



Memo

To: Randy Smith, Vice Provost for Academic Programs, Office of Academic Affairs
From: Rosie Quinzon-Bonello, Assistant Dean for Curriculum and Assessment
Date: May 2, 2023

Re: Informational item submitted by the Chemical and Biomolecular Engineering UG program

In an email dated Wednesday, April 19, CAA informed the Chemical and Biomolecular Engineering UG Program that the committee documented a formal, institutional-level record of a curriculum change action.

The changes recorded by CAA included the following:

- Removal CBE 2345 (3) as a required core course
- Change to required number of technical elective credit hours from 12 to 15

The conditions that led to the aforementioned program changes changed much more quickly than expected, so CBE is submitting an informational item requesting to return to its 2022-2023 state:

- Adding CBE 2345 (3) as a required core course
- Reducing the number of technical elective credit hours from 15 to 12

Attached is the proposal (which was presented to CCAA as a informational item during its April 28, 2023 meeting) requesting the reversal of those changes and explaining the conditions that created this unexpected turnaround. In this way, a formal, college-level record of this action has been created.

Yours sincerely,

Rosie Quinzon-Bonello

Cover Letter

Tuesday, May 2, 2023

Professor Boyd Panton

Chair of the College Committee for Academic Affairs

Dear Professor Boyd Panton,

We are writing to request that the Committee for Academic Affairs considers the proposed changes to the curriculum for the Department of Chemical and Biomolecular Engineering. The proposed changes include (1) adding CBE 2345 as a required core course (gain of 3 credit hours); and (2) reducing the required number of technical elective credit hours from 15 to 12 (reduction of 3 credit hours). The proposed changes will result in no net change in the number of credit hours. We are requesting this change as we have received concurrence from the Math department to teach CBE 2345.

The proposed changes will address delays in receiving concurrence for CBE 2345 that was a requirement for our curriculum proposal submitted on November 21, 2021 (referred to as 1st proposal). We submitted a curriculum proposal on January 5, 2023 (referred to as the 2nd proposal). The 2nd curriculum proposal removed CBE 2345 (3 credit hours) as a core requirement and added three credit hours of technical electives. The 2nd proposal was approved on April 19th, 2023. On April 21st, we received concurrence from the Math department to allow us to teach CBE 2345. In this proposal (3rd proposal), we are reverting to the curriculum proposed in our 1st proposal.

We want the proposed changes to be effective for AU 2023. We would like to have this considered as soon as possible so that changes can be made in time for student scheduling for SP 2024. We can start AU 2023 as students that will graduate in AU 2023 and SP 2024 will not require CBE 2345. Our previous transition plan allowed students that had completed Math 2177 and Physics 1251 to not be required to take CBE 2345. Students graduating in AU2023 and SP2024 will already have completed these courses.

The reason for the 2nd proposal was that OAA requested we seek concurrence from the Math and Statistics departments. In Fall 2022, we submitted CBE 2345 for concurrence and were granted concurrence from the statistics department, but the math department did not grant concurrence. The math department indicated:

- (1) The topics are mathematical in nature
- (2) Math 3607 covers the content
- (3) Scientific computing is increasingly popular with the potential that more departments will want to offer a course

We have updated the syllabus for CBE 2345 to address these concerns. We adjusted the syllabus to reflect the emphasis on Chemical Engineering problems.

We do not anticipate a need for a detailed transition plan for this change since CBE 2345 is not currently a required course until AU 2023. The proposed modifications will hopefully happen at the same time that our other approved curriculum modifications will happen (i.e., AU 2023).

The proposed changes were discussed in a faculty meeting before a final vote was recorded to approve the proposed changes with unanimous consent by the faculty (17 votes recorded during the meeting; 1 vote received via email).

Overall, the proposed modification has no impact on the number of credits required for graduation and will allow students flexibility as we make modifications to the curriculum.

If there are any questions, please let us know.

Sincerely,



Nicholas A. Brunelli

Chair of the Curriculum Working Group for Chemical and Biomolecular Engineering

(1) Proposed change: Add required course – Computational Methods for Chemical Engineers – 3 credit hours (CBE 2345)

Rationale: We have received concurrence from the Math and Stats department.

Present curriculum: See attached BINGO sheets.

Syllabus for new course: See attached.

(2) Proposed change: Decrease the technical elective credit hours from 12 to 15.

Rationale: Our short term goal is to maintain the total credit hours required for graduating from the CBE department at 127. Since we are adding 3 credit hours (proposed change 1), this proposed change would decrease the technical elective credit hours to maintain the total at 127 credit hours.

Present curriculum: See attached BINGO sheets.

Syllabus for new course: See attached.

Bachelor of Science Chemical Engineering

[Brief description of major]. Students in this major will complete a minimum of 127 hours outlined as follows.

General Education Requirements		
Requirement	Course Options	Hours
GE Launch Seminar	ACADAFF 1201	1
Foundations: Writing and Information Literacy ^a	<i>Student Choice</i>	3
Foundations: Mathematical & Quantitative Reasoning/Data Analysis ^a	<i>Student Choice*</i>	0-5
Foundations: Literary, Visual and Performing Arts ^a	<i>Student Choice</i>	3
Foundations: Historical & Cultural Studies ^a	<i>Student Choice</i>	3
Foundations: Natural Science ^a	<i>Student Choice*</i>	0-5
Foundations: Social & Behavioral Sciences ^a	<i>Student Choice</i>	3
Foundations: Race, Ethnic and Gender Diversity ^a	<i>Student Choice</i>	3
Theme: Citizenship for a Diverse & Just World ^b	<i>Student Choice</i>	4
Theme: Student Choice ^b	<i>Student Choice</i>	4
GE Reflection	Capstone**	Embedded into Major Core Capstone
Total		24-34

College / Degree Requirements ^{a, b}		
Requirement	Course Options	Hours
MATH 1151*, 1172*, (Math & Quantitative Reasoning / Data Analysis)		10
PHYSICS 1250* (Nat Sci)		5
ENGR 1181.0x, 1182.0x		4
ENGR 1100.01		1
Total		20

^a Some coursework required by the major or college may satisfy GE requirements. Please add an asterisk to "student choice" for any GE category where that category can be satisfied by a required course. Please indicate in parentheses following the course listing within College/Degree requirements or Major Coursework what GE category the course satisfies (e.g., "Biology 1113 (Nat Sci)" in the Major Core for programs that require this as a prerequisite to major coursework). There is no limit to the number of courses that may overlap between the GE Foundations and the rest of the academic program

^b Students complete either a 4-credit course or two 3-credit courses in each of two General Education Theme areas: Citizenship for a Diverse & Just World (required), and the student's choice of available GE Themes. If major-required courses are approved as a GE Theme course, one course in each GE Theme area may double count in the GE and major hours. Theme courses are identified with a ❖ symbol.

* These courses are can also fulfill certain GE Requirements above (may be degree requirements, pre- or co-requisites, or major courses).

Major Coursework ^{a, b}		
Course	Title	Hours
Major Core		
CBE 2100	Chemical Engineering Seminar	1
CBE 2200	Process Fundamentals	3
CBE 2345	Computational Methods in ChemEng	3
CBE 2523	Separations	3
CBE 3508	Thermodynamics 1	3
CBE 3509	Thermodynamics 2	3
CBE 2420	Transport Phenomena 1	3
CBE 3421	Transport Phenomena 2	3
CBE 3422	Transport Phenomena 3	3
CBE 3610	Kinetics and Reactor Design	3
CBE 3730	Unit Operations 1	1
CBE 3731	Unit Operations 2	1
CBE 3732	Unit Operations 3	2
CBE 4760	Process Design, Econ, Strategy	3
CBE 4764**	Senior Design	3
CBE 4755	Process Safety	2
CBE 4624	Process Control	3
Total		4043

Required Non-Major General Courses		
CHEM 1210	General Chemistry 1	5
CHEM 1220	General Chemistry 2	5
CHEM 2510	Organic Chemistry 1	4
CHEM 2520	Organic Chemistry 2	4
CHEM 2540	Organic Chemistry Lab 1	2
CHEM 4300	Physical Chemistry 1	3
MATH 2173	Engineering Mathematics B	3
ENGR 1221	Introduction to Computer Programming in MATLAB for Engineers and Scientists	2
Total		28

Required Technical / Directed / Targeted Electives; Career Courses		
Required Elective	Math OR Stats OR CBE 5779	3
Technical Electives	CBE OR Other courses	429
Total		432

General Education	24-34
College / Degree	20
Major Core	40
Required Non-Major	28
Required Technical / Directed / Targeted Electives; Career Courses	15
Minimum Total Credit Hours for Degree	127

Proposed Curriculum – Option 1

Yellow

- CBE 2345 will be added to the requirements with a decrease of the technical electives from 15 to 12

Suggested Curriculum

This should be used as a **guide** only. Semester offerings are subject to change.

Year	Autumn	Spring
1	___ CHEM 1210 (<i>Gen Chem I</i>)..... 5 hr ___ MATH 1151 (<i>Calculus I</i>) 5 hr ___ ENGR 1181.xx (<i>Fundamentals of ENGR I</i>) 2 hr ___ ENGR 1100.15 (<i>Engineering Survey</i>) 1hr ___ GE (<i>Launch Seminar</i>)..... 1 hr ___ GE (<i>Writing and Information Literacy</i>)..... 3 hr 17	___ CHEM 1220 (<i>Gen Chem II</i>)..... 5 hr ___ MATH 1172 (<i>Engineering Math A</i>)..... 5 hr ___ ENGR 1182.xx (<i>Fundamentals of ENGR II</i>)..... 2 hr ___ Engr 1221..... 2 hr ___ CBE 2200 (<i>Process Fundamentals</i>)..... 3 hr 17
2	___ CHEM 2510 (<i>Organic Chemistry I</i>)..... 4 hr ___ GE (<i>Literary, Visual, and Performing Arts</i>)..... 3 hr ___ MATH 2173 (<i>Mathematical Topics for Engineers</i>) 3 hr ___ CBE 3508 (<i>Thermodynamics I</i>)..... 3 hr ___ CBE 2523 – (<i>Separations</i>)..... 3 hr ___ CBE 2100 (<i>Chemical Engineering Seminar</i>)..... 1 hr 17	___ CHEM 2520 (<i>Organic Chemistry II</i>) OR Mol Gen 3300 OR Biochem 4511 4 hr ___ CBE 2345 (<i>Comp. Methods for Chem. Eng.</i>)..... 3 hr ___ CBE 2420 (<i>Transport Phenomena 1</i>)..... 3 hr ___ CBE 3509 (<i>Thermodynamics 2</i>)..... 3 hr ___ CHEM 2540 (<i>Organic Chemistry Lab I</i>)..... 2 hr 12
3	___ PHYSICS 1250 (<i>Mechanics, Thermal, Waves</i>)..... 5 hr ___ GE (<i>Historical and Cultural Studies</i>) 3 hr ___ CBE 3421 (<i>Transport Phenomena 2</i>)..... 3 hr ___ CBE 3730 (<i>Unit Operations Lab I</i>)..... 1 hr ___ CBE 5779 (<i>Design and Analysis of Experiments</i>)... 3 hr 15	___ CBE 3610 (<i>Kinetics and Reactor Design</i>)..... 3 hr ___ CBE 3422 (<i>Transport Phenomena 3</i>)..... 3 hr ___ CBE 3731 (<i>Unit Operations Lab II</i>)..... 1 hr ___ Technical Elective..... 3 hr ___ Chem 4300 (<i>Physical Chemistry</i>)..... 3 hr ___ GE (<i>Social & Behavioral Sciences</i>)..... 3 hr 16
4	___ CBE 3732(<i>Unit Operations Lab</i>)..... 2 hr ___ CBE 4760 (<i>Process Design, Econ, & Strategy</i>)..... 3 hr ___ CBE 4755 (<i>Process Safety</i>)..... 2 hr ___ CBE 4624 (<i>Process Control</i>)..... 3 hr ___ GE (<i>Race, Ethnic, & Gender Diversity</i>)..... 3 hr ___ GE (<i>Citizenship for a Diverse & Just World</i>) 4 hr 17	___ CBE 4764 (<i>Senior Design</i>)..... 3 hr ___ Technical Elective..... 3 hr ___ Technical Elective..... 3 hr ___ GE (<i>Student Choice</i>)..... 4 hr 13

Total Hours to complete the degree program = 127

Program Options

Students wishing to complete the biomolecular focus will substitute Biochemistry 4511 in place of Chemistry 2520.

Acceptance Criteria

Acceptance into this program is based on the eligibility point hour ratio (EPHR) of Math 1151, 1172; Engineering 1181.xx, 1182.xx; and Chemistry 1210, 1220. A 3.2 EPHR guarantees admission during the academic year, but admission is more competitive in autumn semester. Applications are accepted during autumn and spring term.

Technical and Other Electives

Students have the option to complete a biomolecular, environmental, or polymer focus for their technical elective plan. Each focus will require the completion of two approved courses in CBE plus one additional course in CBE or in another department. All students will also be required to complete one math or statistics technical elective.

___ CBE XXXX.....(3 hr)
 ___ CBE XXXX.....(3 hr)
 ___ CBE XXXX.....(3 hr)
 ___ Math/Stat XXXX/CBE 5779.....(2-4 hr)
 ___ Additional Course XXXX(2-4 hr)
 ___ **Total Hours** (minimum of 12 are required)

General Education Requirement

Writing and Communication

English 1110.xx 3 hr
Second Writing Course 3 hr

Social Science

Only one course per Social Science group may count.
 _____ 3 hr
 _____ 3 hr

Literature

_____ 3 hr

Visual and Performing Arts

_____ 3 hr

Historical Study

_____ 3 hr

Second Historical Study or Cultures and Ideas

_____ 3 hr

Social Diversity in the United States

Some courses may overlap with another GE category, See course list.
 _____ 0 / 3 hr

Ethics

Some courses may overlap with another GE category, See course list.
 _____ 0 / 3 hr

Foreign Language

Pre-approved substitutions

- A. Credit (including EM) for a foreign language sequence through 1103, or credit for a foreign language course with a prerequisite of 1103, can be substituted for one Gen Ed course requirement as a Cultures & Ideas.
- B. Completion of a foreign language minor can be substituted for two Gen Ed courses: one course as a Social Science, (Individuals & Groups or Organizations & Politics subgroups only) and one course as either a Literature or a Cultures & Ideas.

Parameters: Students must choose either Substitution A OR Substitution B. Both substitutions cannot be applied simultaneously.

University Capstone (Cross-Disciplinary Seminar)

Pre-approved substitutions

Completion of a Social Science 3597 or 4597 can be substituted for a Social Science general education course in any group.
 Completion of an Arts & Humanities 3597 or 4597 can be substituted for a Visual/Performing Arts general education course.

See the list of approved general education courses for additional details: www.advising.engineering.osu.edu.