Degree Requirements

Undergraduate degrees awarded by the School of Engineering & Applied Science are divided into two groups, engineering degrees and applied science degrees. Engineering degrees are named Bachelor of Science in Biomedical Engineering, Chemical Engineering, Computer Engineering, Electrical Engineering, Mechanical Engineering, and Systems Science & Engineering. Applied science degrees are named Bachelor of Science in Applied Science (Chemical, Electrical, Mechanical, or Systems Science & Engineering) and Bachelor of Science in Computer Science.

Engineering Bachelor of Science Degrees

To earn any of the engineering degrees (i.e., BS in Biomedical Engineering, BS in Chemical Engineering, BS in Computer Engineering, BS in Electrical Engineering, BS in Mechanical Engineering, in Systems Science and Engineering), a student must satisfy all of the following general distribution requirements:

1. Complete the engineering Common Studies courses outlined below:
   a. Calculus (Math 131, Math 132, Math 217, Math 233)
   b. Physics I (Physics 117A or Physics 197) and Physics II (Physics 118A or Physics 198)
   c. Chemistry (Chem 111A, Chem 151)
      Note 1: Some programs also require Chem 112A and Chem 152.
      Note 2: Some programs permit alternate science courses to satisfy this requirement.
         Please consult with individual department program requirements.
   d. Technical Writing (Engr 310)

2. Satisfy the specific degree requirements of one of the engineering degree programs, as outlined in other sections of this Bulletin.

3. Satisfy the requirements listed under All Undergraduate Degrees (below).

Applied Science Bachelor of Science Degrees

To earn any of the applied science degrees (i.e., BS in Applied Science [Chemical Engineering], BS in Applied Science [Electrical Engineering], BS in Applied Science [Mechanical Engineering], BS in Applied Science [Systems Science and Engineering], BS in Computer Science), a student must satisfy all of the following general distribution requirements:

1. Complete at least 120 applicable units.
2. Complete at least 48 units of the 120 in mathematics, natural sciences and engineering.
3. Complete at least 42 of the total 120 units at the 300 level or higher.
4. Satisfy the specific degree requirements of one of the applied science degree programs, as outlined in other sections of this Bulletin.
5. Satisfy the requirements outlined under All Undergraduate Degrees.

All Undergraduate Degrees

To earn any undergraduate degree in the School of Engineering & Applied Science, a student must accomplish all the following:

1. Earn at least a C (2.0) cumulative grade point average in all applicable courses taken at Washington University.
2. Earn at least the minimum total number of units specified for the particular degree. All degrees require students to complete at least 120 applicable units.
3. Earn at least a C (2.0) grade point average in the student's major area of study.
4. Satisfy all of the following residency requirements:
   a. Complete a minimum of 30 units of 300 level or higher courses from the school, while matriculated at Washington University in a degree program. An engineering course transferring from an exchange program sanctioned by the School of Engineering & Applied Science may be counted as a school equivalent course for the purpose of satisfying this requirement.
   b. Complete a minimum of 60 units at Washington University, while matriculated at Washington University in a degree program. Exchange program courses sanctioned by the school may be counted toward this requirement.
   c. For students who pursue multiple engineering BS degrees, for each additional BS degree from the school, students must complete an additional 15 resident units of 300-level or higher engineering courses that are listed in 4a above. No more than two BS degrees from the School of Engineering & Applied Science may be earned by the same student.
5. Complete the English proficiency requirement, and the humanities and social sciences requirement of the School of Engineering & Applied Science.

English Proficiency Requirement

Every student must demonstrate proficiency in reading and writing the English language. Students are considered proficient if they have earned one of the following scores: a 5 on the Advanced Placement English Examination of the College Board,
or a score of 750 or higher on the SAT W examination, or a score of 36 on the ACT English exam, or a score of 7 on the International Baccalaureate examination. Proficiency is most commonly demonstrated by satisfactory performance on the Freshman English Composition proficiency test administered by the School of Engineering & Applied Science.

Students who do not demonstrate satisfactory proficiency on the test are required to enroll the following semester in the course or sequence of courses specified by the test's administrator. The school's English proficiency requirement is then satisfied only by a grade of C– or better in the university's College Writing 1 course (CWP 100). Courses taken at other institutions to satisfy the school's English proficiency requirement must be preapproved by the school's English proficiency coordinator. If the course is so approved, the student must pass with a grade of C– or better. Writing 1 does not count toward the Humanities and Social Sciences requirement of the School of Engineering & Applied Science. Waivers of the Writing 1 requirement via the AP, SAT, ACT, IB or other proficiency exam do not carry degree credit.

The English proficiency requirement must be completed as soon as possible. Undergraduate students who have not yet satisfied this requirement must enroll in Writing 1 (or an approved alternative course) at the first possible opportunity, commonly their first spring semester. Enrollment in English composition courses for subsequent semesters may be required until the proficiency requirement is satisfied.

Before enrolling in Writing 1, some students may be required to complete CWP 1001 Fundamentals of Academic Writing or CWP 200 Writing Tutorial or ELP 1511 Academic Writing for Second Language Writers; these courses will not be counted toward the student's degree requirements.

**Humanities and Social Sciences Requirement**

To earn any bachelor's degree from the School of Engineering & Applied Science, students must complete the school's humanities and social sciences requirement:

1. **Minimum units:** At least 18 units of humanities and social sciences courses must be completed with passing grades. Humanities and social sciences courses, other than transfer courses, may be taken for pass/fail credit.
2. **Breadth:** At least 6 units of the 18 must be in the humanities and at least 6 units must be in the social sciences.
3. **Upper-level:** At least 3 units of the 18 units completed must be from one or more courses numbered 300 or higher.

Washington University courses labeled with the EN:H or EN:S attribute in the semester course listings will count respectively toward the humanities or social sciences requirement for engineering degrees. As a convenience, preapproved listings of humanities and social sciences courses are provided for Architecture, Business and University College. In general, most if not all art courses (F10 and F20) will count toward the engineering school's humanities requirement, even if they do not have the specific EN:H designation.

University College courses, Henry Edwin Sever Institute courses, and courses taken elsewhere are treated as transfer courses. Transfer courses must be approved through Engineering Student Services as acceptable transfer credit and as applicable humanities or social sciences courses. All transfer courses must be taken for credit (not pass/fail), and students must earn a C– or better in transfer courses for the credit to transfer to the school. Grades do not transfer.

**Engineering Topics Units**

Bachelor's degree programs accredited by the Engineering Accreditation Commission of ABET (http://www.abet.org) require that the program require a minimum of one and one-half years of Engineering Topics.

One and one-half years is defined as 3/8 of the total number of units required for the particular degree, with a maximum of 48 units. The number of engineering topics units assigned to a course is the sum of the course's engineering science units and engineering design units: Engineering Topics Units = Engineering Design units + Engineering Science units. A course carrying Engineering Topics Units will be marked in Course Listings with the "Eng TU" attribute.

**Engineering Design**

Engineering design is the process of devising a system, component or process to meet desired needs. It is a decision-making process (often iterative), in which the basic science and mathematics and engineering sciences are applied to convert resources optimally to meet a stated objective. Among the fundamental elements of the design process are the establishment of objectives and criteria, synthesis, analysis, construction, testing and evaluation. The engineering design component of a curriculum must include most of the following features: development of student creativity, use of open-ended problems, development and use of modern design theory and methodology, formulation of design problem statements and specifications, consideration of alternative solutions, feasibility considerations, production processes, concurrent engineering design and detailed system descriptions. Further, it is essential to include a variety of realistic constraints, such as economic factors, safety, reliability, aesthetics, ethics and social impact.

**Engineering Science**

The engineering sciences have their roots in mathematics and basic sciences but carry knowledge further toward creative application. These studies provide a bridge between mathematics and basic sciences on the one hand and engineering practice on the other. Such subjects include
mechanics, thermodynamics, electrical and electronic circuits, materials science, transport phenomena and computer science (other than computer programming skills), along with other subjects, depending upon the discipline. While it is recognized that some subject areas may be taught from the standpoint of either the basic sciences or engineering sciences, the ultimate determination of the engineering science content is based upon the extent to which there is extension of knowledge toward creative application. In order to promote breadth, the curriculum must include at least one engineering course outside the major disciplinary area.

**Applicable Undergraduate Engineering Degree Requirements**

Undergraduate engineering students are required to satisfy the engineering degree requirements that are published in the online *Undergraduate Bulletin* (http://bulletin.wustl.edu) in effect at the time they first enroll at the university as degree-seeking undergraduate students.

Undergraduate engineering students must complete all undergraduate degree requirements and graduate within 10 consecutive years of enrolling as degree-seeking undergraduate students at the university.

A student who does not graduate within 10 consecutive years will be required to satisfy the degree requirements that are in the most recently published online *Undergraduate Bulletin* at http://bulletin.wustl.edu and to retake courses identified by the chair of the department in which the student is seeking the degree.

- When a student wishes to return to complete course work and earn a degree after the 10-year time period has passed, the most recent online *Undergraduate Bulletin* (http://bulletin.wustl.edu) is defined as the catalog in effect when the student re-enrolls in the School of Engineering & Applied Science as an undergraduate student seeking a degree.
- When a student has left the university and wishes to complete course work at another university to transfer back and graduate from the School of Engineering & Applied Science, and more than 10 years have elapsed since the student was first enrolled as an undergraduate engineering degree-seeking student, the most recent online *Undergraduate Bulletin* (http://bulletin.wustl.edu) is defined as the catalog in effect when the student files an intent to graduate for an engineering undergraduate degree. The course work the student intends to complete and transfer back to the School of Engineering & Applied Science must be approved by the Engineering School before the student enrolls in the course work.

**Definition of Class Levels**

For classification purposes, a student's undergraduate class level is defined according to the year in which he or she intends to graduate.