

**EXECUTIVE COMMITTEE  
BOURNS COLLEGE OF ENGINEERING**

**REPORT TO THE RIVERSIDE DIVISION  
MAY 23, 2017**

To be adopted:

PROPOSED CHANGE TO CHEMICAL ENGINEERING UNDERGRADUATE REQUIREMENTS

**PRESENT:**

**Major Requirements  
Chemical Engineering**

Students must choose either a Biochemical Engineering, Chemical Engineering or Nanotechnology option.

1. Lower-division requirements (~~63~~ units)
  - a) BIOL 005A, BIOL 05LA
  - b) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 01LA, CHEM 01LB, CHEM 01LC
  - c) CS 010
  - d) MATH 008B or MATH 009A, MATH 009B, MATH 009C, MATH 010A, MATH 010B, MATH 046
  - e) PHYS 040A, PHYS 040B, PHYS 040C
2. Upper-division requirements (75 units)
  - a) CEE 158
  - b) ~~CHEM 112A, CHEM 112B, CHEM 112C~~
  - c) ~~CHE 100, CHE 110A, CHE 110B, CHE 114, CHE 116, CHE 117, CHE 118, CHE 120, CHE 122, CHE 160B, CHE 160C, CHE 175A, CHE 175B~~
  - d) ~~CHE 130/ENVE 130, CHE 160A/ENVE 160A~~
  - e) ENGR 118
3. Option requirements: choose one option
  - a) Biochemical Engineering option (~~20~~ units)
    - (1) ~~BCH 110A~~
    - (2) ~~BIOL 121/MCBL 121~~

**PROPOSED:**

**Major Requirements  
Chemical Engineering**

Students must choose either a Biochemical Engineering, Chemical Engineering or Nanotechnology option.

1. Lower-division requirements (75 units)
  - a) No Change
  - b) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 01LA, CHEM 01LB, CHEM 01LC, CHEM 008A, CHEM 008B, CHEM 008C, CHEM 08LA, CHEM 08LB, CHEM 08LC
  - c) No Change
  - d) No Change
  - e) No Change
2. Upper-division requirements (63 units)
  - a) No Change
  - b) CHE 100, CHE 110A, CHE 110B, CHE 114, CHE 116, CHE 117, CHE 118, CHE 120, CHE 122, CHE 160B, CHE 160C, CHE 175A, CHE 175B
  - c) CHE 130/ENVE 130, CHE 160A/ENVE 160A
  - d) ENGR 118
3. Option requirements: choose one option
  - a) Biochemical Engineering option (19 units)
    - (1) CEE 010
    - (2) BCH110A/BCH 100

- ~~(3) CEE 010~~
- ~~(4) CHE 124, CHE 124L~~
- ~~(5) Four (4) units of technical electives chosen from CEE 132, CEE 135, CHE 140, CHE 150, CHE 171, ENVE 121~~

- (3) CHE 124, CHE 124L, CHE 140
- (4) Four (4) units of technical electives chosen from BIEN 125, BIEN 140A/CEE 140A, BIEN 159/CEE 159, BIOL 121/MCBL 121, CEE 125, CEE 132, CEE 135, CHE 102, CHE 150

- b) Chemical Engineering option (~~18~~ units)
  - (1) CEE 010
  - (2) Sixteen (16) units of technical electives chosen from CEE 125, CEE 132, CEE 135, CHE 102, CHE 131, CHE 136, CHE 171, ENVE 120, ENVE 133, ENVE 134, ENVE 138

- b) Chemical Engineering option (17 units)
  - (1) No Change
  - (2) No Change

- c) Nanotechnology option (~~24~~ units)
  - (1) CEE 010
  - (2) CHE 105
  - (3) CHE 161
  - (4) CEE 135
  - (5) Eight (8) units of technical electives chosen from CHE 102, CHE 131, ENVE 133, ME 114, MSE 160, MSE 161

- c) Nanotechnology option (20 units)
  - (1) No Change
  - (2) No Change
  - (3) No Change
  - (4) No Change
  - (5) No Change

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### **JUSTIFICATION:**

1. The Chemical Engineering and Biochemical Engineering Option curricula do not cover the required prerequisites for BIOL 121/MCBL 121. As such, students in the Biochemical Engineering Option require a prerequisite waiver from the instructors of BIOL 121/MCBL 121 to meet the course requirements for the Option. In the recent past, this waiver has (rightfully) not been granted. To remedy this problem, we propose removing BIOL 121/MCBL 121 as a required course and including it as a potential Technical Elective.
2. Review of the course content of BCH 110A and BCH 100 reveals that both courses cover the necessary biochemistry background to effectively address the content of CHE 124 and CHE 140, required Option courses. Including both courses as prerequisite options provides additional flexibility in student scheduling and increases the number of course offerings available to Biochemical Engineering Options students.
3. By removing BIOL 121/MCBL 121 as a required course (see above for justification), the option is limited in required Biochemical Engineering content. As such, CHE 140 (the follow-on course to CHE 124, the core course of the option) will be required.
4. To ensure that students have sufficient options for their technical electives, we propose to include recently developed and approved CEE courses as technical electives including CHE 102 and CEE 125. These new technical electives will supplement the core option courses (CHE 124 and 140), by providing the opportunity for students to learn about analytic techniques relevant to biochemical engineering and reaction kinetics relevant to enzyme catalysis.

5. We propose to remove CHE 171 as a potential technical elective as the course content (Pollution Control for Chemical Engineers) is not relevant to the current Option curriculum.
6. We propose to remove ENVE 121 as a potential technical elective as the course similar in content to the core Option course, CHE 124.
7. The Chemistry department has made changes to the numbering of the CHEM 112 series to CHEM 008 series of classes. The lecture and lab portions of the courses have also been separated. CHEM 12A becomes CHEM 008A and CHEM 08LA, CHEM 12B becomes CHEM 008B and CHEM 08LB, and CHEM 12C becomes CHEM 008C and CHEM 08LC.
8. CEE 010 has been changed to a 1-unit course. The program units have been adjusted to reflect this change.

**APPROVALS:**

By the faculty of the Department of Chemical & Environmental Engineering: December 15, 2016

By the BCOE Executive Committee:

February 15, 2017

By the Committee on Educational Policy:

May 3, 2017