EXECUTIVE COMMITTEE
COLLEGE OF ENGINEERING

REPORT TO THE RIVERSIDE DIVISION
May 23, 2002

Proposed Changes in B.S. Degree
Chemical Engineering

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<th>Present</th>
<th>Proposed</th>
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<tr>
<td>1. Lower-division Requirements (67 units)</td>
<td>1. Lower Division Requirements (61 units)</td>
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<tr>
<td>a) BIOL 005A, BIOL 05LA</td>
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<td>b) CHEM 001A-CHEM 001B-CHEM 001C</td>
<td>b) CEE 010</td>
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<td>c) CS 010</td>
<td>c) CHEM 001A-CHEM 001B-CHEM 001C</td>
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<td>d) EE 001A, EE 011A</td>
<td>d) CS 010</td>
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<tr>
<td>e) MATH 009A-MATH 009B-MATH 009C, MATH 010A,</td>
<td>e) MATH 009A-MATH 009B-MATH 009C, MATH 010A,</td>
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<tr>
<td>MATH 010B, MATH 046</td>
<td>MATH 010A, MATH 010B, MATH 046</td>
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<td>f) ME 010</td>
<td>f) PHYS 040A, PHYS 040B, PHYS 040C</td>
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<td>g) PHYS 040A, PHYS 040B, PHYS 040C</td>
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<td>2. Upper Division Requirements (73 units)</td>
<td>2. Upper Division Requirements (71 units)</td>
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3. Option Requirements: choose one option

a) Biochemistry option (22 Units)
   (1) BCH 110A - BCH 110B
   (2) BIOL 121A/MCBL 121A
   (3) Ten (10) units of technical electives chosen from CHE 124, CHE 124L, CHE 140, CHE 150, CHE 171, ENVE 121

b) Chemistry option (22 Units)
   (1) CHEM 005, CHEM 125
   (2) Twelve (12) units of technical electives chosen from CHE 102, CHE 136, CHE 171, ENVE 120, ENVE 133, ENVE 134, ENVE 138

3. Option Requirements: choose one option

a) Biochemical Engineering option (18 units)
   (1) BCH 110A
   (2) BIOL 121A/MCBL 121A
   (3) CHE 124, CHE 124L
   (4) Four (4) units of technical electives chose from CHE 132, CHE 135, CHE 140, CHE 150, CHE 171, ENVE 121

b) Chemical Engineering option (16 units)
   (1) CEE 125
   (2) Twelve (12) units of technical electives chosen from CHE 132, CHE 102, CHE 135, CHE 136, CHE 171, ENVE 120, ENVE 133, ENVE 134, ENVE 138

Justification:

1) CEE faculty carefully reviewed the chemical engineering curricula. This included consultation with students who recently graduated, and careful review of the content of each required course. One conclusion was that Mechanical Engineering 10 (Statics) and Electrical Engineering 1A/1AL (Engineering Circuit Analysis/Circuits Lab) were not as relevant for chemical engineering majors as originally thought. The concepts covered in these courses are not reinforced later in the curriculum and the benefits to student’s level of understanding and professional development was low. Therefore the faculty decided to remove these courses from the degree requirements.

2) Introduction to Chemical and Environmental Engineering (CEE 10, 2 units) aims to enrich students’ appreciation of chemical, biochemical, and environmental engineering. The course will help increasing the retention of chemical engineering majors, and will inform non-engineering majors. The new course Professional Development for Engineers (CEE 158, 2 units) will cover selected topics to prepare chemical engineering majors for the Fundamentals of Engineering (FE) exam. Other topics such as ethics, risk management and environmental health and safety, regulatory issues not covered elsewhere will also be addressed.

3) The material covered in CHEM 110B (Statistical Mechanics and Kinetics) is redundant with other required courses for chemical engineering majors. These include thermodynamics (CHE 100, CHE/ENVE 130), Kinetics (CHE 122), and Physics (PHYS 040ABC)
4) The proposed name changes for the options reflect the focus of the options, and is more in line with current terminology.

5) Biochemistry 110B (General Biochemistry) is too detailed for chemical engineering majors following the biochemistry option. The fundamentals of cell metabolism and essential pathways are covered in Biology 121A and Chemical Engineering 124.

6) CHE 124, 124L (Biochemical Engineering Principles/Biochemical Engineering Laboratory) are core courses for chemical engineering students following the biochemistry option. In the past, the choice of electives was such that students had no other choice than taking CHE 124 and 124L. With new electives being offered, this is not longer the case. Hence, the proposed change makes CHE 124, 124L mandatory which guarantees that students following the biochemistry option have training in the fundamentals of biochemical engineering.

7) Chemistry of Materials (CEE 135, 4 units) and Green Engineering (CEE 132, 4 units) are new technical elective courses which is relevant to all chemical engineering students.

8) Although Chemistry 5 (Quantitative Analysis), and Chemistry 125 (Instrumental Methods) are both good courses, however our students were spending a disproportionate amount of time on these courses (eight hours of labs each). Also, not all aspects covered in CHEM 5 and CHEM 125 were relevant to engineers. Thus, we propose to remove those courses from the list of the required courses for chemical engineering majors following the chemistry option. Instead CEE students will take the new CEE 125 course (Analytical Methods for Chemical and Environmental Engineers) (4 units, with four hours of labs). The course will teach in a condensed format analytical techniques that are directly applicable to chemical and environmental engineers. It will use state-of-the-art equipment available in the Department of Chemical and Environmental Engineering and train students in techniques used by professional engineers.

Effective: Fall 2002

Approved by the Executive Committee, Bourns College of Engineering on 3/13/02.
Approved by the Committee on Educational Policy on 4/19/02.