
CHEMISTRY (Ph.D.)

Executive Officer: Professor Mahesh Lakshman

The Graduate Center

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URL: <http://web.gc.cuny.edu/science/pages/chemistry.html>

FACULTY (AS OF JULY 2009)

Daniel L. Akins n Spiro D. Alexandratos n Arthur D. Baker n Valeria Balogh-Nair n
Teresa J. Bandosz n Philip Barnett n James D. Batteas n Ronald L. Birke n Mark R.
Biscoe n Robert Bittman n Gregory S. Boutis n Vernon George Simmonds Box n Stacy
E. Brenner n Marco Ceruso n Emmanuel J. Chang n Malgorzata Ciszewska n Maria
Contel n Alexander Couzis n Joseph J. Dannenberg n Lesley Davenport n Morton M.
Denn n Ruel B. Desamero n Roger Dorsinville n Terry Lynne Dowd n Charles M. Drain
n Robert R. Engel n Cherice M. Evans n Stephen P. Fearnley n Lynn C. Francesconi n
Diana Friedland n Harry D. Gafney n Ranajeet Ghose n Brian R. Gibney n Nicolas
Giovambattista n Dixie J. Goss n David K. Gosser n Michael E. Green n Nancy L.
Greenbaum n Steven G. Greenbaum n Alexander Greer n Marilyn R. Gunner n Wayne
W. Harding n Yi He n William H. Hersh n Mandè N. Holford n James M. Howell n
Qiao-Sheng Hu n Seogjoo Jang n Urs Jans n Andrzej A. Jarzecki n Shi Jin n Andrei
Jitianu n George John n Lawrence W. Johnson n Laura J. Juszcak n Akira
Kawamura n Edward J. Kennelly n Frida Esther Kleiman n Mark N. Kobrak n Ronald
L. Koder n Gerald W. Koeppl n Glen R. Kowach n Ilona Kretschmar n Michal Kruk n
Thomas A. Kubic n Chandrika P. Kulatilleke n Sanjai Kumar n Mahesh K. Lakshman n
Themis Lazaridis n Jong-III Lee n Kenrick M. Lewis n Jianbo Liu n John R. Lombardi
n Alan M. Lyons n Richard S. Magliozzo n Louis J. Massa n Hiroshi Matsui n
Glendon Dale McLachlan n Panayiotis C. Meleties n Pamela Ann Mills n Michael V.
Mirkin n David R. Mootoo n Fred R. Naider n Robert P. Nolan n Ralf M. Peetz n
Nicholas D. Petraco n Manfred Philipp n Adam A. Profit n Gary J. Quigley n
Krishnaswami S. Raja n Angelo R. Rossi n Susan A. Rotenberg n David S. Rumschitzki
n Randy L. Rutberg n Kevin Ryan n Uri Samuni n Roberto A. Sanchez-Delgado n
Angelo V. Santoro n Anne-Marie Sapse n Steven A. Schwarz n Bruno Scrosati n
Chwen-Yang Shew n Peter Spellane n Ruth E. Stark n Carol A. Steiner n Thomas
Strekas n Steven A. Sundberg n William V. Sweeney n Maria C. Tamargo n Martin
Telting-Diaz n Micha Tomkiewicz n Michele Vittadello n Yujia Xu n Nan-Loh Yang n
Zhonghua Yu n Alexandre M. Zaitsev n Barbara Zajc n Pengfei Zhang n Shenping
Zheng n Yan Zheng n Shuiqin Zhou

For the most up-to-date faculty listings and specializations, see the program's Web site.

THE PROGRAM

The Ph.D. Program in Chemistry involves participation of faculty at five senior colleges of the City University of New York: Brooklyn College, The City College, Hunter College, Queens College, and the College of Staten Island. Applicants to the Ph.D. Program in Chemistry are asked to select one of these colleges as the location at which they intend to carry out their doctoral research. Doctoral research and laboratory courses are conducted at the various colleges of the City University. Doctoral seminars and lecture courses are given at the Graduate Center, which also serves as the administrative headquarters for the Ph.D. Program in Chemistry. The Ph.D. degree is granted by the Graduate School and University Center of the City University of New York.

Doctoral research is carried out under the direction of a research mentor. The selection of a research mentor should be made during a student's second semester in the program. The general course of study in the Ph.D. program involves a transition by the student from course work and examinations early in the program to a full-time commitment to the research project as study continues.

The Ph.D. Program in Chemistry has a large faculty with diverse interests. Doctoral research is conducted in all major areas of chemistry. Laboratory work at each of the senior colleges is supported by a wide range of modern instrumentation. One major attribute of the Ph.D. program is that students conducting research at one senior college have access to the facilities and instrumentation at any of the other senior colleges. Students also have access to computers at the Graduate Center and to the many computational facilities at the senior colleges. Other support facilities include a glass shop with a master glassblower, several machine shops, and electronics shops.

Each of the senior colleges maintains a library with a range of chemistry journals. CUNY faculty and students have access to ACS online journals. Remote access to journal articles is also available at no cost to doctoral faculty and students at any CUNY campus via two document-delivery services: ISI (Institute for Scientific Information) and CAS (Chemical Abstracts Service). In addition, SIBL, the Science, Industry, and Business Library of the New York Public Library, is located in the same building as the Graduate Center.

En-route M.A.

Upon completing 45 credits with an average grade of B, passing the First Examination, and satisfactorily completing a major research paper, the student may apply for an M.A. degree. Those seeking an en-route master's degree should have the Executive Officer initiate the appropriate action. The degree is awarded formally by one of the participating senior colleges.

SPECIAL REQUIREMENTS FOR ADMISSION

In addition to meeting the general University requirements for admission stated earlier in this bulletin, applicants are expected to have at least an average grade of B in their undergraduate major and to demonstrate the ability to profit from graduate work in chemistry. Applicants must have completed at least one full year each of general chemistry, organic chemistry, and physical chemistry, and one-half year of quantitative analysis. Mathematics through differential

equations is strongly recommended. Alternatively, a qualified applicant might have a master's degree in chemistry or a related field from an institution of recognized academic standing.

SPECIAL REQUIREMENTS FOR THE DOCTOR OF PHILOSOPHY

The following requirements are in addition to the general University requirements for the Ph.D. given earlier in this bulletin.

Course of Study A minimum of 60 credits of approved course work is required for a Ph.D. in chemistry. Students are required to complete one course each in inorganic, organic, and quantum chemistry. Entering students with exceptionally strong backgrounds may be exempted from this requirement through special examinations. A course in college teaching, a course in basic laboratory techniques, a course in chemical information sources, and two or more courses in the student's area of specialization are also generally required. The student's advisory committee may recommend additional course work selected from the advanced special topics course offerings.

First Examination Upon completion of the fundamental courses, the student must pass First Examinations in the fields of inorganic chemistry, organic chemistry, and quantum chemistry.

Foreign Language An individual's research mentor or dissertation committee may require a student to acquire a working knowledge of a language or languages in which there is a substantial body of literature relevant to that student's research.

Second Examination The second-level examination tests mastery of recent developments in the student's area of specialization and serves to encourage independent study of the relevant chemical literature.

Seminars All students are required to attend and participate in the advanced seminar in their area of specialization while in residence at CUNY.

Dissertation Completion of a major research project is the central requirement for the Ph.D. degree in chemistry. The student works under the guidance of a research mentor and a dissertation committee, which reviews the student's progress at least annually. Upon approval of the dissertation by the research mentor and the dissertation committee, it must be successfully defended at an oral examination.

College Teaching Each student is required to demonstrate a measure of competence in college teaching. This requirement may be fulfilled during the required course on college teaching or while serving as a teaching assistant in the undergraduate classroom and laboratory. Teaching positions are assigned by the chair of the department at the campus at which the student is carrying out dissertation research or, for entering students, usually at the campus of their choice.

Courses

Unless otherwise stated, all courses are 45 hours, 3 credits.

CHEM 60000 Glassblowing

90 hours laboratory, 2 credits

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- CHEM 60100 Project Teach
15 hours, 1 credit
- CHEM 71000 Advanced Inorganic Chemistry
- CHEM 73000 Polymer Chemistry
- CHEM 74000* Analytical Chemistry
- CHEM 75000 Advanced Organic Chemistry I, Physical Organic
- CHEM 75100 Advanced Organic Chemistry II, Synthetic Organic
- CHEM 75200 Quantum Organic Chemistry
Prerequisite: CHEM 76000
- CHEM 76000 Introductory Quantum Chemistry
- CHEM 76100 Spectroscopy
Prerequisite: CHEM 76000
- CHEM 77000 Chemical Thermodynamics, Statistical Thermodynamics, and Chemical Kinetics
60 hours, 4 credits
- CHEM 78000 Chemical Information Sources
15 hours, 1 credit
- CHEM 78500 Introduction to Nanotechnology and Materials Chemistry
60 hours, 4 credits
- CHEM 78700 Introduction to Environmental Chemistry
- CHEM 79001 Basic Laboratory Techniques for Research in Analytical, Physical, and Inorganic Chemistry
15 hours lecture, 105 hours laboratory, 4 credits
- CHEM 79002 Basic Laboratory Techniques for Research in Organic Chemistry
15 hours lecture, 105 hours laboratory, 4 credits
- CHEM 79003 Basic Laboratory Techniques for Polymer Chemistry
15 hours lecture, 105 hours laboratory, 4 credits
- CHEM 79041 Basic Laboratory Techniques for Research in Molecular Biophysics I
15 hours lecture, 105 hours laboratory, 4 credits
- CHEM 79042 Basic Laboratory Techniques for Research in Molecular Biophysics II
15 hours lecture, 105 hours laboratory, 4 credits
- CHEM 79051 Basic Laboratory Techniques for Research in Nanotechnology and Materials Chemistry I
15 hours lecture, 105 hours laboratory, 4 credits
- CHEM 79052 Basic Laboratory Techniques for Research in Nanotechnology and Materials Chemistry II
15 hours lecture, 105 hours laboratory, 4 credits
- CHEM 79061 Basic Laboratory Techniques for Research in Environmental Chemistry
15 hours lecture, 105 hours laboratory, 4 credits
- CHEM 79500 First Level Laboratory Research
Credit and hours variable
Only for students who have not passed the first examination. Permission of Executive Officer and student's research adviser is required.

Seminars

- CHEM 80501 Advanced Seminar in Theoretical, Physical, and Inorganic Chemistry
15 hours, 1 credit

CHEM 80511 Advanced Seminar in Organic Chemistry

15 hours, 1 credit

CHEM 80521 Advanced Seminar in Analytical Chemistry

15 hours, 1 credit

CHEM 80531 Advanced Seminar in Polymer Chemistry

15 hours, 1 credit each semester

CHEM 80541 Advanced Seminar in Molecular Biophysics

15 hours, 1 credit

CHEM 80551 Advanced Seminar in Nanotechnology and Materials Chemistry

15 hours, 1 credit

Special Topics Courses

Courses in specialized areas will be offered for the partial fulfillment of the 60-credit requirement.

Admission to these 80000-level Special Topics courses is restricted to students who have completed the required fundamental 70000-level courses or to other students upon permission of the instructor and the Executive Officer.

CHEM 81900 Special Topics in Inorganic Chemistry

CHEM 81901* Inorganic Systems

CHEM 81902* Kinetics and Mechanisms of Inorganic Reactions

CHEM 81903* Bioinorganic Chemistry

CHEM 81904* Inorganic Photochemistry

CHEM 81905* Organometallic Chemistry and Catalysis

CHEM 83900* Special Topics in Polymer Chemistry

CHEM 83901 Advanced Polymer Chemistry I, Structure and Mechanisms in Polymerization

Prerequisite: CHEM 73000

CHEM 83902 Advanced Polymer Chemistry II, Characterization and Properties of Polymers

Prerequisites: CHEM 73000

CHEM 84900* Special Topics in Analytical Chemistry

CHEM 84901* Theories of Analytical Chemistry

CHEM 84902* Chemistry in Nonaqueous Solutions

CHEM 84903 Chemical Separations

CHEM 84904 Electroanalytical Chemistry

CHEM 84905 Analytical Spectroscopy

CHEM 84908 Light Microscope and Microchemical Analysis for Analytical Chemists

20 hours lecture, 60 hours laboratory, 3 credits

CHEM 84909 Microscopy and Microanalysis for Chemists

CHEM 85900 Special Topics in Organic Chemistry

CHEM 85901* Determination of the Structure of Organic Molecules

CHEM 85902 Organic Chemistry of Heterocycles

CHEM 85903* Chemistry of Natural Products

CHEM 85906* Photochemistry

CHEM 85907* Stereochemistry

CHEM 85908* NMR Spectroscopy

CHEM 85910* Physical-Organic Chemistry
CHEM 86900 Special Topics in Physical Chemistry
CHEM 86901* Colloid Chemistry
CHEM 86902* Group Theory
CHEM 86903* Statistical Mechanics
CHEM 86904* Quantum Mechanics
CHEM 86905* Magnetic Resonance Spectroscopy
CHEM 86906* Radiochemistry
30 hours lecture, 60 hours laboratory, 4 credits
CHEM 86907* Thermodynamic and Statistical Theories of Liquids and Solutions
CHEM 86908* High Resolution Infrared Spectra
CHEM 86909* Relaxation Processes Near Equilibrium
CHEM 86910* Chemical Kinetics
CHEM 86911* Catalysis
CHEM 86912* Surface Chemistry
CHEM 86913* Solid State Physical Chemistry
CHEM 86915* Photochemistry
CHEM 86916* Mechanistic Kinetics
CHEM 86917 Computers in Chemistry
30 hours lecture plus 45 hours laboratory, 3 credits
CHEM 86918* Isotope Chemistry
CHEM 86919 X-Ray Crystal Structure Analysis
CHEM 86920* Microprocessors for Experimentalists
45 hours lecture, plus 30 hours laboratory, 4 credits
CHEM U86921 Computational Chemistry
CHEM 87901 Molecular Biophysics
45 hours, 3 credits

Dissertation

CHEM 81000 Research for the Doctoral Dissertation
Credits variable
Prerequisite: First Examination
CHEM 89000 Special Lectures in Chemistry
Hours and credits variable (15 hours per credit)
CHEM 90000 Dissertation Supervision
1 credit

*offered infrequently