN 137 Advanced Biomechanics
- CHE 105 Introduction to Nanoscale Engineering
- CHE 161 Nanotechnology Processing Laboratory
- EE 162 Introduction to Nanoelectronics
- MSE 155 Materials Science of the Solid State

MSE 134 Microstructural Transformations in Materials is to be added as a required course to the MSE curriculum per the recommendation by the MSE faculty and ABET Accreditation.

MSE 135 Introduction to Inorganic Material Synthesis will replace CEE 135 per the recommendation by the MSE faculty and ABET Accreditation.

Questions from Committee:

- 1) A justification should be provided for the five focus areas selected. Why were these particular areas selected?

The five focus areas have been in place since 2010 in the MSE Suggested Course Plan that were based on existing TEs to help students identify courses that interested them in a particular focus area. It is important to note that these focus areas are NOT required degree options, and are simply a way to help organize TEs. We have removed the focus areas description to avoid any potential confusion.

- 2) Is it “recommended” or “required” for students to pick at least four courses from a single area?

It is “recommended” and NOT required for students to pick at least four courses from a single area. Students are allowed to either take all four courses from a single area for depth or take courses from different focus areas for breadth. We repeat that these focus areas do NOT appear in their transcript or on student diplomas.

- 3) If taking 4 courses in an area is only a recommendation, why delete ME 113, ME 116, ME 138, and ME 180?

These 4 courses were reviewed by the MSE UG Committee and was determined that it did not have sufficient Materials Science and Engineering content nor fit within one of the five focus areas when compared to existing TEs and newly developed TEs available.

- 4) The committee’s understanding is that graduate courses cannot be used as part of the undergraduate requirements. (The committee is seeking clarification from the committee on education policy.) The graduate courses in the list require graduate standing. Some state consent of the instructor is adequate for enrollment, but at least one does not.

We have decided to remove the graduate level courses from the TEs list.

- 5) The Structural Materials focus has only three undergraduate courses, which does not allow students to complete the recommended four courses if graduate courses are not allowed.

We are in the process of developing undergraduate level courses to fulfill the Structural Materials focus. Regardless, students are NOT required to take all courses from a single focus area.

- 6) If taking four courses in an area is a requirement and not a recommendation, will the courses be taught sufficiently frequently to enable students to complete the requirement?

See response to Questions (2).

- 7) MSE 197 is listed in each focus area. Is there a requirement that the subject of the ME 197 course be related to the focus area? If so, what is the process to ensure this?

There is no requirement that the subject of MSE 197 have to be related to any focus area since choosing courses within a single focus area is not required nor are they related to any degree option.

APPROVALS:

Approved by the Materials Science and Engineering faculty:	November 8, 2018
Approved by the MSE Undergraduate Committee:	October 31, 2018
Approved by the MSE Undergraduate Committee:	May 3, 2018
Approved by the Materials Science and Engineering faculty:	May 11, 2018
Approved by the Executive Committee of the College of Engineering:	December 4, 2018
Approved by the Committee on Educational Policy:	April 17, 2019