To be adopted:

Proposed Changes to Undergraduate Degree in Chemical Engineering

PRESENT:

Majors
The Department of Chemical and Environmental Engineering offers B.S. degrees in Chemical Engineering and in Environmental Engineering, and M.S. and Ph.D. degrees in Chemical and Environmental Engineering. For more details, see www.cee.ucr.edu.

Chemical Engineering focuses on transforming raw materials into useful everyday products. Chemical engineers turn the discoveries of chemists and physicists into commercial realities. They find work in a variety of fields including pharmaceuticals, materials, chemical, fuels, pollution control, medicine, and nuclear and electronic industries. At UCR, the B.S. degree in Chemical Engineering offers students three options: Biochemical Engineering, focusing on biochemical processes; Biotechnology, focusing on the biomedical industry; or Chemical Engineering, emphasizing traditional chemical engineering issues.

The program’s educational objectives are to produce graduates who demonstrate in their careers and professional pursuits the following:

- An ability to apply mathematics, engineering principles, computer skills, and natural sciences to chemical engineering practice
- Application of fundamental chemical engineering principles at an advanced level, and competence in synthesizing knowledge from multiple disciplines to develop and evaluate design solutions
- Engagement in chemical engineering careers in diverse areas including bioengineering

PROPOSED:

Majors
No Change

Chemical Engineering focuses on transforming raw materials into useful everyday products. Chemical engineers turn the discoveries of chemists and physicists into commercial realities. They find work in a variety of fields including pharmaceuticals, materials, chemical, fuels, pollution control, medicine, and nuclear and electronic industries. At UCR, the B.S. degree in Chemical Engineering offers students three options: Biochemical Engineering, focusing on biochemical processes; Biotechnology, focusing on the biomedical industry; or Chemical Engineering, emphasizing traditional chemical engineering issues.

The program’s educational objectives are to produce graduates who attain high levels of technical expertise to enable their achievement in diverse chemical engineering practice and research, or in allied careers, prepare them for graduate level education, and enable them to be successful members of the professional community, for the benefit of our constituents.
nanotechnology, petrochemicals, alternative energy, and semiconductor manufacturing.

- Pursuit of graduate education and research in chemical engineering at major research universities.

- Exercise professional responsibility and sensitivity to a broad range of societal concerns, such as ethical, environmental, economic, regulatory, and global issues.

- Effective performance in a team environment, outstanding communication, and involvement in personal and professional growth activities.

The Chemical Engineering B.S. degree at UCR is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; (410) 347-7700.

**Environmental Engineering** deals with design and construction of processes and equipment intended to lessen the impact of man’s activities on the environment. With the growing importance of environmental quality, the environmental engineer plays a pivotal role in modern industrial activity. Environmental engineers are involved in a wide range of activities including the design of alternative fueled vehicles, the development of renewable energy sources, the design of equipment for solid waste collection and disposal, municipal and industrial wastewater treatment, air pollution control systems, and hazardous waste management. At UCR, the B.S. degree in Environmental Engineering allows students to concentrate on air and/or water quality.

The program’s educational objectives are to produce graduates who demonstrate in their careers and professional pursuits the following:

- An ability to apply mathematics, engineering principles, computer skills, and natural sciences to environmental engineering practice.

- Application of fundamental environmental engineering principles at an advanced level.
and competence in synthesizing knowledge from multiple disciplines to develop and evaluate design solutions.

- Engagement in environmental engineering careers in diverse areas including sustainability, air quality and pollution control, water quality engineering, bioremediation, and green engineering.

- Pursuit of graduate education and research in environmental engineering at major research universities.

- Exercise professional responsibility and sensitivity to a broad range of societal concerns, such as ethical, environmental, economic, regulatory, and global issues.

- Effective performance in a team environment, outstanding communication, and involvement in personal and professional growth activities.

The Environmental Engineering B.S. degree at UCR is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; (410) 347-7700.

All undergraduates in the College of Engineering must see an advisor at least annually. Visit student.engr.ucr.edu for details.

**University Requirements**
See Undergraduate Studies section.

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

The Chemical Engineering major and the Environmental Engineering major use the following major requirements to satisfy the college’s Natural Sciences and Mathematics breadth requirement.

1. BIOL 005A, BIOL 05LA
2. CHEM 001A, CHEM 001B, CHEM 001C, CHEM 01LA, CHEM 01LB, CHEM 01LC
Major Requirements

Chemical Engineering

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

1. Lower-division requirements (62 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 (76 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
      (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
   b) Chemical Engineering option (18 units)
      (1) CEE 010, CEE 125
      (2) Twelve (12) units of technical electives chosen from CEE 132, CEE 135, CHE 102, CHE 136, CHE 171, ENVE 120, ENVE 133, ENVE 134, ENVE 138
   c) Bioengineering option (24–26 units)
      (1) BCH 110A, BCH 110B
      (2) BIOL 005B, BIOL 005C
      (3) CEE 011
      (4) Six to eight (6–8) units of technical electives chosen from
   d) Nanotechnology option (21 units)
      (1) CEE 010
      (2) CHE 105
      (3) CHE 161
      (4) CEE 135
      (5) Eight (8) units of technical electives
BIEN 140A/CEE 140A,  
BIEN 140B/CEE 140B, BIOL 107A,  
BIOL 107B, BIOL 115,  
BIOL 121/MCBL 121, BIOL 128/  
CBNS 128, CEE 147, CEE 159/  
BIEN 159, CHE 124, CHE 140, CHE 150  
d) Nanotechnology option (21 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,  
from CHE 102, CHE 131,  
ENVE 133, ME 114, MSE 160,  
MSE 161  
Visit the Student Affairs Office in the College of Engineering or student.engr.ucr.edu for a sample program.

**JUSTIFICATION:**

1. Due to the formation of the Department of Bioengineering, offering a focus in Bioengineering by the Department of Chemical and Environmental Engineering would be redundant and is no longer necessary. The faculty of the Department of Chemical and Environmental Engineering have voted to remove the Bioengineering option as a result. The Nanotechnology option has previously been approved and will replace Bioengineering.

2. Program Educational Objectives (PEO) department and Board of Advisors reviewed PEOs and it was decided they must be updated to meet ABET PEO objectives.

3. Removal of the Bioengineering option from the list of options offered by the Chemical Engineering degree path.

4. Removal of the Bioengineering option requirements from the list of option requirements.

**APPROVALS:**

Approved by the faculty of the Department of Chemical and Environmental Engineering: 08/24/11
Approved by the Executive Committee of the Bourns College of Engineering: 04/25/12
Approved by the Committee on Educational Policy: 04/30/12