GENERAL INFORMATION

The City College offers the following master’s degree in Chemistry:

M.A.

PROGRAMS AND OBJECTIVES

The Chemistry Department, established in 1849, offers rigorous and up-to-date graduate level instruction and research training in the following areas:

Analytical Chemistry
Biochemistry
Environmental Chemistry
Inorganic Chemistry
Organic Chemistry
Physical Chemistry

The M.A. curriculum is flexible, and programs of study are available for students planning to go into industry, governmental service, the health-oriented professions, and secondary school education.

For students wishing to pursue advanced studies in the above areas, the Doctor of Philosophy degree is offered by The City University. The office of the Ph.D. program is at The City University Graduate Center, 365 Fifth Avenue, New York, N.Y. 10016.

DEGREE REQUIREMENTS

The Graduate Committee may waive any required course. Graduate courses from other departments may be taken if approved by the advisor.

Chemistry Option

Required Courses
Chemistry:
B1000: Inorganic Chemistry 5
B5000: Organic Mechanisms 5

Elective Courses
Twenty credits chosen from the following: 20
A1100: Environmental Chemistry (3 cr.)
A1101: Environmental Chemistry Lab (2 cr.)
A1200: Environmental Organic Chemistry (3 cr.)
A1400: Chemical Information Sources (1 cr.)
A8200: Chemistry-Physics-Engineering Seminar I (1 cr.)
A8300: Chemistry-Physics Engineering Seminar II (1 cr.)
B3000: Polymer Chemistry (5 cr.)
B5100: Organic Synthesis (5 cr.)
B5200: Spectroscopy and Structure Proof in Organic Chemistry (5 cr.)
B5300: Organometallics (5 cr.)
B6000: Quantum Chemistry (5 cr.)
B7200: Surface Chemistry and Colloids (5 cr.)
B7300: Computers in Chemistry (5 cr.)
B8900: Introduction to Research Methodology (5 cr.)
B9100: Basic Lab Techniques (5 cr.)

Total Credits 30

Additional Requirements:
Thesis: There is also the possibility of doing a thesis (offered as Chem B9901-B9905, 10 credits). The thesis must be approved by the Graduate Committee. Students choosing to do a thesis will take ten credits of elective Chemistry courses in addition to B9901-B9905.

Comprehensive Examination: A comprehensive examination is required of all students except for those who have completed a thesis. The comprehensive examination includes material from any undergraduate course, plus Chemistry B1000 and Chemistry B5000.

Biochemistry Option

Required Courses
CHEM A8005: Biochemistry II 3
BICM 71010: Advanced Biochemistry I 3
BICM 71020: Advanced Biochemistry II 3
BICM 71110: Research Techniques in Biochemistry I 4
Two of the following four: 2
BICM 72010: Basic Seminar in Biochemistry I (1 cr.)
BICM 72020: Basic Seminar in Biochemistry II (1 cr.)
BICM 81000: Seminar in Biochemistry (1 cr.)
CHEM B9800: Seminar in Biochemistry (1 cr.)
One of the following two: 3-5
CHEM B5000: Organic Mechanisms (5 cr.)
BICM 75000: Bioorganic Chemistry (3 cr.)
One of the following two: 3-4
BICM 77000: Physical Biochemistry (3 cr.)
PHYS V3800: Biophysics (4 cr.)

Elective Courses
Two approved graduate courses in Biology
(One course should be in molecular genetics) 8

Total Credits 29-32
Additional Requirements

Thesis: Students who wish to complete a thesis must obtain approval by the Graduate Committee.

Comprehensive Examination: A comprehensive examination is required of all students except those who have completed a thesis.

ADVISEMENT PROCEDURES AND SERVICES

All students wishing to pursue master’s work in Chemistry should consult with one of the advisors listed below:

Chemistry
Professor R. Birke
MR 1121B; 212-650-8363

Biochemistry
Professor K. Ryan
MR 1337, 212-650-8132

SEMINARS

The Chemistry Department sponsors weekly seminars on topics of current interest. Advance abstracts of these seminars will be posted in the vicinity of MR 1024, and all interested students are invited to attend.

AWARDS, SCHOLARSHIPS AND PRIZES

Each year the department presents a number of awards to its outstanding students.

Ernest Borek Scholarship
Chemistry Scholarship
Albert and Frances Hochman Scholarship
Donald Sloan Scholarship
James A. Whittam Award

COURSE DESCRIPTIONS

BASIC COURSES IN CHEMISTRY

A1100: Environmental Chemistry
Intended to broaden the student’s understanding of chemical processes taking place in our environment. The relationship between atmospheric, soil and water chemistry will be underlined. This course draws upon general, analytical and organic chemistry experience. 3 HR./WK.; 3 CR.

A1101: Environmental Chemistry Lab
Introduction to environmental analysis. Samples of water, air, soil, food, etc. will be obtained and analyzed both qualitatively and quantitatively for pollutants. The effects of these pollutants on the environment will be discussed and linked to urban problems. Analytical techniques will include titrations, separations (GC, HPLC, GC/MS) and polarography. 3 HR./WK.; 2 CR.

A1200: Environmental Organic Chemistry
Examination of processes that affect the behavior and fate of anthropogenic organic contaminants in aquatic environments. Chemical properties influencing transfers between hydrophobic organic chemicals, air, water, and sediments, based on a fundamental understanding of intermolecular interactions, will be studied. Mechanisms of important thermochemical and photochemical transformation reactions will also be briefly investigated. 3 HR./WK.; 3 CR.

A1400: Chemical Information Sources
An introduction to the retrieval of chemical information. Topics covered: primary, secondary and tertiary literature, including the major abstract journals, data sources, compendia, patents, current awareness, and computer readable sources. Spring semester only. 3 HR./WK.; 1 CR.

A8200: Chemistry-Physics-Engineering Seminar I
Required for certain graduate students; emphasis on topics in physical chemistry, inorganic chemistry and organic chemistry. Fall semester only. 1 CR.

A8300: Chemistry-Physics-Engineering Seminar II
Required for certain graduate students; emphasis on topics in physical chemistry, inorganic chemistry and organic chemistry. Spring semester only. 1 CR.

B1000: Inorganic Chemistry
Theories of chemical bonding and molecular structure applied to inorganic compounds; stereochemistry; compounds of the non-transition elements; transition metal complexes. Spring semester only. 5 HR./WK.; 5 CR.

B3000: Polymer Chemistry
Fundamentals of polymer science; polymerization, solution properties, and solid state properties. 5 HR./WK.; 5 CR.

B5000: Organic Mechanisms
The basic methods of studying organic reaction mechanisms and their application to specific reactions. Fall semester only. 5 HR./WK.; 5 CR.

B5100: Organic Synthesis
A critical and mechanistic evaluation of synthetic methods. Prereq: Chemistry B5000. 5 HR./WK.; 5 CR.

B5200: Spectroscopy and Structural Proof in Organic Chemistry
Principles and concepts in spectroscopic methods such as infrared and ultraviolet-visible spectrophotometry, proton and carbon nuclear magnetic resonance spectroscopy including techniques such as decoupling, 2-dimensional correlated spectroscopy, mass spectrometry and elemental analyses. 5 HR./WK.; 5 CR.

B6000: Quantum Chemistry
An introduction to quantum chemistry. A mathematical development of the theories which explain atomic and molecular behavior with applications to chemical bonding and spectroscopy. 5 HR./WK.; 5 CR.

B8900: Introduction to Research Methodology
An introduction to methods of doing research; students are required to submit a research notebook and a short paper. With approval, may be converted to the first half of thesis research. HRS. TBA; 5 CR.

B9100: Basic Laboratory Techniques for Research in Physical, Analytical and Inorganic Chemistry
Electronics, principles of instrumentation, application of some modern instruments, and instrumental techniques. Spring semester only. 2 LECT., 6 LAB. HR./WK.; 5 CR.

BASIC COURSES IN BIOCHEMISTRY

BICM courses are offered through the Biochemistry Program of the Graduate School of the City University of New York.

A8005: Biochemistry II
Molecular basis of enzyme action, membranes (transport and signal transduction), protein structure, signal transduction, virology, bioinformatics, genomics, proteomics, molecular basis of replication, transcription of genetic information, immunology. Prereq: a one semester undergraduate biochemistry course. Spring semester only. 3 HR./WK.; 3 CR.

B9800: Seminar in Biochemistry
Presentation and discussion of current problems in biochemistry. Includes presentations of recent research findings by invited speakers and requires registered students to make at least one presentation based on published work or their own research results. 1 HR./WK.; 1 CR.
BICM 71010: Advanced Biochemistry I
Topics of current importance in biochemistry, including protein structure, enzymology, immunology and regulation of metabolism. Prereq: Chem A8005. 3 HR./WK.; 3 CR.

BICM 71020: Advanced Biochemistry II
Topics of current importance in biochemistry, including bioenergetics, membrane biochemistry, and synthesis of nucleic acids and proteins. Prereq: Chem A8005. 3 HR./WK.; 3 CR.

BICM 71110: Research Techniques in Biochemistry I
Laboratory work dealing with modern approaches in the solution of biochemical problems. The student will work in at least two research laboratories. Pre- or coreq: Chem A8005. 1 CLASS, 7 LAB. HR./WK.; 4 CR.

BICM 72010: Basic Seminar in Biochemistry I
Each student will make at least one presentation of published work. The course complements and supplements the Advanced Biochemistry I lecture (BICM 71010). Prereq: Chem A8005. 1 CR.

BICM 72020: Basic Seminar in Biochemistry II
Each student will make at least one presentation of published work. The course complements and supplements the Advanced Biochemistry II lecture (BICM 71020). Prereq: Chem A8005. 1 CR.

BICM 75000: Bioorganic Chemistry
Organic reaction mechanisms with emphasis on biochemical reactions. Chemistry of amino acids, sulfur compounds, and phosphates. Catalysis: acid-base, nucleophilic, electrophilic, metal-ion, intramolecular, multiple and complexation. 3 HR./WK.; 3 CR.

BICM 77000: Physical Biochemistry
Kinetics, thermodynamics and spectroscopy as applied to biochemical systems. 3 HR./WK.; 3 CR.

BICM 81000: Seminar in Biochemistry
(see B9800)

B8000: Special Topics in Chemistry
5 HR./WK.; 5 CR.

B8001: Special Topics in Inorganic Chemistry

B8002: Special Topics in Analytical Chemistry

B8003: Special Topics in Organic Chemistry

B8004: Special Topics in Physical Chemistry

B9901-B9905: Thesis Research
Students choosing thesis research will prepare a thesis under the personal guidance of a faculty advisor. The research must be completed in two years from the initial date of registration for the thesis course, continuing registration until completed. 10 CR.

BICM 71120: Research Techniques in Biochemistry II
Laboratory work in one biochemical research laboratory. Prereq: BICM 71110. 1 CLASS, 7 LAB. HR./WK.; 4 CR.

DOCTORAL COURSES OPEN TO MASTER’S STUDENTS
Qualified students may take or substitute, with the approval of the Graduate Committee, courses available in the doctoral program in Chemistry. Those courses are described in the bulletin of The Graduate School of The City University of New York.

FACULTY

Daniel L. Akins, Professor
B.S., Howard Univ.; Ph.D., Univ. of California, Berkeley

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B.Sc., Univ. of Louvain (Belgium), Ph.D.

Teresa Bandosz, Professor
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Ronald Birke, Professor
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Vernon G. S. Box, Professor
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