CHEMICAL AND BIOMOLECULAR ENGINEERING (BS)

NYSED: 08796 HEGIS: 0906.00 CIP: 14.0701

Program Description
The undergraduate program in Chemical and Biomolecular Engineering (CBE) leads to rewarding, impactful careers in industries that span chemical, pharmaceutical, consumer products, materials, and related fields. The CBE major also provides excellent preparation for graduate studies in engineering, medicine, business, and law. It introduces students to a discipline that applies broad scientific and engineering principles to the understanding and design of processes ranging from molecular to manufacturing scale, based on thorough grounding in mathematics and the sciences, including physics, chemistry, and biology. Students in the program learn how to transform raw material and energy resources into valuable products needed by society with emphasis on making such processes sustainable, environmentally friendly, economical, and safe. They develop expertise in subjects that include thermodynamics, reaction kinetics, fluid mechanics, heat and mass transport, as well as the instrumentation and processes encountered in manufacturing and R & D settings. The curriculum culminates in a capstone design project, and includes a year-long laboratory that introduces students to both classic and modern aspects of chemical engineering operations.

The undergraduate program leads to a Bachelor of Science in Chemical and Biomolecular Engineering and is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org.

Admissions
New York University’s Office of Undergraduate Admissions supports the application process for all undergraduate programs at NYU. For additional information about undergraduate admissions, including application requirements, see How to Apply (https://www.nyu.edu/admissions/undergraduate-admissions/how-to-apply.html).

Program Requirements
The program requires the completion of 128 credits, comprised of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>MA-UY 1002</td>
<td>Calculus I: Multi-Dimensional Calculus</td>
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<tr>
<td>CM-UY 1000</td>
<td>General Chemistry for Engineers</td>
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<td>Physical Chemistry I</td>
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<tr>
<td>BMS-UY 1003</td>
<td>Introduction to Cell and Molecular Biology</td>
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<td>CBE-UY 1002</td>
<td>INTRODUCTION TO CHEMICAL &amp; BIOMOLECULAR ENGINEERING (recommended, but not required)</td>
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<td>Analysis of Chemical and Biomolecular Processes</td>
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<td>CHEMICAL ENGINEERING COMPUTATION</td>
<td>3</td>
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<tr>
<td>CBE-UY 3153</td>
<td>Chemical and Biomolecular Engineering Thermodynamics</td>
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<td>CBE-UY 3313</td>
<td>Transport I</td>
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<td>CBE-UY 3173</td>
<td>Polymeric Materials</td>
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<td>CHEM &amp; BIOMOLECULAR ENG SEPARATIONS</td>
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<td>KINETICS AND REACTOR DESIGN</td>
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<td>CBE-UY 4143</td>
<td>Process Dynamics and Control</td>
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<td>MECHANICS</td>
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<tr>
<td>PH-UY 2023</td>
<td>ELECTRICITY, MAGNETISM, &amp; FLUIDS</td>
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<td>PH-UY 2033</td>
<td>WAVES, OPTICS, &amp; THERMODYNAMICS</td>
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1. Students who complete this course in the first year can count it as part of the 12 credits of free electives.

Required Safety Trainings
CBE majors in their sophomore year must complete initial safety training provided by NYU’s Office of Research and Laboratory Safety. There are three mini courses that must be completed:
1. Lab Safety
2. Hazardous Waste
3. Bloodborne Pathogens

Students must show proof of completion (certificate) that they completed the training to their advisor during the sophomore spring advisement meeting as part of removing the registration hold. In their junior fall they
must take the corresponding refresher courses for all three topics, and present proof of completion at the junior spring advising meeting.

### Sample Plan of Study

#### 1st Semester/Term

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<tr>
<th>Course</th>
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<tr>
<td>MA-UY 1024</td>
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<td>EXPOS-UA 1</td>
<td>Writing The Essay</td>
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<td>EG-UY 1004</td>
<td>Introduction to Engineering and Design</td>
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<td>Introduction to Cell and Molecular Biology</td>
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<td>Introduction to Cell and Molecular Biology Laboratory</td>
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<td>INTRODUCTION TO CHEMICAL &amp; BIOMOLECULAR ENGINEERING (recommended, but not required)</td>
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<tr>
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<td>THE ADVANCED COLLEGE ESSAY</td>
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<td>CBE-UY 2124</td>
<td>Analysis of Chemical and Biomolecular Processes</td>
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<td>MA-UY 2034</td>
<td>Linear Algebra and Differential Equations</td>
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<td>ELECTRICITY, MAGNETISM, &amp; FLUIDS</td>
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<td>ORGANIC CHEMISTRY II</td>
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<td>MA-UY 2114</td>
<td>Calculus III: Multi-Dimensional Calculus</td>
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<td>CBE-UY 2233</td>
<td>CHEMICAL ENGINEERING COMPUTATION</td>
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<td>WAVES, OPTICS, &amp; THERMODYNAMICS</td>
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<td>Transport I</td>
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<td>Polymeric Materials</td>
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<td>Humanities and Social Sciences Elective</td>
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#### 6th Semester/Term

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<td>CHEM &amp; BIOMOLECULAR ENG SEPARATIONS</td>
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<td>CBE-UY 3223</td>
<td>KINETICS AND REACTOR DESIGN</td>
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<td>Transport II</td>
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<td>Free Elective</td>
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<td>Humanities and Social Sciences Elective</td>
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#### 7th Semester/Term

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<tr>
<td>CBE-UY 4143</td>
<td>Process Dynamics and Control</td>
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<tr>
<td>CBE-UY 4163</td>
<td>Chemical and Biomolecular Process Design I</td>
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<td>Free Elective</td>
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<td>Humanities and Social Sciences Elective</td>
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#### 8th Semester/Term

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<td>CBE-UY 4223</td>
<td>BIOCHEMICAL ENGINEERING</td>
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### Learning Outcomes

Upon successful completion of the program, graduates will have:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.
8. An ability to analyze and design chemical and biomolecular processes and systems.

### Policies

#### GPA and Grade Policy

In addition to the NYU Tandon requirement of a 2.0 GPA or better for graduation, students must also meet the department's academic standards. For chemical and biomolecular engineering students to advance to senior-year, they must maintain a minimum average GPA of 2.5 in courses CBE-UY 2124 Analysis of Chemical and Biomolecular Processes, CBE-UY 3153 Chemical and Biomolecular Engineering Thermodynamics, CBE-UY 3313 Transport I, CBE-UY 3233 CHEM & BIOMOLECULAR ENG SEPARATIONS, CBE-UY 3223 KINETICS AND REACTOR DESIGN and CBE-UY 3323 Transport II. The same course must not be failed twice. Students who fail to meet these requirements are not allowed to register for senior courses. All listed prerequisites must be satisfied before students may enroll in CBE courses. In addition, students need a grade of B- or better in their first college level mathematics course (typically MA-UY 1024 Calculus I for Engineers) for registering into the sophomore course CBE-UY 2124 Analysis of Chemical and Biomolecular Processes. Should the above requirements not be met, students must meet with their faculty advisor to formulate an individual remedial plan. Typically, one or more courses will need to be retaken until the missing requirement is satisfied, possibly leading to a delayed graduation.

### NYU Policies

University-wide policies can be found on the New York University Policy pages (https://bulletins.nyu.edu/nyu/policies/).
Tandon Policies

Additional academic policies can be found on the Tandon academic policy page (https://bulletins.nyu.edu/undergraduate/engineering/academic-policies/).