

## FACULTY

### Chairperson and Graduate Program Coordinator:

Associate Professor Edward Brush

**Professor:** Frank Gorga

**Associate Professors:** Steven Haefner, Cielito King

**Assistant Professors:** Samer Lone, Chifuru Noda,  
Stephen Waratuke

**Department Telephone Number:** 508.531.1233

**Location:** Conant Science Building, Room 318

**Web site:** [www.bridgew.edu/chem](http://www.bridgew.edu/chem)

## 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)
- MAT – Physical Science

## UNDERGRADUATE MINORS

- Biochemistry
- Chemistry

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

The department is housed in the Conant Science Building and maintains a suite of modern scientific instrumentation that is used for both teaching and research purposes. This includes electrochemical equipment, a nuclear magnetic resonance (NMR) spectrometer, an atomic absorption spectrometer (AA), several infrared (IR) spectrometers, an ultraviolet-visible spectrophotometer (UV/Vis), and a luminescence spectrometer. Other equipment includes a gas chromatograph (GC), a gas chromatograph/mass spectrometer and a high pressure liquid chromatograph.

Students, staff and faculty maintain an atmosphere of informal interaction, both inside and 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. Students are encouraged to participate in research and together with faculty often attend American Chemical Society (ACS) and other professional meetings throughout the country to present their research results.

## UNDERGRADUATE PROGRAMS

### BACHELOR OF ARTS/BACHELOR OF SCIENCE

The chemistry major, with a concentration in biochemistry, environmental chemistry or professional chemistry, leads to the BS degree. These programs are designed for students who plan a career as a professional chemist or biochemist either immediately after graduation or after graduate work in a chemically related discipline. Satisfactory performance (a 3.0 average or better) in any 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.

The chemistry major (without a concentration) leads to the BA 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.

Additionally, the department offers a chemistry-geology major jointly with the Department of Earth Sciences. It also participates in preprofessional advising for students interested in medicine and dentistry or oceanography. Additional information 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 enroll in CHEM 141 Chemical Principles I and calculus (MATH 151 or MATH 141) in the fall semester of their first year. Additionally, students interested in biochemistry should also enroll in BIOL 121. In the spring semester of the first year, students will normally take CHEM 100 Computers in Chemistry in addition to continuing with CHEM 142 Chemical Principles II 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 in addition to the regular freshman advisers during the first year registration process.

### CHEMISTRY MAJOR (Leading to a BA degree)

Credits

|   |   |
|---|---|
| CHEM 100 Computers in Chemistry (COMP 100 is an acceptable substitute).....                                   | 2 |
| CHEM 141-142 Chemical Principles I-II.....  | 8 |
| CHEM 242 Intermediate Inorganic Chemistry.....  | 3 |
| CHEM 343-344 Organic Chemistry I-II.....  | 8 |
| CHEM 381-382 Physical Chemistry I-II.....   | 8 |
| CHEM 461 General Biochemistry I.....  | 4 |
| MATH 151-152 Calculus I-II (MATH 141-142 are acceptable substitutes with the permission of the adviser*)..... | 6 |
| PHYS 243-244 General Physics I-II (PHYS 181-182 are acceptable substitutes with permission of adviser*).....  | 8 |

\* Note: MATH 141-142 and PHYS 181-182 are not acceptable as substitutes in the professional chemistry program.

Total minimum credits: 47

## Core Curriculum Requirements

A minimum of 120 earned hours is required for graduation. These earned hours include the core curriculum requirements as specified in the "Undergraduate Academic Programs" section of this catalog and at the Core Curriculum Web site, [www.bridgew.edu/corecurriculum](http://www.bridgew.edu/corecurriculum). For additional graduation requirements, see the "Undergraduate Academic Policies" section of this catalog.

## CHEMISTRY MAJOR WITH A CONCENTRATION IN BIOCHEMISTRY (Leading to a BS degree; approved by the American Chemical Society)

Credits

|  |    |
|--|----|
| All of the courses required for the chemistry major, except CHEM 242 ..... | 44 |
| plus the following additional courses:                                     |    |
| CHEM 444 Advanced Inorganic Chemistry .....                                | 3  |
| CHEM 462 General Biochemistry II .....                                     | 3  |
| CHEM 466 Advanced Biochemistry Laboratory .....                            | 2  |
| BIOL 121 General Biology I .....   | 4  |
| BIOL 200 Cell Biology .....  | 4  |
| BIOL 321 Genetics .....  | 4  |
| BIOL 428 Microbiology .....  | 4  |
| One of the following .....   | 3  |
| CHEM 241 Quantitative Chemical Analysis                                    |    |
| CHEM 250 Instrumentation   |    |
| CHEM 450 Instrumental Analysis   |    |

Total minimum credits: 71

## Core Curriculum Requirements

A minimum of 120 earned hours is required for graduation. These earned hours include the core curriculum requirements as specified in the "Undergraduate Academic Programs" section of this catalog and at the Core Curriculum Web site, [www.bridgew.edu/corecurriculum](http://www.bridgew.edu/corecurriculum). For additional graduation requirements, see the "Undergraduate Academic Policies" section of this catalog.

## CHEMISTRY MAJOR WITH A CONCENTRATION IN ENVIRONMENTAL CHEMISTRY (Leading to a BS degree)

Credits

|   |    |
|---|----|
| All of the courses listed for the chemistry major ..... | 47 |
| plus the following additional courses:                  |    |
| CHEM 290 Environmental Chemistry .....                  | 3  |
| CHEM 450 Instrumental Analysis .....                    | 3  |
| CHEM 490 Special Topics in Chemistry .....              | 3  |
| BIOL 121 General Biology I .....                        | 4  |
| EASC 100 Physical Geology .....                         | 4  |
| BIOL 122 General Biology II .....                       | 4  |
| or  |    |
| EASC 101 Historical Geology                             |    |

Select one course from the following .....

- BIOL 225 Ecology
- BIOL 420 Limnology
- EASC 240 Hydrology
- EASC 250 Geomorphology
- EASC 350 Structural Geology
- EASC 450 Geochemistry

Total minimum credits: 72

## Core Curriculum Requirements

A minimum of 120 earned hours is required for graduation. These earned hours include the core curriculum requirements as specified in the "Undergraduate Academic Programs" section of this catalog and at the Core Curriculum Web site, [www.bridgew.edu/corecurriculum](http://www.bridgew.edu/corecurriculum). For additional graduation requirements, see the "Undergraduate Academic Policies" section of this catalog.

## CHEMISTRY MAJOR WITH A CONCENTRATION IN PROFESSIONAL CHEMISTRY (Leading to a BS degree; approved by the American Chemical Society)

Credits

|   |    |
|---|----|
| All of the courses required for the chemistry major* .....          | 47 |
| plus the following additional courses:                              |    |
| CHEM 241 Quantitative Chemical Analysis .....                       | 3  |
| CHEM 444 Advanced Inorganic Chemistry .....                         | 3  |
| CHEM 450 Instrumental Analysis .....                                | 3  |
| CHEM 492 Laboratory Techniques .....                                | 3  |
| MATH 251 Calculus III .....   | 3  |
| One additional mathematics course selected from the following ..... | 3  |
| MATH 110 Elementary Statistics I                                    |    |
| MATH 120 Introduction to Linear Algebra                             |    |
| MATH 200 Probability and Statistics                                 |    |
| MATH 202 Linear Algebra   |    |
| MATH 316 Differential Equations                                     |    |

\* Note: MATH 141-142 and PHYS 181-182 are not acceptable as substitutes in the professional chemistry program.

Total minimum credits: 65

## Core Curriculum Requirements

A minimum of 120 earned hours is required for graduation. These earned hours include the core curriculum requirements as specified in the "Undergraduate Academic Programs" section of this catalog and at the Core Curriculum Web site, [www.bridgew.edu/corecurriculum](http://www.bridgew.edu/corecurriculum). For additional graduation requirements, see the "Undergraduate Academic Policies" section of this catalog.

## CHEMISTRY-GEOLOGY MAJOR (Leading to a BS in Chemistry-Geology)

A major in chemistry-geology is offered jointly with the Department of Earth Sciences. See the catalog section titled "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 Chemical Sciences and the appropriate education department for further information.

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

Students may major in chemistry and minor in secondary (high school, grades 8-12); middle school (grades 5-8 or PreK-12 specialist) education. Successful completion 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

Credits

|   |    |
|---|----|
| CHEM 100 Computers in Chemistry .....                 | 2  |
| or  |    |
| one other chemistry course at the 200-level or higher |    |
| CHEM 141-142 Chemical Principles I and II .....       | 8  |
| CHEM 343-344 Organic Chemistry I and II.....          | 8  |
| Total minimum credits:                                | 18 |

### BIOCHEMISTRY MINOR

Credits

|   |    |
|---|----|
| CHEM 141-142 Chemical Principles I and II ..... | 8  |
| CHEM 343-344 Organic Chemistry I and II.....    | 8  |
| CHEM 461-462 General Biochemistry I and II..... | 7  |
| Total minimum credits:                          | 23 |

## 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 postgraduate employment or in the pursuit of an advanced degree in chemistry. Contact the Department of Chemical Sciences for further information concerning eligibility and application.

## GRADUATE PROGRAMS

### MASTER OF ARTS IN TEACHING

This program is inactive.

### CHEMISTRY

This program is inactive.

### GENERAL SCIENCE

This program is inactive.

### PHYSICAL SCIENCE

The MAT in Physical Science degree was developed for high school and middle school subject area teachers who have an initial license in chemistry, earth science or physics and are seeking a professional license in the Commonwealth of Massachusetts. This MAT program is defined to meet the "appropriate master's degree" requirement, which is part of the criteria for professional stage licensure, as set forth in the most recent Massachusetts Department of Elementary and Secondary Education licensure regulations.

Students should consult the "School of Graduate Studies" section of this catalog for information regarding program policy and procedures.

For current information concerning program requirements, consult the "Physics" section of this catalog.