

Major in Engineering Chemistry (ECM)

The interdisciplinary major in Engineering Chemistry leads to the Bachelor of Science degree. The following courses are required and must be taken for a letter grade; P/NC grades are not acceptable. All of the courses used to fulfill the requirements of the major (CHE, MAT, ESG, PHY, etc.) must be passed with a grade of C or higher, with the exception of three courses, for which the grade may be C-. No transferred course with a grade lower than C may be used to fulfill any major requirement. At least six credits each of upper-division work in chemistry and in materials science and engineering must be taken at Stony Brook.

A. Mathematics and Basic Science Requirements

1. [MAT 131](#), [MAT 132](#) Calculus I, II (E)
2. One of the following pairs of courses: [AMS 261](#) and [AMS 361](#) Engineering Mathematics I, II; or [MAT 203](#) and [MAT 303](#) Calculus III, IV with Applications
3. [ESG 111](#) Computer Science for Engineers, [CHE 358](#) Computing in Chemistry or equivalent computer course
4. [CHE 129/130](#), [CHE 132](#) or [CHE 131](#), [CHE 132](#) General Chemistry, or [CHE 152](#) Molecular Science I
5. [CHE 133](#), [CHE 134](#) General Chemistry Labs I and II, or [CHE 154](#) Molecular Science Laboratory I
6. [PHY 131/PHY 133](#), [PHY 132/PHY 134](#) Classical Physics I, II and labs or [PHY 141](#), [PHY 142](#) Classical Physics I, II: Honors or [PHY 125](#), [PHY 126](#), [PHY 127](#) Classical Physics A, B, C, with labs
7. [PHY 251/252](#) Modern Physics and Laboratory or [ESG 281](#) An Engineering Introduction to the Solid State

B. Core Program

1. [CHE 301](#), [CHE 302](#) Physical Chemistry I, II (F/Sp)
2. [CHE 303](#) Solution Chemistry Laboratory (F)
3. [CHE 304](#) Chemical Instrumentation Laboratory (S)
4. [CHE 321](#) Organic Chemistry I (F) or [CHE 331](#) Molecular Science II
5. [CHE 378](#) Materials Chemistry (F)
6. [ESM 325](#) Diffraction Techniques and Structure of Solids
7. [ESG 332](#) Materials Science I: Structure and Properties of Materials
8. [ESG 333](#) Materials Science II: Electronic Properties

Minor in Materials Science

Students who have a special interest in Materials Science are encouraged to combine their major in Engineering Chemistry with the minor offered by the Department of Materials Science and Engineering. The minor is especially recommended for those students planning graduate study in Materials Science. For details, see the Department of Materials Science and Engineering website.

Electives

Students make a selection of technical and open electives to total 120 credits. Students are advised to divide their electives among courses within the College of Engineering and Applied Sciences and the Department of Chemistry, to strengthen their professional interests, and courses in the social sciences and humanities, to help them place the problems of society and industry in perspective.

Careers

Students graduating with a B.S. degree in Engineering Chemistry are well prepared for entry-level positions in many different industries. Such students are particularly attractive to the chemical industry, the petroleum industry, the materials manufacturing and processing industry and the electronics industry. The best jobs go to students with good records and with lots of laboratory experience, including research. Many students choose to pursue graduate study in such fields as solid state chemistry, materials science and engineering, or Polymer Chemistry, at various universities around the nation. Masters degrees are usually obtainable after one and a half to two years additional study. Ph.D. degrees usually require five years study beyond the B.S. degree. Graduate Students usually receive substantial stipends throughout their period of graduate study.

Please keep in mind that some courses are offered in the fall & some in the spring.
F=Fall Sp=Spring E=Either semester.
Very few courses are offered during summer.

For information on possible MAT and PHY course substitutions, see www.stonybrook.edu/chemistry. Click on "Education, Undergraduate Program, Engineering Chemistry Major."

Alternate course available in Math & Physics:
MAT: 125/126/127
PHY: 125/126/127 + labs





Research Opportunities

Engineering Chemistry is based upon research. This is why students in the major have so many laboratory courses required for their degree. However structured instructional laboratories cannot truly introduce students to independent study and research. Students who wish to acquire this experience must seek out independent study and research opportunities. The faculty of both the Department of Chemistry and the Department of Materials Science and Engineering welcome qualified undergraduate students into their research laboratories. These opportunities are especially suitable for students in their junior and senior years of study. Interested students should review the research interests of the various faculty members and then discuss the possibilities for independent study or research with the individual faculty members who have the research programs of greatest interest. Each summer there are numerous special research programs available at Stony Brook, at nearby Brookhaven Laboratory and at universities across the country, open to qualified students. Interested students should talk to the Program Directors several months in advance.

Five year BS / MS

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Engineering Chemistry

The interdisciplinary program in Engineering Chemistry (ECM), which leads to the Bachelor of Science Degree, is designed to provide students with a basic understanding of the chemical principles and materials technology underlying modern materials engineering. The program emphasizes a strong background in physical chemistry, infused with an orientation toward the solid state sciences and materials technology. Its central theme is a chemistry core, strengthened by materials science and laboratory courses, the latter with a "chemistry of materials" component. The choice of suitable electives will help the student to prepare for work or advanced study in areas such as electronic materials, interfacial phenomena, solid-state science and technology, polymers, ceramics, biomaterials, etc.

Jointly sponsored by the College of Arts and Sciences and the College of Engineering and Applied Sciences, the program is a basic preparation for chemical and materials professionals who can enter a wide range of industries or proceed to graduate work in either solid-state chemistry or materials science.

