

TO: The Faculty of the College of Engineering

FROM: The School of Agricultural and Biological Engineering

RE Curriculum Changes - Biological Engineering Plan of Study

The faculty of the School of Agricultural & Biological Engineering has approved the following changes to the curriculum for Biological Engineering. The requested changes follow the new plan in the freshman year and will improve preparation of undergraduate students. The proposed plan has an increase of 1 credit hour. This action is now submitted to the Engineering Faculty with a recommendation for approval.

New Requirements: The changes proposed below alter the Plan of Study followed by students in the Biological Engineering degree program. If approved it would apply to students entering Biological Engineering Fall 2012 and thereafter.

1. Credit hours for CHE 37700 and CHE 37800 are increased from 3 to 4 to reflect recent increase in credit hours for those courses.
2. CHE 32000 will be a required course.
3. The number of credit hours for ABE 20100 will be increased from 3 to 4.
4. IT 22600 (2cr) is included as required course in the third semester

In order to accommodate these changes the following courses will be dropped

1. Biology 29500F Quantitative Biology of the Living Cell and
2. 6 credits of Engineering Electives

Reasons:

1. The changes to credit hours for CHE 37700 and 37800 were necessitated by changes to those courses made by the School of Chemical Engineering.
2. In the past, students have had the option of taking CHE 32000 or other courses with similar content. Experience has shown that there is no other single course that adequately prepares our students for subsequent coursework and therefore we want to require CHE 32000.
3. The increase in credit hours for ABE 20100 was the result of incorporating a laboratory. This change was requested in EFD 45-11, which preceded this EFD. The laboratory reinforces previous experiences in the course and also requires that the students seek out new knowledge to solve assigned tasks. Just-in-time lectures and learning modules will provide the necessary technical instruction. The addition of the laboratory is in accordance with the College of Engineering's Engineer of 2020 goals, the team approach used in the laboratory enhances professional skill training and leadership development.

**Minimum Degree Requirements for Biological Engineering
Credit Hours Required for Graduation**

Present	Total Credit Hours	134	Proposed	Total Credit Hours	135
Courses		Credit Hours	Courses		Credit Hours
Mathematics and Basic Sciences			Mathematics and Basic Sciences		
Calculus: MA16500, 16600, 26100, 26500, 26600		18	Calculus: MA16500, 16600, 26100, 26500, 26600		18
Chemistry: CHM 11500, 11600, 25700		12	Chemistry: CHM 11500, 11600, 25700		12
Physics: PHYS 17200, 24100		7	Physics: PHYS 17200, 24100		7
Biological and Food Sciences			Biological and Food Sciences		
Biological Sciences: BIOL 22100, 23000, 29500		8	Biological Sciences: BIOL 22100, 23000, IT 22600		9
BCHM 22100 or FN 20500		3	BCHM 22100 or FN 20500		3
Biological or Food Science Selectives		7	Biological or Food Science Selectives		7
Engineering Tools and Skills			Engineering Tools and Skills		
ENGR 12600		3	ENGR 13100, ENGR 13200, CHE 32000		7
Professional Development			Professional Development		
ENGR 10000, ABE 29000, 49000		3	ABE 29000, 49000		2
Communication			Communication		
English Composition: ENGL 10600		4	English Composition: ENGL 10600		4
Speech: COM 11400		3	Speech: COM 11400		3
Humanities and Social Sciences			Humanities and Social Sciences		
General Education Must be chosen in accordance with the approved general education list and with the help of a faculty advisor. Of the 18 credit hours, 6 must meet College of Agriculture international understanding requirements, 3 must be an additional communication elective, and 3 must be economics		18	General Education Must be chosen in accordance with the approved general education list and with the help of a faculty advisor. Of the 18 credit hours, 6 must meet College of Agriculture international understanding requirements, 3 must be an additional communication elective, and 3 must be economics		18
Core Engineering Courses			Core Engineering Courses		
Thermodynamics: ABE 20100, 20200, 30100, 30300		12	Thermodynamics: ABE 20100, 20200, 30100, 30300		13
Momentum, Heat and Mass Transfer: CHE 37700, 37800		6	Momentum, Heat and Mass Transfer: CHE 37700, 37800		8
Kinetics and Reaction Engineering: ABE 37000		3	Kinetics and Reaction Engineering: ABE 37000		3
Sensors and Process Control: ABE 460000		3	Sensors and Process Control: ABE 460000		3
Transport Processes: ABE 45400		4	Transport Processes: ABE 45400		4
Unit Operations: ABE 55500		4	Unit Operations: ABE 55500		4
Plant Design and Economics: ABE 55600		4	Biological and Food process Design: ABE 55600		4
Process Engineering: ABE 58000		3	Process Engineering: ABE 58000		3
Technical Electives		9	Technical Electives		3

Supporting Documentation - ABE Plan of Study revisions (BFPE major):

Present**Proposed*****Freshman Year*****First Semester**

(1) AGR 10100 Freshman Engineering Lectures OR	(4) CHM 11500 General Chemistry I
ENGR 10000 Freshman Engineering Lectures	(4) ENGL 10600 English Composition I
(4) ENGL 10600 English Composition I	(2) ENGR 13100 Transforming Ideas to Innovation I
(4) CHM 11500 General Chemistry I	(4) MA 16500 Plane Analytic Geometry and Calculus I
(3) ENGR 12600 Engineering Problem Solving and Computer Tools	
(4) MA 16500 Plane Analytic Geometry and Calculus I	

16**14****Second Semester**

(4) CHM 11600 General Chemistry II	(4) CHM 11600 General Chemistry II
(3) COM 11400 Fundamentals of Speech Communications	(3) COM 11400 Fundamentals of Speech Communications
(4) MA 16600 Plane Analytic Geometry and Calculus II	(4) MA 16600 Plane Analytic Geometry and Calculus II
(4) PHYS 17200 Modern Mechanics	(4) PHYS 17200 Modern Mechanics
(3) Humanities /Social Science Elective	(2) ENGR 13200 Transforming Ideas to Innovation II

18**17*****Sophomore Year*****Third Semester**

(3) ABE 20100 Thermodynamics of Biological Systems I	(4) ABE 20100 Thermodynamics of Biological Systems I
(4) MA 26100 Multivariate Calculus	(4) MA 26100 Multivariate Calculus
(4) CHM 25700 Organic Chemistry I	(4) CHM 25700 Organic Chemistry I
(3) PHYS 24100 Electricity and Optics	(3) BIOL 23000 Biology of the Living Cell
(3) General Education elective	(2) IT 22600 Biotechnology Laboratory I
(1) ABE 29000 Sophomore Seminar	(1) ABE 29000 Sophomore Seminar

18**18****Fourth Semester**

(3) ABE 20200 Thermodynamics of Biological Systems II	(3) ABE 20200 Thermodynamics of Biological Systems II
(3) BCHM 22100 Analytical Biochemistry OR F & N 20500 Food Science	(3) BCHM 22100 Analytical Biochemistry OR F & N 205 Food Science
(3) MA 26500 Linear Algebra	(3) MA 26500 Linear Algebra
(3) MA 26600 Ordinary Differential Equations	(3) MA 26600 Ordinary Differential Equations
(3) Engineering Elective	(3) CHE 32000 Statistical Modeling
(3) General Education Elective	(3) General Education Elective

18**18**

Present

Proposed

Junior Year

Fifth Semester

(3) ABE 30100 Modeling & Computation Tools in Biol. Engr.	(3) ABE 30100 Modeling & Computation Tools in Biol. Engr.
(3) ABE 30300 App of Phys Chemistry to Biol Processes	(3) ABE 30300 App of Phys Chemistry to Biol. Processes
(3) CHE 37700 Momentum Transfer	(4) CHE 37700 Momentum Transfer
(3) BIOL 23000 Biology of the Living Cell	(3) PHYS 24100 Electricity and Optics
(1) BIOL 29500F Quantitative Biology of the Living Cell	(3) General Education Elective
(3) General Education Elective	

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Sixth Semester

(3) ABE 37000 Biol./Microbial Kinetics & Reaction Engr.	(3) ABE 37000 Biol./Microbial Kinetics & Reaction Engr.
(4) ABE 45400 Transport Processes in Biological and Food Process Systems	(4) ABE 45400 Transport Processes in Biological and Food Process Systems
(3) CHE 37800 Heat and Mass Transfer	(4) CHE 37800 Heat and Mass Transfer
(4) BIOL 22100 Microbiology	(4) BIOL 22100 Microbiology
(3) Engineering Elective Statistical Modeling CHE 32000	(3) General Education Elective

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Senior Year

Seventh Semester

(1) ABE 49000 Professional Practice in Agric. & Biol. Engr	(1) ABE 49000 Professional Practice in Agric. & Biol. Engr
(4) ABE 55500 Biological & Food Processing Unit Operations	(4) ABE 55500 Biological & Food Processing Unit Operations
(4) Biological or Food Science Elective*	(4) Biological or Food Science Elective
(3) Engineering Elective	(3) Engineering Elective
(3) General Education Elective	(6) General Education Elective

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Eighth Semester

(3) ABE 58000 Process Engineering of Renewable Resources	
(4) ABE 55600 Biological and Food Process Design	No change
(3) ABE 46000 Sensors and Process Controls	
(3) General Education Elective	
(3) Biological or Food Science Elective	

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Total

Total

134

135



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Date: February 23, 2011

APPROVED FOR THE FACULTY
OF THE SCHOOLS OF ENGINEERING
BY THE ENGINEERING
CURRICULUM COMMITTEE

ECC Minutes #1
Date 8/31/11
Chairman ECC R. Cipra