Department of Chemistry

(Division of Science)

Professor Simon Simms, Chair • Department Office: MR 1024 • Tel: 212-650-8402

General Information

The City College offers the following Master’s Degree in Chemistry:

M.S.

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.S. 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 of New York. The office of the Ph.D. program is at The City University of New York Graduate Center, 365 Fifth Avenue, New York, N.Y. 10016.

Degree Requirements

Graduate courses from other departments may be taken if approved by the advisor.

Chemistry Option

Required Courses

CHEM B1000: Inorganic Chemistry  5
CHEM B5000: Organic Mechanisms  5

Elective Courses

Twenty credits chosen from the following:  20
CHEM A1100: Environmental Chemistry (3 cr.)
CHEM A1101: Environmental Chemistry Lab (2 cr.)
CHEM A1200: Environmental Organic Chemistry (3 cr.)
CHEM A1400: Chemical Information Sources (1 cr.)
CHEM A6200: Chemistry-Physics-Engineering Seminar I (1 cr.)
CHEM A6300: Chemistry-Physics Engineering Seminar II (1 cr.)
CHEM B3000: Polymer Chemistry (5 cr.)
CHEM B5100: Organic Synthesis (5 cr.)
CHEM B5200: Spectroscopy and Structure Proof in Organic Chemistry (5 cr.)
CHEM B5300: Organometallics (5 cr.)
CHEM B6000: Quantum Chemistry (5 cr.)
CHEM B7200: Surface Chemistry and Colloids (5 cr.)
CHEM B7300: Computers in Chemistry (5 cr.)
CHEM B8900: Introduction to Research Methodology (5 cr.)
CHEM 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 CHEM B9901-B9905.

Comprehensive Examination: A comprehensive examination is required of all students except 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

Two of the following four:

BICM 71020: Advanced Biochemistry II  3
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:

CHEM B5000: Organic Mechanisms (5 cr.)
BICM 75000: Bioorganic Chemistry (3 cr.)

One of the following two:

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)  6-8

Total Credits  30-32

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

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

Chemistry

Professor Barbara Zajc
Location: MR 1234
Tel: 212-650-8926

Biochemistry

Professor Kevin Ryan
Location: MR 1337
Tel: 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
Albert and Frances Hochman Scholarship
Sol and Bettina Kornbluh Award

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.

Chemistry Course Descriptions

Basic Courses in Chemistry

CHEM 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.

CHEM 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.
CHEM 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.

CHEM 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.

CHEM A8000-A8999: Special Topics in Chemistry
Special topics not covered in the usual department offerings. Topics will vary from semester to semester depending on student and instructor interest. Each course will have a designated list of prerequisites. These depend on the central topic of the course and will be decided by the instructor. Credits and hours will be determined by the instructor and the department. 1-5 hr./wk.; 1-5 cr.

CHEM A8200: Chemistry-Physics-Engineering Seminar I
Topics in physical chemistry, inorganic chemistry and organic chemistry. Fall semester only. 1 cr.

CHEM A8300: Chemistry-Physics-Engineering Seminar II
Topics in physical chemistry, inorganic chemistry and organic chemistry. Spring semester only. 1 cr.

CHEM 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.

CHEM B3000: Polymer Chemistry
Fundamentals of polymer science; polymerization, solution properties, and solid state properties. 5 hr./wk.; 5 cr.

CHEM 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.

CHEM B5100: Organic Synthesis
A critical and mechanistic evaluation of synthetic methods. Spring semester only. Prereq: CHEM B5000. 5 hr./wk.; 5 cr.

CHEM 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.

CHEM 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.

CHEM B9905: Thesis Research
Pre/Co-requisite(s): CHEM A8005. 1 Class, 7 Lab. hr./wk.; 4 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 specific laboratory is arranged by mutual agreement between the student and a Chemistry Department professor. Pre/Co-requisite(s); 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 CHEM B9800)

Additional Courses
CHEM B5300: Organometallics
5 hr./wk.; 5 cr.

CHEM B7200: Surface Chemistry and Colloids
5 hr./wk.; 5 cr.

CHEM B7300: Computers in Chemistry
5 hr./wk., 5 cr.

CHEM B8000: Special Topics in Chemistry
4 hr./wk.; 5 cr.

CHEM B8001: Special Topics in Inorganic Chemistry

CHEM B8002: Special Topics in Analytical Chemistry

CHEM B8003: Special Topics in Organic Chemistry

CHEM B8004: Special Topics in Physical Chemistry

CHEM 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.

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

Valeria Balogh-Nair, Professor
B.Sc., Univ. of Louvain (Belgium), Ph.D.

Teresa Bandoz, Professor
B.S., Univ. of Mining Metallurgy (Cracow, Poland), M.S.; Ph.D., Technical Univ. of Cracow

Ronald Birke, Professor
B.S., Univ. of North Carolina; Ph.D., M.I.T.

Mark Bispo, Assistant Professor
B.A., Wesleyan Univ.; Ph.D., Columbia Univ.
Sean Boson, Lecturer
B.S., Jahangirnagar Univ. (Bangladesh); M.S.; Ph.D., Univ. of Cambridge (U.K.)
Zimei Bu, Associate Professor
B. Engineering, Chengdu Univ. of Science & Technology (China); Ph.D., Louisiana State Univ.
David H. Calhoun, Professor
B.A., Birmingham-Southern College; Ph.D., Univ. of Alabama
Marco Ceruso, Assistant Professor
Diplome d'Ingénieur Chimiste, CPE Lyon (France); Ph.D., SUNY (Stonybrook)
Ranajeet Ghose, Professor
B.Sc., Presidency College (India); M.S., Yale Univ., Ph.D.
David K. Gosser, Professor
B.S., St. Joseph's Univ.; Ph.D., Brown Univ.
Michael E. Green, Professor
A.B., Cornell Univ.; M.S., Yale Univ., Ph.D.
Urs Jans, Associate Professor
Diploma in Chemistry, Swiss Federal Institute of Technology, Ph.D.
George John, Associate Professor
B.S., Univ. of Kerala (India), Ph.D.
Glen Kowach, Associate Professor
B.S., Univ. of Wisconsin, Madison; Ph.D., Cornell Univ
Mahesh Lakshman, Professor
B.S., University of Bombay (India); M.S.; Ph.D., University of Oklahoma
Themis Lazaridis, Professor
Diploma in Chemical Engineering, Aristotle Univ. (Greece); Ph.D., Univ. of Delaware
John R. Lombardi, Professor
A.B., Cornell Univ.; M.A., Harvard Univ., Ph.D.
Stephen O'Brien, Associate Professor
B.Sc., Sussex Univ. (UK); D.Phil., Oxford Univ. (UK)
Kevin Ryan, Associate Professor
B.S., Providence College; M.S., Univ. of Rochester, Ph.D.
Issa Salame, Assistant Professor
B.S., The City College; M. Phil., CUNY, Ph.D.
Simon A. Simms, Associate Professor and Chair
B.S., The City College; Ph.D., Princeton Univ.
Ruth Stark, Distinguished Professor
A.B., Cornell University; Ph.D., Univ. of California (San Diego)
Mark L. Steinberg, Professor
B.A., Univ. of Michigan; Ph.D., Univ. of Pennsylvania
Maria Tamargo, Professor
B.S., Univ. of Puerto Rico; M.S., Johns Hopkins Univ., Ph.D.
Barbara Zajc, Associate Professor
B.S., Univ. of Ljubljana, M.S., Ph.D.

Professors Emeriti
John S. Arents
Theodore Axenrod
Vernon G. S. Box
Thomas Haines
Neil McKelvie
Jack I. Morrow
Stanley R. Radel
Henri L. Rosano
Charlotte S. Russell
Horst Schulz
Amos Turk
Michael Weiner
Arthur E. Woodward