

## **PROPOSAL TO THE SENATE COMMITTEE ON EDUCATIONAL POLICY TO ESTABLISH OR MODIFY AN UNDERGRADUATE MINOR**

### **Title of the proposed minor:**

Creation of an Undergraduate Minor in Biomolecular Engineering in the Department of Chemical and Biomolecular Engineering, School of Chemical Sciences, College of Liberal Arts and Sciences.

**Sponsoring unit(s):** Please include the name of the unit and the name of the college(s) involved. Also please include the name, phone number and e-mail of a faculty member knowledgeable about the proposal.

Professor Huimin Zhao, Department of Chemical and Biomolecular Engineering;  
zhao5@uiuc.edu; 3-2631  
Associate Dean Ann Mester, College of Liberal Arts and Sciences; [mester@uiuc.edu](mailto:mester@uiuc.edu);  
3-1350

**Brief description of the program of study:** Please explain how the proposed minor meets each of the following criteria:

- The minor program of study should require some depth in the subject, but not as extensive as the major.
- Ordinarily, the minor should be 1) a comprehensive study in a single discipline, or 2) an interdisciplinary study focusing on a single theme. If this minor is an exception, please explain and justify.

The Department of Chemical and Biomolecular Engineering proposes to establish a new undergraduate minor in Biomolecular Engineering. Biomolecular Engineering is a broad, interdisciplinary field that brings together engineering, biology, and chemistry. As such, the minor will be comprehensive of study in the discipline, consisting of courses in biology, chemistry, chemical engineering, and biomolecular engineering. If approved, this minor will become the first minor in the department. The new minor will be open to all undergraduate students at UIUC, with the exception, of course, of students majoring in chemical engineering.

### **Justification:**

Biomolecular Engineering is a broad, interdisciplinary field with its main goal of engineering value-added biomolecules and biomolecular systems for applications in medical, chemical, agricultural and food industries. Its practice ranges from fundamental study of biomolecules and biomolecular systems to the design of cellular factories and artificial organs.

The Department of Chemical and Biomolecular Engineering is well suited to administer the required coursework for a Biomolecular Engineering minor because of the following reasons. First, four different biomolecular engineering courses have been and will continue to be offered in the Department of Chemical and Biomolecular Engineering. With the recent hiring of four new junior faculty in the biomolecular engineering area, more biomolecular engineering courses are expected to be developed in the near future. Second, because of its traditional strengths in molecular (or biomolecular) science and engineering, chemical engineering as a discipline is poised to take the lead in further developing the biomolecular engineering field. Third, a biomolecular engineering option is being offered to chemical engineering students in the Department of Chemical and Biomolecular Engineering. This option requires students to complete all the coursework involved in the Biomolecular Engineering minor in addition to other coursework required for a chemical engineering degree. Lastly, the Department of Bioengineering has decided not to offer its Biomolecular Engineering Specialization, and the current Biomolecular Engineering minor is designed (in consultation with the Department of Bioengineering) as a replacement.

#### **Budgetary and Staff Implications:**

- a. Additional staff and dollars needed

Current courses and faculty in the department can accommodate this minor.

- b. Internal reallocations (e.g. change in class size, teaching loads, student-faculty ratio, etc.).

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- c. Effect on course enrollment in other departments and explanations of discussions with representatives of those departments.

Changes are manageable. Please see letters of support from Bioengineering, Biochemistry, Molecular and Cellular Biology, and Chemistry.

- d. Impact on library, computer use, laboratory use, equipment, etc.

Current resources will be able to handle this new minor.

**Requirements:** list the hours and course requirements for the proposed minor. The minor should consist of at least 16 and no more than 21 hours of course work. At least six hours of the minor must be advanced (300 or 400) level courses. If the proposed minor fails to meet these criteria, please provide a reason.

Students enrolled in this minor in biomolecular engineering are required to complete a course sequence with a total of 21 credit hours.

Hours	Required Courses
3	MCB 450 – Introductory Biochemistry
3	CHBE 221 – Principles of Chemical Engineering
3	CHEM 232 – Elementary Organic Chemistry I
9	Biomolecular Engineering electives <sup>1</sup>
3	Technical Electives <sup>2</sup>
21	Total

<sup>1</sup> Students must take at least three "Biomolecular Engineering" courses offered by the Department of Chemical and Biomolecular Engineering (for example, including CHBE 471, 472, 473, and 474). Students may obtain a current list of courses that may be used to satisfy this requirement in Room 209 RAL.

<sup>2</sup>.Course to be selected from a departmentally approved list of biomolecular engineering related technical electives.

**Prerequisites for the minor:** describe the prerequisites (if any) for the proposed minor. Prerequisite courses within the sponsoring unit count toward the total hours of coursework; prerequisite courses outside the sponsoring unit ordinarily do not.

None.

**Expected enrollment in the minor:** provide an estimate of the total number of students expected in the minor once it achieves its full enrollment.

At a steady state, approximately 10-20 students per year will be enrolled in the minor.

**Admission to the minor:** describe how the department will monitor the admission process for the minor. If the department intends to limit enrollment in the minor, tell how this will be done.

The admission process will initially reviewed by the Director of the Office of Student Advising in the School of Chemical Sciences. Where significant out-of-the-ordinary questions arise regarding the application, the SCS student advising director will refer the case to the department's Undergraduate Petition Advisor.

**Minor advisor:** describe how students enrolled in the minor will be advised.

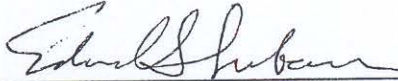
The department's Director of Undergraduate Advising will assume ultimate responsibility and will be assisted by the Director of the Office of Placement and Student Services in the School of Chemical Sciences.

**Certification of successful completion:** describe the system that has been set up within the department and college of the sponsoring department/unit for certifying successful completion of the minor.

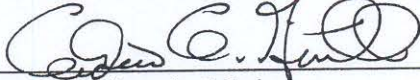
Certification of successful completion will be handled by the Office of Placement and Student Services in the School of Chemical Sciences. For some difficult cases, Debe will consult with the Director of Undergraduate Advising.

**Proposed Effective Date:** Fall 2008

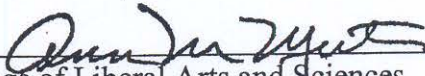
CLEARANCES:

  
\_\_\_\_\_  
Department of Chemical and Biomolecular Engineering  
Edmund Seebauer, Head

1/4/07  
Date

  
\_\_\_\_\_  
School of Chemical Sciences  
Andrew Gewirth, Director

1/4/07  
Date

  
\_\_\_\_\_  
College of Liberal Arts and Sciences

9/21/07  
Date

\_\_\_\_\_  
Chair, Senate Educational Policy Committee

\_\_\_\_\_  
Date

**Statement for the Programs of Study Catalog:**

**MINOR IN BIOMOLECULAR ENGINEERING**

[www.scs.uiuc.edu/chem\\_eng](http://www.scs.uiuc.edu/chem_eng)

Biomolecular Engineering is a broad, interdisciplinary field with its main goal of engineering value-added biomolecules and biomolecular systems for applications in medical, chemical, agricultural and food industries. Its practice ranges from fundamental study of biomolecules and biomolecular systems to the design of cellular factories and artificial organs. The Biomolecular Engineering minor is designed to better prepare non-chemical engineering students for careers in the food, pharmaceutical, personal care, and biotechnology industries. This minor is not open to students majoring in chemical engineering. Those students should instead take the biomolecular engineering concentration if they are interested in biomolecular engineering coursework.

Students may fulfill the requirements for a minor in biomolecular engineering by completing the following course sequence. For further information, please contact the Department of Chemical and Biomolecular Engineering.

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<sup>2</sup> Course to be selected from a departmentally approved list of biomolecular engineering related technical electives.

For more information regarding to the Biomolecular Engineering minor, contact the Chemical and Biomolecular Engineering Department Office (209 Roger Adams Laboratory, 217-333-1050, [debe@uiuc.edu](mailto:debe@uiuc.edu)).