

Department of Chemistry

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Chemistry occupies a central place in the study of matter and life. Chemistry careers span the entire range of contemporary technologies. BS graduates in chemistry work in laboratories developing pharmaceuticals, cosmetics, energy resources, advanced materials for specific applications, solutions to environmental problems, and other areas of modern industry. A chemistry bachelor's degree is also excellent preparation for professional schools of medicine or dentistry, especially with the increasing dependence of medical research and practice on knowledge of living systems at the molecular level. With the MS or PhD in chemistry, a scientist can take responsibility for planning research and supervising laboratories. Excellent career opportunities are found in private industry, in government laboratories, and in college and university chemistry and biochemistry departments.

In addition to the chemistry major approved by the American Chemical Society, Simmons offers a number of special programs:

- major in biochemistry;
- major in environmental science;
- dual degree in chemistry and pharmacy, in collaboration with Massachusetts College of Pharmacy and Health Sciences;
- joint major in chemistry and management;

- MAT in teaching chemistry fast-track; and
- MS in science librarianship fast-track.

The MAT fast-track program permits students to decrease the time required to obtain a master's degree by starting graduate courses during the undergraduate years. A science major may pursue this program to obtain secondary school teaching credentials. The program in library and information science will appeal to students interested in the application of new technology to science information retrieval.

Major in Chemistry

First Year

CHEM 113	Principles of Chemistry
CHEM 114	Organic Chemistry I
MATH 120	Calculus I
MATH 121	Calculus II

Sophomore Year

CHEM 225	Organic Chemistry II
CHEM 226	Quantitative Analysis
PHYS 112	Fundamentals of Physics I
PHYS 113	Fundamentals of Physics II

Junior Year

CHEM 331	Thermodynamics and Kinetics
CHEM 332	Quantum Mechanics and Molecular Structure
MATH 220	Multivariable Calculus
	300-level elective in chemistry

Senior Year

CHEM 355	Independent Study with Thesis (eight semester hours)
CHEM 390	Chemistry Seminar (required; no credit)
	300-level elective in chemistry

Electives:

CHEM 341	Advanced Analytical Chemistry
CHEM 343	Advanced Topics in Modern Chemistry

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- CHEM 345 Biochemistry
 CHEM 346 Advanced Instrumental Laboratory
 CHEM 347 Advanced Topics in Biochemistry
 CHEM 348 Advanced Inorganic Chemistry

Facilities and Prerequisites

After declaring a major in chemistry, students select one of the individual laboratory study/bench spaces in S430, where they carry out much of the rest of their work in chemistry. Grants to Simmons have provided the department with instrumentation beyond the scope usually available at undergraduate colleges. Students considering a major in chemistry should take CHEM 113 and 114 during their first year. In some cases, students with little or no previous high school background may be advised to take CHEM 111 instead of 113. MATH 101 or 102 will be recommended by advisors for students in chemistry who may need to review basic mathematical concepts. By the middle of the junior year, students should have taken MATH 220 and PHYS 112 and 113.

Graduate School Preparation

The American Chemical Society (ACS) suggests a set of standards that it believes will prepare students for graduate study. To meet these standards, the student's program must include CHEM 345 or CHEM 223 plus two additional 300-level electives chosen from CHEM 341, CHEM 343, CHEM 346, CHEM 347, or CHEM 348. Certification that the student's curricular program has met the ACS standards is not required for any career or graduate study; the standards are only a guide in planning a program that will make graduate study easier.

Joint Major in Biochemistry

The major in biochemistry is jointly administered by the departments of biology and chemistry and is approved by the American Chemical Society. The rapidly growing field of biochemistry involves the application of biological and chemical concepts and techniques to the understanding of life processes such as the

determination of hereditary traits, utilization of energy, propagation of nerve signals, and the molecular basis of physiological and pharmacological phenomena. Biochemists are involved in agriculture, medical research, biotechnology, nutritional research, and other areas at the interface of chemistry and biology. Students majoring in biochemistry will be well equipped for professions in research and industry, as well as the pursuit of graduate study in biochemistry, medicine, genetics, and other related fields.

The program consists of a core of chemistry and biology courses beginning in the first year and continuing for the first three years, a choice of two 300-level elective courses in chemistry and/or biology, and a one-year independent study project culminating in a thesis. In addition, there are six prerequisite courses in biology, chemistry, calculus, and physics. The following list of requirements includes both the core and the prerequisite courses. A student may find it convenient to take MATH 120 and/or MATH 121 during the summer. The advanced biochemistry lab, CHEM 345, provides an opportunity to learn more advanced techniques in biotechnology.

Graduate School Preparation

To meet the ACS standards described above under chemistry major, biochemistry majors must include two additional 300-level chemistry electives chosen from CHEM 341, CHEM 343, CHEM 346, CHEM 347 or CHEM 348.

Requirements:

First Year

- BIOL 113 General Biology
 BIOL 221 Microbiology
 CHEM 111 Introductory Chemistry: Inorganic or CHEM 113 Principles of Chemistry
 CHEM 114 Organic Chemistry I
 MATH 120 Calculus I
 MATH 121 Calculus II

Sophomore Year

BIOL 225	Cell Biology
CHEM 225	Organic Chemistry II
CHEM 226	Quantitative Analysis
PHYS 112, 113	Fundamentals of Physics

Junior Year

BIOL 337	Molecular Biology
CHEM 331	Thermodynamics and Kinetics
CHEM 345	Biochemistry
300-level elective in biology or chemistry	

Senior Year

300-level elective in chemistry or biology

Biochemistry majors do their independent study research either in chemistry (CHEM 355) or in biology (BIOL 350). If registered for CHEM 355, biochemistry majors must also participate in the classroom component of BIOL 350.

Biochemistry majors also register for CHEM 390 Chemistry Seminar.

Joint Major in Environmental Science

Environmental science is a joint major offered by the Departments of Chemistry and Biology. This major recognizes the importance of environmental problems in the contemporary world and the expansion of career opportunities in this area.

Environmental careers fall into three broad categories: environmental protection, natural resource management, and planning/communication. The Simmons environmental science major is most closely associated with the environmental protection area. This field depends particularly on the application of science to problems such as air quality, water quality, solid waste, hazardous waste, and habitat destruction. Persons pursuing careers in environmental protection need strong preparation in the basic sciences combined with the broad outlook that characterizes environmentally responsible development projects.

The environmental science major incorporates strong preparation in basic sciences

(biology, chemistry, physics, statistics); four science courses with specific emphasis on environmental problems (BIOL 245, BIOL 333, CHEM 327, CHEM 550); two economics courses, which explore the relationships between market forces and industrial behavior; and the option of an internship in an environmental science laboratory. A formal presentation is required and can be fulfilled by CHEM 390 Chemistry Seminar or an equivalent experience in a 300-level biology course. Additional opportunities for specialization in environmental science are available through the Colleges of the Fenway.

Requirements:**First Year**

BIOL 113	General Biology
BIOL 218	Principles of Zoology
CHEM 111	Introductory Chemistry: Inorganic
or CHEM 113	Principles of Chemistry
CHEM 112	Organic Chemistry
ENV 201	Environmental Forum I

Sophomore Year

BIOL 245	Principles of Ecology
CHEM 226	Quantitative Analysis
MATH 118	Introductory Statistics
or MATH 238	Applied Statistical Models
PHYS 110	Introductory Physics I
PHYS 111	Introductory Physics II
ENV 202	Environmental Forum II

Junior Year

CHEM 327	Advanced Applications in Environmental Science
CHEM 550	Environmental Chemistry (taught at Wentworth Institute of Technology)
BIOL 340	Plant Biology
ECON 100	Principles of Microeconomics
ENV 203	Environmental Forum III

Senior Year

- BIOL 333 Marine Biology
 ECON 247 Environmental Economics
 or ECON 239 Government Regulation of
 Industry
 PHIL 129 Environmental Ethics
 Independent learning/internship

Some electives are offered in alternate years to afford student flexibility in scheduling.

Joint Major in Chemistry-Management

The chemistry-management joint major is designed for students who would like to apply their scientific interests to a business career. The major is appropriate for a variety of careers at the interface of the two disciplines, such as sales and marketing specialists for chemical and pharmaceutical companies, business officers in science-based industries or institutions, and scientific information liaisons (e.g., public relations, political advising, and lobbying).

The independent learning requirement is ordinarily fulfilled by MGMT 370 Internship (eight semester hours) in a project related to the management or financial aspects of science-related organizations, such as science museums or hospital laboratories. These internships are administered by the management program according to the normal procedures of MGMT 370.

In rare instances, the independent learning requirement may be fulfilled by CHEM 355 (eight semester hours) or by a non-science-related internship in MGMT 370.

First Year

- CHEM 111 Introductory Chemistry: Inorganic
 or CHEM 113 Principles of Chemistry
 CHEM 114 Organic Chemistry I
 MATH 120 Calculus I
 MATH 121 Calculus II

Sophomore Year

- CHEM 225 Organic Chemistry II
 CHEM 226 Quantitative Analysis

- PHYS 112 Fundamentals of Physics I
 PHYS 113 Fundamentals of Physics II
 ECON 100 Principles of Microeconomics
 MGMT 100 Introduction to Management

Junior Year

- CHEM 331 Thermodynamics and Kinetics
 or CHEM 332 Quantum Mechanics and
 Molecular Structure
 ECON 101 Principles of Macroeconomics
 MGMT 110 Principles of Financial Accounting
 MGMT 234 Organizational Communication
 and Behavior
 MATH 118 Introductory Statistics

Senior Year

- MGMT 250 Principles of Marketing
 or MGMT 260 Principles of Finance
 Chemistry elective
 Internship/independent study
 CHEM 390 Chemistry Seminar

Strongly recommended electives:

- MGMT 340 Strategy
 and the remaining course from MGMT 250 or
 MGMT 260.

Dual-Degree Program in Chemistry and Pharmacy

Under the provisions of an interinstitutional agreement with the Massachusetts College of Pharmacy and Health Sciences (MCPHS), Simmons College offers a seven-year dual major (dual-degree) program for Simmons students, leading to the BS degree in chemistry from Simmons and the PharmD degree from MCPHS. Interested students should consult the chair of the chemistry department.

Pharmacy is an integral part of the health care community and industry. The PharmD degree, followed by state licensing, leads to a variety of opportunities in community or hospital pharmacy, ambulatory care, long-term care, regulatory agencies, and practice management. The dual-degree program requires one year

more to complete than a regular entry level six-year PharmD but, by adding the BS in chemistry, offers more flexibility in career options, particularly for a student who is interested in research.

MCPHS, a member of the Colleges of the Fenway consortium, is located on Longwood Avenue, one block from Simmons, and accredited by the New England Association of School and Colleges and the Accreditation Council on Pharmacy Education. It was organized as a private institution in 1823 to educate men and women in the profession of pharmacy. In addition to the professional PharmD degree, MCPHS offers undergraduate and professional degrees in a number of health-related areas and research-oriented MS and PhD degrees in the pharmaceutical sciences.

The curriculum begins with three full years at Simmons. In the second semester of her third year, a student enrolls for the three-credit course Health Care Delivery at MCPHS, and follows the normal MCPHS transfer procedures. In the fourth year, eight semester hours of senior research plus seminar are carried out at Simmons, and an almost full load of course work in pharmacy is started at MCPHS. The fifth and sixth years are spent entirely at MCPHS, and the pharmacy curriculum is completed in the seventh year with 36 weeks of experiential education.

Students fulfill the degree requirements of both institutions; no degree is awarded until the entire program is complete. At that time, the student receives a PharmD degree from MCPHS and a BS degree in chemistry from Simmons.

Licensure in pharmacy in Massachusetts requires 1,500 hours of internship (practical pharmacy) plus a state board examination. One thousand hours of the internship are arranged by the student and are paid. The student usually begins the internship with summer or academic year appointments after transferring to MCPHS. The balance of the internship requirement is met by satisfactory completion of the experiential education during the seventh year. State

licensing examinations are generally taken during the summer following graduation.

Students interested in the dual-degree should talk to the chair of the chemistry department as early as possible in their programs.

Students apply for admission to MCPHS during their junior year at Simmons through MCPHS's normal transfer student admission process. Although MCPHS agrees to give qualified Simmons students preference, it is their right to determine final suitability for entry into the professional pharmacy program.

Requirements for the chemistry major:
(First three years plus independent study)

Year One

BIOL 113	General Biology
BIOL 218	Principles of Zoology
CHEM 111 or CHEM 113	Introductory Chemistry: Inorganic Principles of Chemistry
CHEM 114	Organic Chemistry I
MATH 120	Calculus I
MATH 121	Calculus II

Year Two

BIOL 221	Microbiology
CHEM 225	Organic Chemistry II
CHEM 226	Quantitative Analysis
PHYS 112	Fundamentals of Physics I
PHYS 113	Fundamentals of Physics II
PSYC 101	Introduction to Psychology

Year Three

CHEM 331	Thermodynamics and Kinetics
CHEM 332	Quantum Mechanics and Molecular Structure
CHEM 345	Biochemistry
ECON 101	Principles of Macroeconomics
MATH 238 or MATH 118	Applied Statistical Models Introductory Statistics

Year Four

CHEM 355	Independent Study with Thesis
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A detailed description of the dual-degree program is available from the chemistry department office.

Minor in Chemistry

A minor in chemistry consists of two 100-level courses: (111 or 113 and 112 or 114); one or two 200-level courses; and one or two 300-level courses.

Minors can be designed to meet the special interests of a variety of students. An environmental interest would be met by the CHEM 111 or 113, 112, 226, 327, and 550 (WIT) sequence; math students could elect CHEM 112, 113, 226, 332, and 343 or 348; biologists could easily obtain a chemistry minor by electing CHEM 111 or 113, 114, 225, 226, and 345.

Students in majors constructed from the offerings of two departments (biochemistry, environmental science) do not obtain a minor in either department. No more than one course in the minor should be taken pass/fail.

Minor in Physics of Materials

This minor is offered jointly by the Departments of Physics and Chemistry. Please see the description under physics.

Integrated BS/MAT or MS Programs

Integrated programs permit students to obtain bachelor's and master's degrees in less time than it would take to do the programs separately. Students begin the master's degree program during their junior and senior years. The integrated program in education, described under the Department of General Education on pages 114–115, helps to fulfill a great unmet need for qualified chemistry teachers at the high school level.

The integrated program in chemistry and library and information science leads to a BS in chemistry and a MS in library and information science. Information about this program can be obtained from the chemistry department or from the Graduate School of Library and Information Science. Biotechnology and other private sector and government research organiza-

tions actively seek science information specialists with this combination of qualifications.

Certificate in Chemical Health and Safety

The Colleges of the Fenway offer a program leading to a certificate in chemical health and safety. The program requires 20 hours of coursework in biology, physics, and chemistry including at least one semester of organic chemistry. One course from BIOL 245, CHEM 327, or CHEM 550 (WIT) is highly recommended. Beyond these, the course in chemical health and safety offered as a summer course at Wentworth Institute of Technology plus a two-hour seminar in safety procedures and a four-hour internship are required. Consult the chair of the chemistry department for more information.

COURSES

CHEM 107 Chemistry of Drugs and Drug Action (M4) (F-2)

4 sem. hrs.

Focuses on chemistry and biochemistry of drugs, including a historical perspective and modern methods of drug design. Introduces chemical principles using a topical approach. Topics may include over-the-counter drugs such as diet pills, non-drugs such as tobacco and alcohol, and legal and illegal drugs. Six hours per week, variable lecture/laboratory. For non-science students. Canfield.

CHEM 109 Chemistry and Consumption: Applying Chemistry to Society (M4) (S-1)

4 sem. hrs.

Introduces chemical principles on a need-to-know basis in the framework of social, political, economic, and ethical issues. Students develop critical thinking skills and learn the chemistry needed to assess risks and benefits in making informed decisions about technology-based issues in contemporary life. For non-science students. Lecture and laboratory; learning community. Gurney, Stafford.

CHEM 111 Introductory Chemistry: Inorganic (M4) (F-1,2; U-1,2)

4 sem. hrs. Prereq.: Completion of the competency in basic mathematics requirement or MATH 101 or MATH 102.

Covers basic concepts with special reference to inorganic compounds, including chemical equations, the periodic table, chemical bonding, and equilibrium. Assumes no previous knowledge of the subject or sophisticated background in mathematics. Laboratory correlates with and amplifies the lecture material and presents fundamental laboratory techniques, including instrumental methods. Three lectures, one discussion period, and one laboratory per week. Berger.

CHEM 111N Introductory Chemistry: Inorganic (M4) (F-1,2)

4 sem. hrs. Prereq.: Completion of the competency in basic mathematics requirement or MATH 101 or MATH 102

Special section of CHEM 111 for nursing students

This section is a Learning Community with BIOL 113N and includes special emphasis on clinical applications of chemistry and biology. Three lectures, one discussion period, and one laboratory per week. For nursing students. Lee.

CHEM 112 Introductory Chemistry: Organic (S-1,2; U-1,2)

4 sem. hrs. Prereq.: CHEM 111 or CHEM 113.

Covers nature of the covalent bond, structure of organic compounds, and their reactions and reaction mechanisms. Introduces structure and biochemical functions of compounds important to life. Three lectures, one discussion period, and one laboratory per week. For concentrators in paramedical or science-related fields other than nursing. Staff.

CHEM 112N Introductory Chemistry: Organic (S-1,2)

4 sem. hrs. Prereq.: CHEM 111N or CHEM 113.

Special section of CHEM 112 for nursing students.

This section integrates organic chemistry and biochemistry with special emphasis on clinical applications. Three lectures, one discussion period, and one laboratory per week. Lee.

CHEM 113 Principles of Chemistry (M4) (F-1,2)

4 sem. hrs. Prereq.: A satisfactory score on the Simmons chemistry placement examination.

Provides a quantitative development of a few fundamental topics: connections between chemical behavior and molecular structure, with special reference to molecular modeling; dynamic chemical processes; and energy, entropy, and chemical equilibrium. Emphasizes applications of chemistry to real-world problems. Laboratory introduces quantitative techniques, including instrumental methods, for studying chemical systems. Three lectures, one discussion period, and one laboratory per week. Soltzberg.

CHEM 114 Organic Chemistry I (S-1,2)

4 sem. hrs. Prereq.: CHEM 111 or CHEM 113.

Covers fundamental concepts of atomic structure, hybridization, molecular orbitals, and structure of organic molecules. Surveys functional groups, classes of organic compounds, and their reactions. Provides in-depth mechanistic study of those reactions, involving energies, stereochemistry, equilibrium, and reaction rate theory. Three lectures, two discussion periods, and one laboratory per week. Lee.

CHEM/PHYS 220 Materials Modeling (F-2)

2 sem. hrs.

See description on page 193.

CHEM 223 Introduction to Biochemistry (S-1,2)

4 sem. hrs. Prereq.: CHEM 114 or CHEM 112.

Covers chemical processes in living organisms, with special emphasis on human nutrition. Studies carbohydrates, lipids, proteins, and enzymes; their function in living systems; and their metabolic pathways and regulation. Three lectures per week. Canfield.

CHEM 225 Organic Chemistry II (F-1,2)

4 sem. hrs. Prereq.: CHEM 114 or CHEM 112 with consent of the instructor.

Extends CHEM 114 to consider additional classes of organic compounds and the more intimate relationship between structure and reactivity as expressed in mechanistic terms. Three lectures, two discussion periods, and one laboratory per week. Gurney.

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CHEM 226 Quantitative Analysis (S-1,2)

4 sem. hrs. Prereq.: CHEM 113 or CHEM 111 with consent of the instructor.

Presents theoretical principles and experimental practice of quantitative analysis. Topics include solubility, acid-base and redox equilibria and their application in potentiometric, gravimetric, titrimetric, and coulometric methods; spectrophotometry; ion-exchange and chromatographic separations; and analytical data evaluation and computer data reduction. Three lectures and approximately six hours of laboratory per week. Berger.

CHEM 327 Advanced Applications in Environmental Science (F-1)

4 sem. hrs. Prereq.: PHYS 110, PHYS 111, and BIOL 245.

A capstone course involving the application of a variety of analytic tools to environmental problems. Teaches dynamic systems modeling, advanced spreadsheet techniques, and other computer and laboratory methods. Application areas include the environmental impacts of energy production and consumption, population dynamics, and climate change. Includes a project and presentation in the latter part of the course. Three lectures and one laboratory per week. Berger.

CHEM/PHYS 331 Thermodynamics and Kinetics (F-1,2)

4 sem. hrs. Prereq.: CHEM 226, PHYS 113, and MATH 121.

Treats in detail the states of matter and the laws of thermodynamics (with applications to chemical and phase equilibria and electrochemistry) and reaction kinetics and mechanisms. Laboratory studies once a week emphasize the application of concepts developed in the lectures. Kaplan.

CHEM/PHYS 332 Quantum Mechanics and Molecular Structure (S-1,2)

4 sem. hrs. Prereq.: CHEM 226, PHYS 113, and MATH 121.

Covers the wave mechanical treatment of atoms, atomic and molecular spectroscopy, theories of chemical bonding, molecular structure, and statistical mechanics. Laboratory work comprises spectroscopic and computer modeling studies. Soltzberg.

CHEM 341 Advanced Analytical Chemistry (S-1)

4 sem. hrs. Prereq.: CHEM 331.

Examines the theory and practice of selected modern methods in analytical chemistry. Covers computer methods in the laboratory with emphasis on data acquisition and the use of computers for extracting information from noisy data. Specific areas of modern analysis include Fourier-transform NMR, electrochemical analysis, mass spectrometry, and spectrophotometric methods. Staff.

CHEM 343 Advanced Topics in Modern Chemistry (F-2)

4 sem. hrs.

Builds on previous work in organic and physical chemistry to explore developments at the frontier of modern chemistry and biochemistry. Covers specific topics chosen based on current developments and the interests of the students and faculty involved and incorporates modern synthetic, instrumental, computer, theoretical, and biochemical methods in the exploration of these topics. Staff.

CHEM 345 Biochemistry (F-1,2)

4 sem. hrs. Prereq.: CHEM 225 and CHEM 226 or consent of the instructor; BIOL 225 strongly recommended.

Covers organizing principles of living systems; structure and function of proteins, sugars, and lipids; mechanism and kinetics of enzymes; introduction to bioenergetics; and integration and control of metabolic pathways. One laboratory per week emphasizes modern instrumentation such as Western blotting, column chromatography, HPLC, and spectrophotometric methods. Canfield.

CHEM 346 Advanced Instrumental Laboratory (S-2)

4 sem. hrs. Prereq.: CHEM 225, CHEM 226, and CHEM 331.

Explores in depth the use of modern instrumentation for advanced analysis and structure determination problems. Develops a high level of proficiency in the interpretation of nuclear magnetic resonance, infrared and mass spectra. Lee, Soltzberg.

CHEM 347 Advanced Topics in Biochemistry (S-1,2)

4 sem. hrs. Prereq.: CHEM 345.

Teaches modern biochemical techniques such as protein expression, protein purification, and enzyme assays. Emphasizes development of independent laboratory skills. Canfield, Lopilato.

CHEM 348 Advanced Inorganic Chemistry (F-1)

4 sem. hrs. Prereq. or concurrent: CHEM 332.

Presents structural and dynamic aspects of inorganic compounds, including ionic crystals, transition metal complexes, organo-metallics, and electron deficient species. Includes topics of current materials science interest, such as band theory of solids, shape memory metals, and polymers. Kaplan.

CHEM 349 Directed Study (F-1,2; S-1,2)

4 or 8 sem. hrs.

Directed study addresses coursework required for the major or degree not being offered formally that semester. Students work under the close supervision of a faculty member. Consent is required for a directed study, which does not count toward the independent learning requirement. Staff.

CHEM 350 Independent Study (F-1,2; S-1,2)

4 or 8 sem. hrs.

Selection of a research project involving scientific literature search and related laboratory work. Staff.

CHEM 355 Independent Study with Thesis (F-1,2; S-1,2)

8 sem. hrs.

Selection of a research project involving scientific literature search, followed by laboratory work required for solution of the problem. Results presented in a thesis. Staff.

CHEM 390 Chemistry Seminar (F-1,2; S-1,2)

No credit. Required of all chemistry, chemistry/pharmacy, and biochemistry majors. Other interested students are invited to attend. Staff.

Courses taught through the Colleges of the Fenway**ENVI 200 Environmental Forum [Colleges of the Fenway] (S-1,2)**

2 sem. hrs.

Provides a forum for different disciplines and interests to assess current environmental topics. Examines scientific, socioeconomic and political aspects of environmental issues. Includes a service-learning component and encourages interaction with local, regional and national environmental advocates. Students will develop applied research skills and make oral and written presentations.

CHEM 550 Environmental Chemistry [taught at Wentworth Institute of Technology] (S-1,2)

4 sem. hrs. Prereq.: PHYS 110, PHYS 111, CHEM 226, and MATH 118 or 238.

Analyzes and evaluates organic and inorganic contaminants and materials using state-of-the-art laboratory techniques. Covers identity and mobility of air, water, and soil pollutants. Wentworth Institute of Technology staff. (For more information, view the WIT catalog online at <http://www.wit.edu>.)

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