

DEGREE REQUIREMENTS

Biological Engineering Program

A student earning a Bachelor of Science degree in the Biological Engineering Program must complete the following academic requirements. Degree requirements apply to students matriculating in the fall semester of 2008 or later. A minimum of 127 credit hours of courses is required.

Group	Subject Matter	Credit Hours
1.	Mathematics (1910, 1920, 2930, 2940) All math courses in this sequence must be completed with a grade of C- or better.	16
2.	Physics Calculus-based Physics (1112, 2213)	8
3.	Chemistry General Chemistry (2070 or 2090) Organic Chemistry (1570 or 3570)	7
4.	Biological Sciences Introductory Biology (1101/1103, 1102/1104 recommended) (8 credits) ^a Biochemistry or Microbiology (BIOBM 3300 or 3330 or BIOMI 2900 or recommended) (3 or 4 credits) Advanced Biological Science at 2000 level or above (3 credits) ^b	15
5.	Written Expression First Year Writing Seminars Technical Writing – one course required. Technical writing courses are listed in the <i>Courses of Study</i> , College of Engineering section. BEE 4530, BEE 4730 and BEE 4890 are approved courses.	6
6.	Liberal Studies (6 courses) Liberal Studies courses are listed in the <i>Courses of Study</i> , College of Engineering section. Minimum of 6 courses in at least 3 of the 6 groups, at least 2 of 6 courses at or above 2000 level. <ol style="list-style-type: none"> 1. Cultural Analysis (CA) 2. Historical Analysis (HA) 3. Literature and the Arts (LA) 4. Knowledge, Cognition, and Moral Reasoning (KCM) 5. Social and Behavioral Analysis (SBA) 6. Foreign Language (FL, not literature) 	18
7.	Computer Programming Intro to Computer Programming - BEE 1510 (or CS 1112) and CS 1130	5
8.	Engineering Distribution and Field Courses (all must be taken for letter grade, except BEE/BME 5010) <ol style="list-style-type: none"> (a) Required Courses <ul style="list-style-type: none"> Mechanics of Solids - ENGRD 2020^c (4 credits) Engineering Statistics and Probability - ENGRD 2700 or CEE 3040 (3 or 4 credits) (b) Biological Engineering Core Courses <ul style="list-style-type: none"> The BEE Experience - BEE 1200 (1 credit) [Not required of students who have completed ENGRG 1050^d] Engineering Distribution^c - BEE/ENGRD 2600 or BEE/ENGRD 2510 (3 credits) Biological and Environmental Transport Processes - BEE 3500 (3 credits) Fluid Mechanics - BEE 3310 or CEE 3310 (4 credits) [Students may petition CHEME 3230 (3 credits).] Thermodynamics - BEE 2220 or ENGRD 2210 (3 credits). [Students may petition to substitute CHEME 3130 (4 credits); MSE 3030 (4 credits); or AEP 4230 (4 credits).] (c) Biological Engineering Concentration – three courses from one concentration (minimum of 9 credits), see pages 12-14. 	46

DEGREE REQUIREMENTS (CONT'D)

Biological Engineering Program

Group	Subject Matter	Credit Hours
	(d) Major-approved engineering electives to complete 46 engineering credits	
	BEE and other Engineering courses at 2000 level or above from BEE or the College of Engineering (one ENGRI course counts if taken as a freshman). A maximum of 4 credits of research, teaching or independent study may be used in this category. BEE/BME 5010 may be taken twice. Engineering Laboratory (select one course) - BEE 3650, BEE 4270, BEE 4500, BEE 4730, or CEE 4530. Capstone Design (select one course) – BEE 4500, BEE 4530, BEE 4730, BEE 4740, BEE 4810/4960, or BEE 4870.	
9.	Approved Electives	6
	These courses are selected by the student with approval of the Faculty Advisor.	
TOTAL MINIMUM		127

^aStudents may take BIOG 1105/1106 or 1107/1108 or 1109/1110 but will need to complete at least 15 credits in the Biological Sciences category. Inclusion of an upper level lab-based biology course is strongly recommended for those taking BIOG 1109/1110.

^bPrerequisite must be 1 year of introductory biology. Up to 4 credits of BIOG 4990 may be used in this category, must be for letter grade.

^cEngineering distribution requirement is satisfied by ENGRD 2020 and ENGRD 2510 or ENGRD 2600

^dNo engineering credit for ENGRG 1050, credit is given in approved electives.

Concentrations

All students are required to complete a concentration. Concentrations are intended to be used as a guide to areas in biological engineering that relate to individual interests or preparation for careers or graduate study. They are intended to help in choosing electives while planning an individual curriculum. The three concentrations are *Biomedical Engineering*, *Bioprocess Engineering* and *Bioenvironmental Engineering*.

Special Courses

Courses numbered 10XX, such as PHYS 1012 do not count toward graduation requirements. Academic Excellence Workshops (ENGRG 1091, 1092, 2093 and 2094) may not be used as Biological Engineering Electives but may be used as Approved Electives (area 9).

Transfer Credit

All transfer credit for the engineering major must be approved before it will be posted on the Cornell transcript. Courses completed prior to matriculation will be evaluated when the student matriculates at Cornell. Courses taken outside of Cornell after matriculation must be approved before the student enrolls in them to ensure credit will count toward the engineering degree. If a transfer course meets the subject matter content, but lacks full credit content, the student must fulfill the credit requirement by petitioning the College of Engineering to substitute engineering credits.

Physical Education

Two semesters of physical education are required. All students must pass a swim test prior to graduation. Transfer students are exempted from one semester of PE for each full-time semester they transfer into Cornell.

Letter and S/U Grading

All courses must be taken for letter grade except for Liberal Studies and Approved Electives.

Additional program information is provided in the *Courses of Study*, College of Engineering section and in the College of Engineering Undergraduate Handbook.