3. Six additional credits in Caribbean studies chosen either from the courses listed above or approved by the program director. Students may use credits in relevant special topics courses and/or seminars toward satisfying this requirement. Such courses are offered by the Departments of Africana Studies, History, Political Science, and Puerto Rican and Latino Studies. Some seminars offer opportunities for field study in Caribbean countries. However, students must complete 12 credits in Caribbean studies before enrolling in a seminar.

4. A major in any of the departments of the college. Courses taken to satisfy requirements in the primary major may not be used to satisfy dual major requirements in the Caribbean Studies Program.

**Requirements for a minor in Caribbean studies**

A program of twelve credits of advanced electives in Caribbean studies, as defined above in part 1 of the description of the Caribbean Studies Program, including one seminar each course completed with a grade of C or higher.

**Course**

1.1 **Major Themes in Caribbean Studies**

3 hours; 3 credits

Major factors that have shaped the Caribbean: discovery, slavery, colonialism, imperialism, "foreign" ideologies, and neocolonialism. Comparative description of plantation societies in the Caribbean.
nationwide. Students who wish to pursue graduate studies may apply to the master's and doctoral degree programs offered by or in conjunction with this department. Please see the Division of Graduate Studies section below.

Core curriculum

The Department of Chemistry participates in the college's core curriculum through Core Curriculum 3.22.

Courses for reentering students

A student who completed courses in chemistry at Brooklyn College that are no longer offered and who wants to take additional courses in chemistry, must consult a department counselor to determine which courses in the present numbering system are equivalent to those for which credit has already been given. Without clearance, credit may be denied.

Choosing a first course in chemistry

Chemistry 1 and 1.1 are intended for students planning a career in any of the following: the physical, chemical, or biological sciences; engineering; geology; medicine; dentistry; pharmacy; or physical therapy.

Students who have taken one year of high school chemistry and who have taken or are enrolled in Mathematics 2.9 or its equivalent should take Chemistry 1. Students who are not prepared for Chemistry 1 but who have completed intermediate high school algebra or its equivalent should take Chemistry 1.1.

Chemistry 5 is intended for students who plan a career in such health-related fields as occupational therapy, nursing, or nutrition. Students in health and nutrition sciences should consult with their department counselor before choosing a chemistry course.

American Chemical Society Certification

The American Chemical Society recommends a program of study for students planning a career in chemistry. Chemistry majors who complete the curriculum described for the B.S degree in chemistry and who have taken selected courses, including instrumental analysis (Chemistry 42), inorganic chemistry (Chemistry 76), and biochemistry (Chemistry 57 or 57.1) may receive American Chemical Society accreditation. Certified graduates are eligible to become members of the society; other chemistry graduates may become associate members of the society and members after three years of professional experience in chemistry. Interested students should consult the department counselor.

B.S. degree program in chemistry

HEGIS code 1905; SED program code 02084

This program is intended for students planning a professional career in chemistry or biochemistry.

Department requirements (67–70 1/2 credits)

Chemistry 1 or both Chemistry 1.1 and 1.2.

All of the following: Chemistry 2, 41 or 41W, 51, 52, 61, 62.

At least nine credits chosen from the following: Chemistry 35, 42, 53, 55, 57, 57.1, 58, 58.1, 64, 72, 76, 76.1, either 78 or 79; Biology 17 and 17.1.

One of the following physics sequences a) or b) or c):

- a) Physics 1 and 2.
- b) Physics 1.5 and 2.5.
- c) Physics 1.5 and 2.

Computer and Information Science 1.10, 1.20, or 1.5.

One of the following mathematics sequences a) or b):

- a) Mathematics 3.3 and 4.3 and 5.3.
- b) Mathematics 3.20 and 4.20 and 4.31 and 5.3.

A college-wide minimum of 24 credits in advanced courses in one department must be completed at Brooklyn College with a grade of C- or higher in each course.

Department recommendations

Physics 1.5 and 2.5.

Chemistry 62 should be completed by the end of the junior year.

One of the following languages through level 3: French, German, Russian.

Additional requirements for a B.S. degree

Candidates for a B.S. degree with a major in chemistry must complete at least 60 credits in science and mathematics; 24 of these 60 credits must be completed in advanced courses in the Chemistry Department. These 24 credits must be completed at Brooklyn College with a grade of C- or higher in each course. Specific course requirements for a B.S. degree are described above.

The following courses may be applied toward the 60 credits in science and mathematics:

A) All courses in the departments of biology, chemistry, computer and information science, geology, mathematics, physics, and psychology.

B) Courses marked with a (•) symbol in the Department of Health and Nutrition Sciences.

C) Anthropology and Archaeology 2.4, 16, 24.1, 24.2, 26.1, 26.2, 36, 85.3.

Core Studies 5, 5.1, 5.2, 7.2, 8.1, 8.2. Core Curriculum 3 through 3.99; Core Curriculum 30.01 through 30.99.


Philosophy 13, 33, 42.

Physical Education 22.71, 22.75, 23, 30, 51.

Sociology 77.1.

B.A degree program in chemistry

HEGIS code 1905; SED program code 02082

This program is intended for premedical and predental students and for others for whom a broad background in chemistry is desirable.

Department requirements (49–53 credits)

Chemistry 1 or both Chemistry 1.1 and 1.2.

All of the following: Chemistry 2, 41 or 41W, 51, 52, 60.1 or 61.

At least five credits chosen from the following: Chemistry 35,
42, 53, 55, 57, 57.1, 58, 58.1, 62, 64, 72, 76, 76.1, either 78 or 79; Biology 17 and 17.1.

One of the following physics sequences a) or b) or c):

- a) Physics 1 and 2.
- b) Physics 1.5 and 2.5.
- c) Physics 1.5 and 2.

The following mathematics sequence:
Mathematics 3.3 and 4.3.

**Department recommendation**
Chemistry 60.1 or 61 should be completed by the end of the junior year.

**B.A. degree program in adolescence education:** chemistry teacher
**HEGIS code 1905.01; SED program code 26813**

The School of Education and the Department of Chemistry jointly offer a program for students who plan to teach chemistry in grades 7 through 12. Additional information may be obtained from the School of Education or the Department of Chemistry. Students should consult a counselor as early as possible to plan their program.

**Program requirements (70–74 1/2 credits):**
Chemistry 1 or Chemistry 1.1 and 1.2.

All of the following: Chemistry 2, 41 or 41W, 51, 52, 60.1 or 61.

At least five credits chosen from the following: Chemistry 35, 42, 53, 55, 57, 57.1, 58, 58.1, 62, 64, 72, 76, 76.1, either 78 or 79; Biology 17 and 17.1.

One of the following physics sequences, a), or b), or c):

- a) Physics 1 and 2.
- b) Physics 1.5 and 2.5.
- c) Physics 1.5 and 2.

The following mathematics sequence: Mathematics 3.3 and 4.3.

The following pedagogical courses: Education 16, 34, 64.1, 69, 71.04, and 72.04. These courses are described in the "Education" section of this Bulletin. Also consult the "Education" section for specific grade requirements for the degree program for chemistry teacher.

These program requirements meet the revised teacher certification regulations adopted by the New York State Board of Regents in 2000 and replace the requirements that appeared in the 2000–2003 Bulletin for undergraduate programs.

**Requirements for a minor in chemistry**
A program of 12 credits of advanced electives in chemistry, each completed with a grade of C- or higher. Each course must be completed at Brooklyn College and must have 3 or more credits.

**Requirements for a minor in biochemistry**
Biology 17; Chemistry 1 or both 1.1 and 1.2; Chemistry 2; Chemistry 41 or 41W or Biology 17.1; Chemistry 51, 52, 57; Chemistry 58 or 58.1.

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**Division of Graduate Studies**

The Chemistry Department offers master of arts degree programs in chemistry, and chemistry teacher (grades 7 through 12). Some courses may be creditable toward the CUNY doctoral degree. For information, students should consult the department’s deputy chairperson for graduate studies. A Graduate Bulletin may be obtained in the Office of Admissions.

**Courses**

Courses marked with an asterisk (*) are not counted toward the requirement of no fewer than 18 credits in advanced courses for majors in this department for the B.A. degree or 24 credits for the B.S. degree.

§Independent work means not less than three additional hours each week per credit of conference, research, independent reading, and writing as assigned by the instructor. The student’s grade is determined in part by the successful completion of this independent work.

The Schedule of Classes published each term lists courses offered. Not all courses are offered each term.

*0.5 Chemistry and Society
3 hours lecture; 3 credits
Role of chemistry in contemporary life. Topics may include consumer products, foods, drugs, energy sources, and environmental problems. Recommended for nonscience majors.
Prerequisite: Core Studies 7.1.

*1 General Chemistry I
1 hour recitation, 3 hours laboratory; 5 credits
Principles of chemistry. Emphasis on the facts, theories, and laboratory techniques needed for further courses in the sciences. Intended for students planning a career in any of the following: the physical, chemical, or biological sciences; engineering; geology; medicine; dentistry; pharmacy; physical therapy. (Not open to students who are enrolled in or have completed Chemistry 1.1.)
Prerequisite: a passing grade in high school chemistry.
Prerequisite or corequisite: Mathematics 2.9 or 2.92; or assignment by the Department of Mathematics to Mathematics 3.3.

*1.1 General Chemistry IA
3 hours lecture; 2 credits
Introduction to the principles of chemistry with more introductory material than is covered in Chemistry 1. Chemistry 1.1 and 1.2 constitute a two-term sequence intended for students who are not prepared for Chemistry 1. (Not open to students who are enrolled in or who have completed Chemistry 1.)
Prerequisite: a passing grade in intermediate high school algebra or a grade of C- or higher in Mathematics 0.47.
*1.2 General Chemistry IB
3 hours lecture, 3 hours laboratory; 3½ credits
Continuation of Chemistry 1.1. (Not open to students who are enrolled in or who have completed Chemistry 1.)
Prerequisite: Chemistry 1.1.

*2 General Chemistry II
1 hour recitation, 3 hours lecture, 3 hours laboratory; 5 credits
Continuation of Chemistry 1.
Prerequisite: Chemistry 1 or 1.2.

*5 General Chemistry for Health-related Professions
1 hour recitation, 3 hours lecture, 3 hours laboratory; 5 credits
Principles of chemistry with applications to biological systems and processes. Intended for students in nursing or other health-related fields. (Not open to students who have completed Chemistry 1 or 1.2 or the equivalent.)
Prerequisite: one year of high school algebra or Mathematics 0.22.

35 Introduction to Inorganic Chemistry
3 hours; 3 credits
Introduction to the principles of modern inorganic chemistry. Integration of the properties and reactions of representative compounds with illustrations of the importance of inorganic chemistry in the chemical industry, in fuel and advanced materials technology, in biology/medicine, and in environmental issues.
Prerequisite: Chemistry 2.

41 Analytical Chemistry
3 hours lecture, 4 hours laboratory; 5 credits
Theory and practice of classical and modern analytical chemistry. Laboratory emphasizes quantitative methods. (Not open to students who are enrolled in or have completed Chemistry 41W.)
Prerequisite: Chemistry 2.

41W Analytical Chemistry
3 hours lecture, 4 hours laboratory, 1 hour writing workshop; 5 credits
Theory and practice of classical and modern analytical chemistry. Laboratory emphasizes quantitative methods. Writing-intensive section. (Not open to students who are enrolled in or have completed Chemistry 41.)
Prerequisite: Chemistry 2 and English 2.

42 Instrumental Analysis
2 hours lecture, 6 hours laboratory; 5 credits
Principles and applications of modern instrumentation in analytical chemistry including basic electronics, electroanalytical methods, chromatography, and spectroscopic methods.
Prerequisite: Chemistry 41 or 41W; and Physics 2 or 2.5.

*50 Organic Chemistry for Health-related Professions
1 hour recitation, 3 hours lecture, 3 hours laboratory; 5 credits
Survey of fundamental classes of organic compounds, and principles of organic chemistry as applied to aliphatic, aromatic, and biologically important compounds. Emphasis on structure, properties, and preparative methods. Intended for students in nursing or other health-related fields. Not intended for chemistry majors. (Not open to students who are enrolled in or have completed Chemistry 51.)
Prerequisite: Chemistry 1 or 1.2 or 5.

51 Organic Chemistry I
1 hour recitation, 3 hours lecture, 4 hours laboratory; 5 credits
Structure and properties of fundamental classes of organic compounds. Emphasis on reactivity, reaction mechanisms, synthesis, stereochemistry, and applications to allied fields. Chemistry 51 and 52 are required for admission to medical and dental schools. (Students who have taken Chemistry 50 will lose credit for Chemistry 50 upon successful completion of this course.)
Prerequisite: Chemistry 2.

52 Organic Chemistry II
1 hour recitation, 2 hours lecture, 4 hours laboratory; 5 credits
Continuation of Chemistry 51.
Prerequisite: Chemistry 51.

53 Advanced Organic Laboratory Techniques
2 hours lecture, 6 hours laboratory; 5 credits
Elucidation of the structures of organic compounds by spectrometric methods. Separation, purification, and identification of the components of mixtures. Synthesis of compounds utilizing modern methods.
Prerequisite: Chemistry 41 or 41W; and 52.

55 Advanced Organic Chemistry
3 hours lecture; 3 credits
Intensive study of organic reaction mechanisms including topics of current interest.
Prerequisite: Chemistry 52.

57 Biochemistry I
3 hours lecture, 4 hours laboratory; 5 credits
Protein biosynthesis. Laboratory work emphasizes basic biochemical skills. (Not open to students who are enrolled in or have completed Chemistry 57.1.)

**Prerequisite:** Chemistry 41 or 41W, or Biology 17.1; and Chemistry 52.

### 57.1 Biochemistry I Lectures

3 hours; 3 credits

This course is the same as Chemistry 57, but without laboratory work. (Not open to students who are enrolled in or have completed Chemistry 57.)

**Prerequisite:** Chemistry 52.

### 58.1 Biochemistry II Lectures

3 hours; 3 credits

This course is the same as Chemistry 58, but without laboratory work. (Not open to students who are enrolled in or have completed Chemistry 58.)

**Prerequisite:** Chemistry 57 or 57.1.

### 60.1 Physical Chemistry for the Health Professions

3 hours lecture; 3 credits

Physical chemistry with applications to biochemical processes. Topics include thermodynamics, chemical and physical equilibria, transport phenomena, kinetics, and quantum chemistry. Not recommended for students who intend to take graduate courses in chemistry or biochemistry. Students who complete Chemistry 60.1 may take Chemistry 61, but must forfeit three credits earned for Chemistry 60.1. (Not open to students who are enrolled in or have completed Chemistry 60.1.)

**Prerequisite:** Chemistry 2; and Mathematics 4.3. **Prerequisite or corequisite:** Physics 2 or 2.5.

### 61 Physical Chemistry I

3 hours lecture, 4 hours laboratory; 5 credits

Thermodynamics, including nonelectrolyte and electrolyte solutions, reaction equilibria, and phase equilibria. Laboratory emphasizes physicochemical measurements. Students who complete Chemistry 60.1 may take Chemistry 61, but must forfeit three credits earned for Chemistry 60.1.

**Prerequisite:** Chemistry 41 or 41W; and Mathematics 5.3; and Physics 2 or 2.5.

### 62 Physical Chemistry II

3 hours lecture, 4 hours laboratory; 5 credits

Continuation of Chemistry 61. Chemical kinetics; transport properties; quantum mechanics; atomic and molecular structure; spectroscopy; statistical mechanics. Laboratory emphasizes synthesis and physical characterization of inorganic compounds.

**Prerequisite:** Chemistry 61.

### 64 Quantum Chemistry

3 hours lecture; 3 credits

Application of quantum mechanics to molecular electronic structure, including the Schrödinger equation, operators, angular momentum, variation and perturbation methods, electron spin, Pauli principle, many-electron atoms, application of molecular-orbital and valence-bond theories to diatomic and polyatomic molecules.

**Prerequisite or corequisite:** Chemistry 62.

### 73.1, 73.2, 73.3 Research I, II, III

Minimum of 6 hours conference and independent work; 2 credits each

Planning and carrying out a research problem under supervision of a faculty member. Weekly conference. Written and oral reports. Students may not receive credit for more than three terms of undergraduate research in the Chemistry 73 and 83 sequences.

**Prerequisite of 73.1:** Chemistry 41 or 41W, and 52 and permission of the instructor and the chairperson.

**Prerequisite of 73.2:** Chemistry 73.1 and permission of the instructor and the chairperson.

**Prerequisite of 73.3:** Chemistry 73.2 and permission of the instructor and the chairperson.

### 76 Inorganic Chemistry

1 hour lecture, 4 hours laboratory; 5 credits


**Prerequisite:** Chemistry 60.1 or 61; Chemistry 35 is strongly recommended.

### 76.1 Inorganic Chemistry

3 hours lecture; 3 credits


**Prerequisite:** Chemistry 60.1 or 61; Chemistry 35 is strongly recommended.

### 78 Environmental Chemistry

3 hours lecture; 3 credits

Principles of chemistry applied to problems of the environment. Sources, reactions, effects of chemical species on the environment. General and specific problems of analysis, interpretation of results, and pollution control. Methods and impact of energy production.

**Prerequisite:** Chemistry 41 or 41W, and 52.
Honors courses

Students with superior records and the recommendation of a department faculty member may apply to the chairperson for permission to register for courses described below. Students may not register for more than six credits in honors courses in the department in one term.

83.1, 83.2, 83.3 Independent Research I, II, III
Minimum of 9 hours conference and independent work§; 3 credits each

Independent research supervised by a faculty member. Weekly conference. Written and oral report. Students may not receive credit for more than three terms of undergraduate research in the Chemistry 73 and 83 sequences.

Prerequisite of 83.1: Chemistry 41 or 41W, 52, an index of 3.30 or higher in chemistry, and permission of the instructor and the chairperson.

Prerequisite of 83.2: Chemistry 83.1, an index of 3.30 or higher in chemistry, and permission of the instructor and the chairperson.

Prerequisite of 83.3: Chemistry 83.2, an index of 3.30 or higher in chemistry, and permission of the instructor and the chairperson.

84.1, 84.2, 84.3 Seminar I, II, III
Minimum of 3 hours conference and independent work§; 1 credit each

Presentation and discussion of current topics.

Prerequisite: completion of an approved program of advanced courses and permission of the chairperson.

85.1, 85.2 Colloquium I, II
Minimum of 9 hours recitation, conference, and independent work§; 3 credits

Intensive reading and group discussion of a special field. A term report or examination may be required. Students should consult the department bulletin board for current offerings. Colloquium topics may include: statistical mechanics, polymer chemistry, interfacial phenomena, neurochemistry, physical biochemistry, spectroscopy, separation methods, solid-state, modern electrochemical methods. Students and faculty may suggest colloquium topics to the chairperson.

Prerequisite: completion of an approved program of advanced courses and permission of the chairperson.

The following courses are inactive and will be offered only if there is sufficient demand:

58 Biochemistry II
70 Introduction to Research
72 Mathematical Methods of Chemistry

Children's Studies Program

Office: Children's Studies Center; 3602 James Hall
Telephone: (718) 951-3192
Web site: http://depthome.brooklyn.cuny.edu/childrensstudies/

Director: Gertrud Lenzer; Sociology and Children's Studies
Faculty: Gertrud Lenzer; Margaret-Ellen Pipe, Psychology and Children's Studies

From the departments of the College, including, among others, Johnson, King, History; Korn, Education; Levin, Health and Nutrition Sciences; Natov, English.

The innovative interdisciplinary field of children's studies was founded in 1991 at Brooklyn College. Called “pioneering” by The New York Times, it was soon emulated by other colleges. Brooklyn College children's studies faculty draw on the arts, humanities, social and natural sciences, education, medicine, and the law. Although individual disciplines deal with the experience of childhood and youth, children's studies considers the different perspectives of these disciplines on children and youth as the main focus of inquiry. It provides students with a holistic and comprehensive understanding of the propensities and aptitudes of children, from birth to age 18, in their formal and informal contexts, both historical and contemporary. At the same time, children's studies advances the rights of children, who often cannot advocate for themselves.

Every year since its inception, children's studies has attracted more and more students at Brooklyn College. The Children's Studies Center was established in 1997 to expand the scope of the academic courses and to promote teaching, research, public service, and advocacy. A student-organized ChildrenFirst Club is now chartered, with a blog by the same name.

Children's studies offers a concentration for education majors in the early childhood education teacher program (birth–grade 2) and the childhood education teacher program (grades 1–6), a liberal arts minor; and an area of concentration for students in the CUNY Baccalaureate program. The concentrations and minor include such topics as the history of childhood; human rights of children; autobiography as an inquiry into the child's self; the child's imagination; child development and health; the child in family, school, and community contexts; applied research methodologies; social, economic, and educational policies affecting children and youth; children and disability; and advocacy and policy research in the areas of child welfare and juvenile justice. The Internship in Applied Children's Studies places students in demanding professional settings.

Students benefit in numerous ways from the minor; concentrations, and courses offered by Brooklyn College children's studies. These offerings enrich the student's liberal arts education and complement the major area of study. Children's studies provides training in traditional, contemporary, and evolving research methodologies for studying the well-being of the whole child. Children's studies promotes an awareness of child-related issues for students in their present