designated Air Force base during the summer following their sophomore year of college. When they return to the university in the fall, they are placed under contract with the Air Force to complete the program and serve a minimum of four years on active duty. Pilot and navigator candidates incur an additional obligation because of specialized training following commissioning.

Students in any major with less than four years, but more than two remaining until graduation may join the program. These students will enter the appropriate GMC class based on their projected graduation date.

**TWO-YEAR PROGRAM**

The two-year program is normally offered to prospective juniors and graduate students. The academic requirements for this program are identical to the final two years of the four-year program. This option may not be available to students in all academic degrees.

**GENERAL REQUIREMENTS FOR POC ACCEPTANCE**

Students competing for acceptance as POC cadets must pass the Air Force Officer Qualifying Test, be physically qualified, meet certain age requirements, be in good academic standing, and be able to meet all Air Force enlistment standards.

**THE CURRICULUM**

**ACADEMIC COURSES**

**Freshman year:** The Foundations of the USAF I and II (AFSC 110 (fall) and AFSC 111 (spring)). Each of these one-credit courses consists of approximately one hour of academic class each week. In combination, these two courses survey the history and organization of the Air Force, its benefits and opportunities, and leadership skills.

**Sophomore year:** The Evolution of USAF Air/Space Power I and II – AFSC 210 (fall) and AFSC 211 (spring). Each of these one-credit courses consists of approximately one hour of academic class each week. These two GMC courses survey the history of air power from the 18th century to the present.

GMC courses are open to all freshmen and sophomore students.

**Junior year:** Leadership Studies I and II – AFSC 310 (fall) and AFSC 311 (spring). Each of these three-credit courses consists of three hours of academic classes each week. Here the student is introduced to leadership and management concepts. The courses are designed to provide a foundation for basic leadership and management skills, with emphasis on communications.

**Senior year:** National Security Affairs I and II – AFSC 410 (fall) and AFSC 411 (spring). Each of these three-credit courses consists of three hours of academic classes each week. These courses focus on our national security policy—its evolution, actors, processes, and current issues. Emphasis is also given to military professionalism, military justice, and communication skills.

POC courses are open to all juniors and seniors.

**LEADERSHIP LABORATORY**

Leadership laboratory is required for students who are members of the Air Force Reserve Officer Training Corps and are eligible to pursue a commission as determined by the Professor of Aerospace Studies. Leadership laboratory is scheduled for two hours per week for GMC and for three hours per week for POC.

**PHYSICAL FITNESS**

Members of the Air Force Reserve Officer Training Corps are required to maintain certain physical fitness standards. Physical training activities are scheduled twice a week for one hour each. In order to participate, members must have a valid DoDMERB physical or sports physical. Forms to document the sports physical are available at the detachment and online.

**SCHOLARSHIPS AVAILABLE**

Air Force ROTC scholarships are available to qualified students in all majors and are based on the whole-person concept. Scholarships are awarded in varying amounts and may be used towards tuition and some mandatory fees. All Air Force scholarships include a yearly book stipend and a tax-free monthly allowance. Students who accept these scholarships enter the AFROTC program as a contract cadet and incur a four-year active duty service commitment.

The University of Delaware also offers scholarships to students enrolled in the AFROTC program. These scholarships may be used towards tuition or room charges and are offered each semester to qualified students in all majors based on merit.

Contact the unit’s admission officer for current details.

**AIR FORCE ROTC NURSING PROGRAM**

Air Force ROTC makes it possible for qualified nursing school students to enroll in its programs and, upon completion of all academic requirements, receive a commission as a second lieutenant in the United States Air Force in the nursing career field. Scholarships are available to qualified applicants.

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**CHEMICAL ENGINEERING**

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The Department of Chemical Engineering offers a program leading to the Bachelor of Chemical Engineering, including an Honors Degree option. Chemical Engineering is a combination of biology, chemistry, mathematics and physics with the art and creativity of engineering. The department has much more inclusive descriptions of the profession for those interested.

The Educational Objectives of our Department are:
- To provide students with the breadth of educational opportunities in the chemical and biological sciences and in engineering that will enable them to pursue productive careers.
- To maintain an environment that enables students to identify and pursue their personal and professional goals within an innovative educational program that is rigorous and challenging as well as flexible and supportive.
- To educate graduates who will be able to apply their knowledge of chemical engineering, including their problem solving, analytical, design, and communication skills, in the private or public sectors and/or in the pursuit of more advanced degrees.
- To cultivate graduates who will actively seek to provide technical, educational, public sector and/or business leadership in a rapidly changing, increasingly technological, global society and who recognize their professional responsibility toward the betterment of our community.

The chemical engineering curriculum is designed to fulfill these objectives and offers an early start in the discipline. In the first year, the course CHEG 112 applies the student's background in science and mathematics to the solution of several engineering problems. Physical chemistry is introduced earlier than at many other schools, enabling much of the chemical engineering science component to be completed by the end of the third undergraduate year. As a result, the fourth year provides opportunities for in-depth pursuit of technical topics of special interest. A student can choose general technical electives and chemical engineering technical electives to concentrate or minor in a special area.

The Department of Chemical Engineering also offers a minor in Biochemical Engineering designed for those students with special interest in the pharmaceutical and biotechnology industries. The Biochemical Engineering minor’s curriculum consists of a sequence of courses in the biological and biochemical sciences and their engineering applications (see description below). A student can fulfill the requirements of both the Bachelor in Chemical Engineering and a minor in Biochemical Engineering in four academic years.

The early introduction to the discipline enables the student who has made an inappropriate choice to transfer out of the chemical engineering without loss of status. However, it also makes it difficult for students to transfer into the program during the sophomore or junior years. Students may transfer into Chemical Engineering after completing CHEG 112, CHEM 111, CHEM 112, CHEM 119 (or CHEM 103/104), MATH 242, MATH 243 and PHYS 207. Admission is competitive and is based on the grade point index in the required courses as listed.

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The purpose of the technical electives is to advance the scientific or engineering background of the chemical engineers. The technical electives program consists of a minimum of twelve credits taken from the College of Engineering and the College of Arts and Sciences (see below). At least three of these courses (nine credits) must be at the intermediate level (generally 300-600). Students should select their technical electives in the spring of sophomore year to avoid scheduling conflicts. Students should formulate an academic plan for their technical and chemical engineering electives with the assistance of their academic advisor.

The technical elective program is under constant review by the faculty. An updated list is available in the department office, and a formal mechanism exists to make substitutions coupled with the Chemical Engineering Technical Electives to obtain a technical concentration.

**Chemical Engineering Technical Electives**

The curriculum provides three chemical engineering technical electives in the senior year. In addition, the student can exchange one of the General Technical Electives provided in the senior year for a Chemical Engineering Technical Elective after consultation with the academic advisor. These courses are intended to provide some flexibility in selecting a chemical engineering program at the advanced level. Students should decide with the assistance of their advisor if they should conduct a program of independent research and then choose their course elective(s). Chemical engineering technical electives are defined as follows: Any Chemical Engineering course numbered 466 to 474; UNIV 401-UNIV 402 Senior Thesis (directed by a Chemical Engineering Faculty); any 600- or 800-level course in Chemical Engineering. Courses of the 600 and 800-level are graduate courses open, with the consent of the instructor, to students with senior standing.

**CREDITS TO TOTAL A MINIMUM OF . . . . . . . . . . . . . . 126**

**CONCENTRATIONS**

The technical electives and the chemical engineering electives can be coupled to provide a more intense concentration in an area of interest. The grouping below is an example of this approach:

**CHEMISTRY**

CHEM 457 Inorganic Chemistry
CHEM 527 Introductory Biochemistry
CHEG 606 Introduction to Catalysis
CHEG 616 Chemistry and Physics of Surfaces and Interfaces
CHEG 617 Colloid Science and Engineering

**HONORS BACHELOR OF CHEMICAL ENGINEERING**

A recipient of the Honors Bachelor of Chemical Engineering must satisfy the following:

1. All requirements for the Bachelor of Chemical Engineering degree.
2. A minimum grade of C- in all other Chemical Engineering courses counted as Honors courses.

**DEPARTMENTAL STANDARDS**

The department has rigorous standards for admission into the courses in the department. These standards have evolved over time and are intended to promote success in the sequential development of the material. In general students must have a minimum grade of C- in all chemical engineering prerequisite courses to qualify for admission to the next course. Please read the course descriptions for the specific prerequisites and corequisites.

**GRADUATION REQUIREMENTS:**

1. A "P" (pass) in CHEG 009.
2. A minimum grade of C- in all other Chemical Engineering courses counted towards graduation.

**MINOR IN BIOCHEMICAL ENGINEERING**

A minor in Biochemical Engineering may be earned by a student in any University bachelor’s degree program through successful completion of a minimum of 19 credits as described below. This degree provides students with an opportunity to study new advances in biochemistry and the biological sciences integrated with engineering analysis. Before beginning these courses the student must meet the required course prerequisites. A minimum grade of C- is required in all of the courses completed for the minor.

To obtain a Minor in Biochemical Engineering the student must take the following four required courses:

BISC207 Introductory Biology I
BISC401 Molecular Biology of the Cell
CHEM457 Introduction to Biochemistry
CHEG620 Biochemical Engineering
CIVIL AND ENVIRONMENTAL ENGINEERING

AND the students must take any TWO of the following courses:

CHEG621 Metabolic Engineering
CHEG650 Biomedical Engineering
CHEM645 Protein Structure and Function
CHEM649 Molecular Biophysics
CHEM646 DNA-Protein Interactions
CHEM644 Mechanisms of Enzyme Catalysis
CHEM648 Membrane Biochemistry
MEEG684 Biomaterials and Tissue Engineering

Other courses in Chemical Engineering, Chemistry or Biology can be included in the list with the prior approval of a representative from the Department of Chemical Engineering. For inquiries about the Biochemical Engineering Minor contact Prof. Anne Robinson at 831-0550 (robinson@che.udel.edu).

CHEMICAL ENGINEERING CURRICULUM

MASTER’S-BACHELOR’S PROGRAM

Under unusual circumstances, a highly-qualified student may earn a Bachelor of Chemical Engineering and a Master’s of Chemical Engineering in four years. This program assumes that the student enters with advanced sophomore standing and is able to cope with at least one term of a substantial overload. Interested students should contact the department for further information and a sample schedule. It should be noted that, in order to ensure a broad educational experience, the Department does not admit Delaware undergraduates to its PhD program unless they have at least three years of industrial experience or have earned a master’s degree at another institution.

CIVIL AND ENVIRONMENTAL ENGINEERING

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Faculty Listing: http://www.ce.udel.edu/directories/faculty.html

The Civil and Environmental Engineering Department offers programs which lead to the degrees of Bachelor of Civil Engineering and Bachelor of Environmental Engineering, both with Honors Degree options, as well as a minor in Civil Engineering.

Traditionally, civil engineering has been identified with the planning and design of constructed facilities such as dams, bridges, buildings, roads, waterways, and tunnels. Modern civil engineering now addresses larger segments of societal infrastructure such as mass transportation systems, water resource exploration and management, environmental protection, coastal management, and off-shore structures. The Civil Engineering curriculum includes specialization options in structural engineering, geotechnical engineering, environmental engineering, hydraulic and ocean engineering, and transportation and construction engineering as shown by the listed Technical Electives.

The Educational Objectives of the Civil Engineering degree program are as follows:

1. Graduates will be prepared with a solid foundation in mathematics, sciences, and technical skills needed to analyze and design civil infrastructure systems.
2. Graduates will possess strong written, oral and graphical communications skills.
3. Graduates will be familiar with current and emerging socioeconomic issues and the global context in which civil engineering is practiced.
4. Graduates will have an understanding of professional ethics and their societal responsibilities as a practicing engineer.
5. Graduates will have the ability to obtain professional licensure, will recognize the need for engaging in life-long learning, and will have the ability to assume leadership roles in and outside of the profession.
6. Graduates will have the necessary qualifications for employment in civil engineering and related professions and for entry into advanced studies.

Areas concerned with pollution control, water supply, and water resource management are now considered to comprise the distinct discipline of Environmental Engineering. The Environmental Engineering curriculum is focused on causes, control, and prevention of environmental contamination, environmental facilities design and construction, and pollution transport and control processes.

The Educational Objectives of the Environmental Engineering degree program are as follows:

1. Graduates will be prepared with a solid foundation in mathematics, sciences, and technical skills needed to analyze and design civil infrastructure systems.
2. Graduates will possess strong written and oral communications skills.
3. Graduates will be familiar with current and emerging environmental engineering and global issues, and have an understanding of ethical and societal responsibilities.
4. Graduates will have the ability to obtain professional licensure, and will recognize the need for engaging in life-long learning.
5. Graduates will have the necessary qualifications for employment in environmental engineering and related professions, for entry into advanced studies, and for assuming eventual leadership roles in their professions.

DEPARTMENTAL POLICIES

In general, 300- and 400-level courses in civil engineering are open only to students majoring in civil or environmental engineering. Students who have declared a civil engineering minor and students enrolled in other departments of the College of Engineering may be enrolled in 300 and 400-level civil engineering courses with the approval of their home department advisor. In some instances, other students may be permitted to enroll in selected 300 and 400-level courses, but they must have the permission of both the course instructor and the chair of the Civil and Environmental Engineering Department.

The Department has developed standards that require minimum grades in certain courses. These standards are intended to promote success in the sequential development of the curriculum. The requirements for the civil and environmental engineering majors are as follows:

CIVIL ENGINEERING

Admission to 300- and 400-level civil engineering and mechanics courses requires:
- A minimum grade of C- in MATH 241 and MATH 242.
- A minimum grade of C- in CHEM 103.
- A minimum grade of C- in PHYS 207.

ENVIRONMENTAL ENGINEERING

Admission to 300- and 400-level civil engineering and mechanics courses requires:
- A minimum grade of C- in CHEM 111 and CHEM 112.
- A minimum grade of C- in PHYS 207.

Admission to CHEG 231 requires:
- A minimum grade of C- in MATH 243.

Admission to CHEG 325 requires:
- A minimum grade of C- in CHEG 325.
- A minimum grade of C- in MATH 302.

Admission to CHEG 342 requires:
- A minimum grade of C- in CIEG 305 and CIEG 306