
CHEMICAL SCIENCES

FACULTY

Chairperson: Professor Frank Gorga

Associate

Professors: Edward Brush, Cielito DeRamos-King

Assistant

Professors: Steven Haefner, Chifuru Noda

Department Telephone Number: (508) 531-1233

Web site: www.bridgew.edu/catalog/chemsci.htm

DEGREE PROGRAMS

- BA in Chemistry
- BS in Chemistry
Concentrations: Biochemistry, Environmental Chemistry, Professional Chemistry
- BS in Chemistry/Geology (offered jointly with the Department of Earth Sciences and Geography)
- MAT - Physical Sciences

UNDERGRADUATE MINORS

- Biochemistry
- Chemistry

The Department of Chemical Sciences offers programs leading to the degrees of Bachelor of Arts in Chemistry, and Bachelor of Science in Chemistry and Master of Arts in Teaching Chemistry. These programs are designed to provide the skills and knowledge necessary to prepare students for successful careers in the chemical industry, chemical research, teaching, oceanography and environmental science or for further study in graduate degree programs and professional schools.

Modern scientific instrumentation, used both for teaching and research purposes, includes electrochemical analytical equipment, a nuclear magnetic resonance (NMR) spectrometer, and atomic absorption spectrometer (AA), a visible-ultraviolet spectrophotometer (VIS-UV), several infrared (IR) spectrophotometers, electronic balances, a gas chromatograph (GC), and a high-pressure liquid chromatography (HPLC) unit.

Students, staff and faculty maintain a well-functioning atmosphere of informal interaction, outside the classroom and laboratory. Many students participate in

Chemistry Club activities, which include seminars by area scientists, visits to academic and industrial laboratories, and special social events. Occasionally, students and faculty together attend national American Chemical Society (ACS) meetings throughout the country.

UNDERGRADUATE PROGRAMS

BACHELOR OF ARTS/BACHELOR OF SCIENCE

The chemistry major (without a concentration) leads to the B.A. degree. This program is designed for students who wish to prepare for fields such as medicine, dentistry, secondary school teaching, chemical or pharmaceutical sales, pharmacy, environmental sciences or veterinary medicine. A minimum number of chemistry courses are required so that a program of other courses suited to the individual's interests may be developed in consultation with the student's adviser.

The chemistry major, with a concentration in biochemistry, professional chemistry, or environmental chemistry, leads to the B.S. degree. These programs are designed for students who plan a career in research and development either immediately after graduation or after graduate work in a chemically related discipline. Satisfactory performance (a B average or better) in either of these programs gives students the preparation required to obtain an assistantship or fellowship in graduate school. The biochemistry and the professional chemistry programs are both certified by the American Chemical Society.

Additionally, the department offers a chemistry/geology major jointly with the Department of Earth Sciences and Geography. It also participates in the preprofessional programs (medicine and dentistry) and in the oceanography program. Additional information on these programs may be found in the *Interdisciplinary and Preprofessional Programs* section of this catalog.

Students interested in any of the programs offered by the department should plan on taking CH 141, calculus (MA 151 or MA 141) and six credits towards the general education requirements in the fall semester of their first year. In the Spring semester of the first year, students will normally take CH 100 in addition to continuing with CH 142 and the second semester of calculus. Students need not decide among the various programs within the department until the spring of their second year. Because of the sequential nature of many courses required in our programs we urge new students to consult with a chemistry faculty member

during the freshman registration process in addition to consulting with the freshman advisers.

CHEMISTRY MAJOR (LEADING TO A B.A. DEGREE)

CH 100 Computer Science in Chemistry (CS 100 is an acceptable substitute).

CH 141-142 Chemical Principles I-II (CH 131-132 are acceptable substitutes)

CH 242 Intermediate Inorganic Chemistry

CH 343-344 Organic Chemistry I-II

CH 381-382 Physical Chemistry I-II

CH 461 General Biochemistry I

MA 151-152 Calculus I-II (MA 141-142 are acceptable substitutes with the permission of the adviser*)

PH 243-244 General Physics I-II (PH 181-182 are acceptable substitutes with permission of adviser*)

* Note: PH 181-182 and MA 141-142 are not acceptable as substitutes in the Professional Chemistry program.

General Education Requirements (GER)

A minimum of 120 earned hours is required for graduation. These earned hours include General Education Requirements as specified in the Undergraduate Academic Programs section of this catalog. For additional graduation requirements, see the Undergraduate Academic Policies section of this catalog.

CHEMISTRY MAJOR WITH A CONCENTRATION IN BIOCHEMISTRY (LEADING TO A B.S. DEGREE; APPROVED BY THE AMERICAN CHEMICAL SOCIETY)

All of the courses listed for the Chemistry Major, except CH 242, plus the following additional courses:

CH 444 Advanced Inorganic Chemistry

CH 462 General Biochemistry II

CH 466 Advanced Biochemistry Laboratory

BI 121 General Biology I

BI 200 Cell Biology

BI 321 Genetics

BI 428 Microbiology

One of the following:

CH 241 Quantitative Chemical Analysis

CH 250 Instrumentation

CH 450 Instrumental Analysis

General Education Requirements (GER)

A minimum of 120 earned hours is required for

graduation. These earned hours include General Education Requirements as specified in the Undergraduate Academic Programs section of this catalog. For additional graduation requirements, see the Undergraduate Academic Policies section of this catalog.

CHEMISTRY MAJOR WITH A CONCENTRATION IN ENVIRONMENTAL CHEMISTRY (LEADING TO A B.S. DEGREE)

All of the courses listed for the Chemistry Major, plus the following additional courses:

CH 290 Environmental Chemistry

CH 450 Instrumental Analysis

CH 490 Special Topics in Chemistry

BI 121 General Biology I

BI 122 General Biology II

or

ES 101 Historical Geology

ES 100 Physical Geology

Select one course from the following:

BI 225 Ecology

BI 420 Limnology

ES 240 Hydrology

ES 283 Structural Geology

ES 284 Geomorphology

ES 311 Geochemistry

General Education Requirements (GER)

A minimum of 120 earned hours is required for graduation. These earned hours include General Education Requirements as specified in the Undergraduate Academic Programs section of this catalog. For additional graduation requirements, see the Undergraduate Academic Policies section of this catalog.

CHEMISTRY MAJOR WITH A CONCENTRATION IN PROFESSIONAL CHEMISTRY (LEADING TO A B.S. DEGREE; APPROVED BY THE AMERICAN CHEMICAL SOCIETY)

All of the courses listed for the Chemistry Major* plus the following additional courses:

CH 241 Quantitative Chemical Analysis

CH 444 Advanced Inorganic Chemistry

CH 450 Instrumental Analysis

CH 492 Laboratory Techniques

MA 251 Calculus III

One additional math course selected from the following:

MA 110 Elementary Statistics I

MA 120 Introduction to Linear Algebra

MA 200 Probability and Statistics

MA 202 Linear Algebra
MA 316 Differential Equations

* Note: PH 181-182 and MA 141-142 are not acceptable as substitutes in the Professional Chemistry program.

General Education Requirements (GER)

A minimum of 120 earned hours is required for graduation. These earned hours include General Education Requirements as specified in the Undergraduate Academic Programs section of this catalog. For additional graduation requirements, see the Undergraduate Academic Policies section of this catalog.

CHEMISTRY/GEOLOGY MAJOR

A major in chemistry-geology is offered jointly with the Department of Earth Sciences and Geography. (See the catalog section entitled *Interdisciplinary and Preprofessional Programs* for detailed information.)

DOUBLE MAJOR WITH ELEMENTARY EDUCATION, EARLY CHILDHOOD EDUCATION OR SPECIAL EDUCATION

Students may choose a double major in chemistry or chemistry-geology and elementary education, early childhood education or special education for licensure purposes. Please contact the Department of Chemistry and the appropriate education department for further information.

MINOR IN SECONDARY (HIGH SCHOOL, MIDDLE SCHOOL OR PREK-12 SPECIALIST) EDUCATION

Students may minor in secondary (high school, grades 9-12; middle school (grades 5-9 or PreK-12 Specialist) education. Successful completion of either of these programs will lead to Massachusetts Initial Teacher Licensure. Please refer to the *Department of Secondary Education and Professional Programs* for specific teacher licensure and program requirements.

CHEMISTRY MINOR

18 credits in chemistry.

Only one of the following sequences or its equivalent may be taken for credit:

- (a) CH 125-126 Introductory Chemistry for the Life Sciences I-II
 - (b) CH 131-132 General Chemistry I-II
- or
- CH 141-142 Chemical Principles I-II

Students may not take both CH 300 Organic Chemistry for the Life Sciences and CH 343-344 Organic Chemistry

I-II for credit. CH 111 The Art of Chemical Inquiry may not be used to fulfill minor requirements in chemistry.

BIOCHEMISTRY MINOR

18-20 credits in chemistry.

The following sequences of courses must be taken:

- CH 343-344 Organic Chemistry I-II
- CH 461-462 General Biochemistry I-II

Additional Comments on Requirements:

The normal freshman program for a student interested in either chemistry major consists of CH 100 Computer Science in Chemistry (or CS 100 Programming in Basic), CH 141-142 Chemical Principles I-II, MA 151-152 Calculus I-II, and six credits toward the general education requirements. A student need not decide between the three chemistry concentrations until the second semester of the sophomore year. Students completing the professional chemistry concentration will meet the requirements for certification by the American Chemical Society.

Because of the sequential nature of the courses required of a chemistry major, a student considering majoring in chemistry must take MA 151-152 Calculus I-II (or MA 141-142 Elements of Calculus I-II with the permission of the adviser) and CH 141-142 Chemical Principles I-II in the freshman year or plan to attend summer school. For this reason any student considering the possibility of majoring in chemistry should consult a member of the department before registering for freshman courses.

HONORS PROGRAM

The Honors Program in Chemistry provides highly motivated chemistry majors with opportunities to enhance their academic program through intensive scholarly study and research designed to be of assistance in post-graduate employment or in the pursuit of an advanced degree in chemistry. Contact the Department of Chemistry for further information concerning eligibility and application.

GRADUATE PROGRAMS

MASTER OF ARTS IN TEACHING CHEMISTRY

This program is inactive.

PHYSICAL SCIENCES

For current information concerning this program, contact the Department of Physics.