



School of Arts and Science Department of Chemistry

Chemistry & Pharmaceutical Science Student Handbook

2012-2013

Academic Core, Room 3F01

Telephone: 718 262 2650

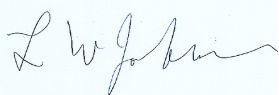
Facsimile: 718 262 2652

Message from the Department Chairperson

Welcome to the **Department of Chemistry**. This department houses both the major in **chemistry** and the major in **pharmaceutical science**. This department is staffed by a group of very well educated and energetic faculty members. While their main objective is to provide the students taking chemistry or pharmaceutical science courses with a strong and modern grasp of the science, the faculty members are also dedicated researchers. Consequently, there are numerous opportunities for undergraduate students to participate in research in the department.

The study of chemistry or pharmaceutical science is demanding, and rewarding. This handbook, coupled with faculty advisement is intended to help make your undergraduate education a clear sequence of course work which will lead to your professional goal (e.g. graduate school, medical school, industry, etc.) The main point is, that if you are thinking about majoring in one of these areas, or you have already decided to, **come into the Department of Chemistry (AC3F01), discuss your goals and get to know our faculty members.**

Best wishes,



L. W. Johnson, Chair

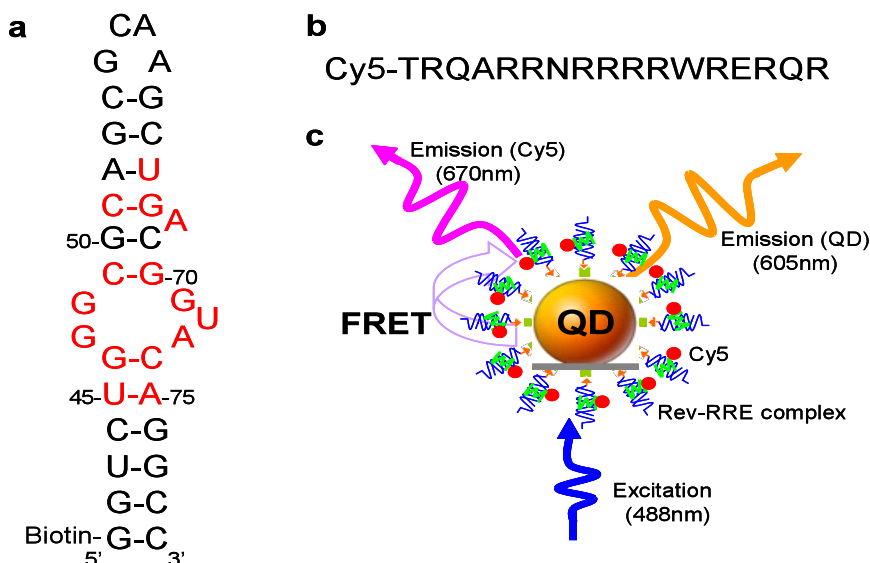


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Graduating from York College

The current requirements are available at the following website:

<http://www.york.cuny.edu/academics/policies/graduation-requirements/>

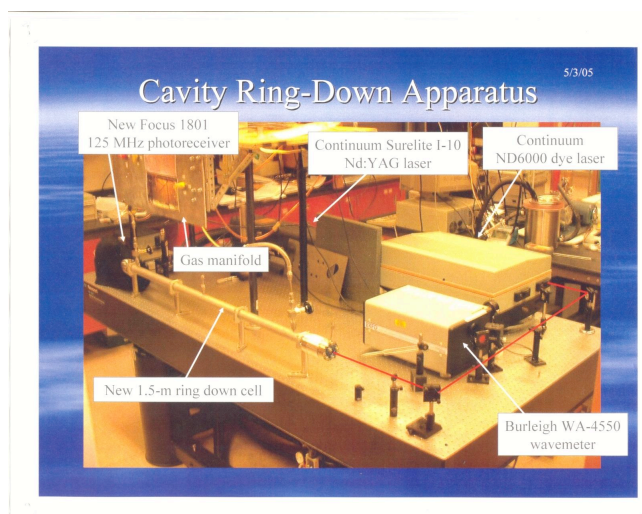
Chemistry degrees offered at York College

1. The chemistry major

The flowchart shows the courses in the chemistry major and the relationships of prerequisites and corequisites. This four-year curriculum shows that it is possible to complete all the general education and the major requirements in four years, and 105 credits. (This plan includes 8 credits to complete the foreign language requirement for general education. If the student passes out of parts of the foreign language requirement, the number of credits required to complete the major may be as little as 97.) For purposes of illustration, particular courses have been chosen for some general education requirements.

The major follows the pattern of chemistry majors everywhere in the United States:

- A year of general chemistry, with laboratory;
- A year of organic chemistry, with laboratory;
- A year of physical chemistry lectures;
- At least a semester laboratory in analytical chemistry;
- A semester of inorganic chemistry lectures;
- Electives, including biochemistry;
- A semester of laboratory in physical and inorganic chemistry.



SPECIAL NOTE:

Beginning Fall 2013, a course number change took place as follows:

Chem 105/L becomes Chem 106/7

Chem 101/L becomes Chem 108/9

Chem 102/L becomes Chem 111/2

YORK COLLEGE
School of Arts & Sciences
B.S. in Chemistry
Possible Four Year Plan (Chem), 2013-2014

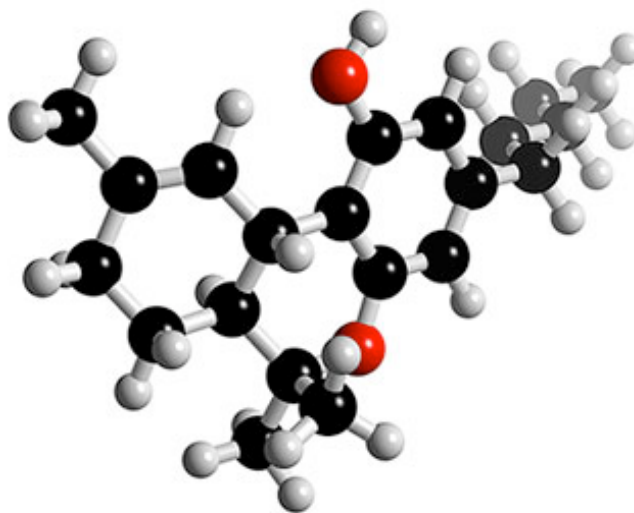
<u>Color Course Key</u> Pathways Major Requirement Minor or Elective

FRESHMAN – FALL	Credits 16	SPRING	Credits 15
Chemistry 108 (also meets Pathways requirements)	3.5	Chemistry 111 (also meets Pathways requirements)	3.5
Chemistry 109 (also meets Pathways requirements)	1.5	Chemistry 112 (also meets Pathways requirements)	1.5
English 125	4	English 126	3
Mathematics 121	4	Mathematics 122	4
Health Education 111	3	World Cultures & Global Issues course	3
SOPHOMORE -- FALL	14	SPRING	16
Chemistry 231	3	Chemistry 233	3
Chemistry 232	2	Chemistry 234	2
Mathematics 221	4	U.S. Diversity in its Experience course	3
Physics 151	5	Physics 152(also meets Pathways requirements)	5
		Creative Expression course	3
JUNIOR - FALL	16	SPRING	13
Chemistry 321	3	Chemistry 322	3
Chemistry 341	3	Chemistry 342	3
Biology 201	4	Biology 202	4
Individual & Society course	3	General Elective	3
General Elective	3		
SENIOR - FALL	15	SPRING	15
Chemistry 310	3	Chemistry 421	3
Chemistry Elective (A)	3	General Elective	3
Foreign Language +	3	Foreign Language +	3
Writing 300	3	General Elective	3
General Elective	3	General Elective	3
		Total	120

The goal of a Four Year Plan is to ensure that students graduate with no more than 120 credits and in four years.

(A) Chemistry Elective Courses

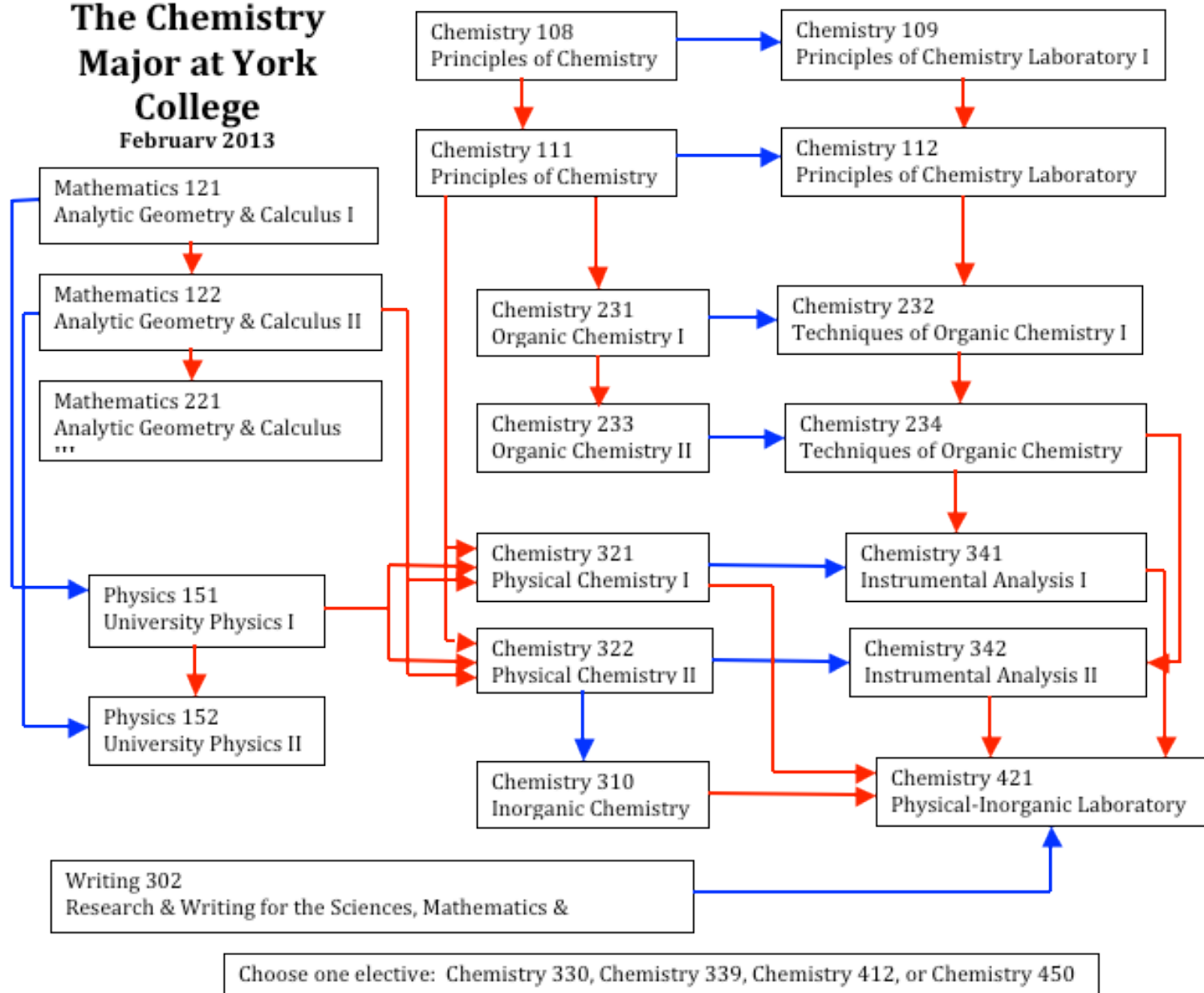
Chemistry 330, 339, 412, or 450



**FOR MORE INFORMATION:
Department of Chemistry, Room 3F01, (718) 262-2650**

The Chemistry Major at York College

February 2013

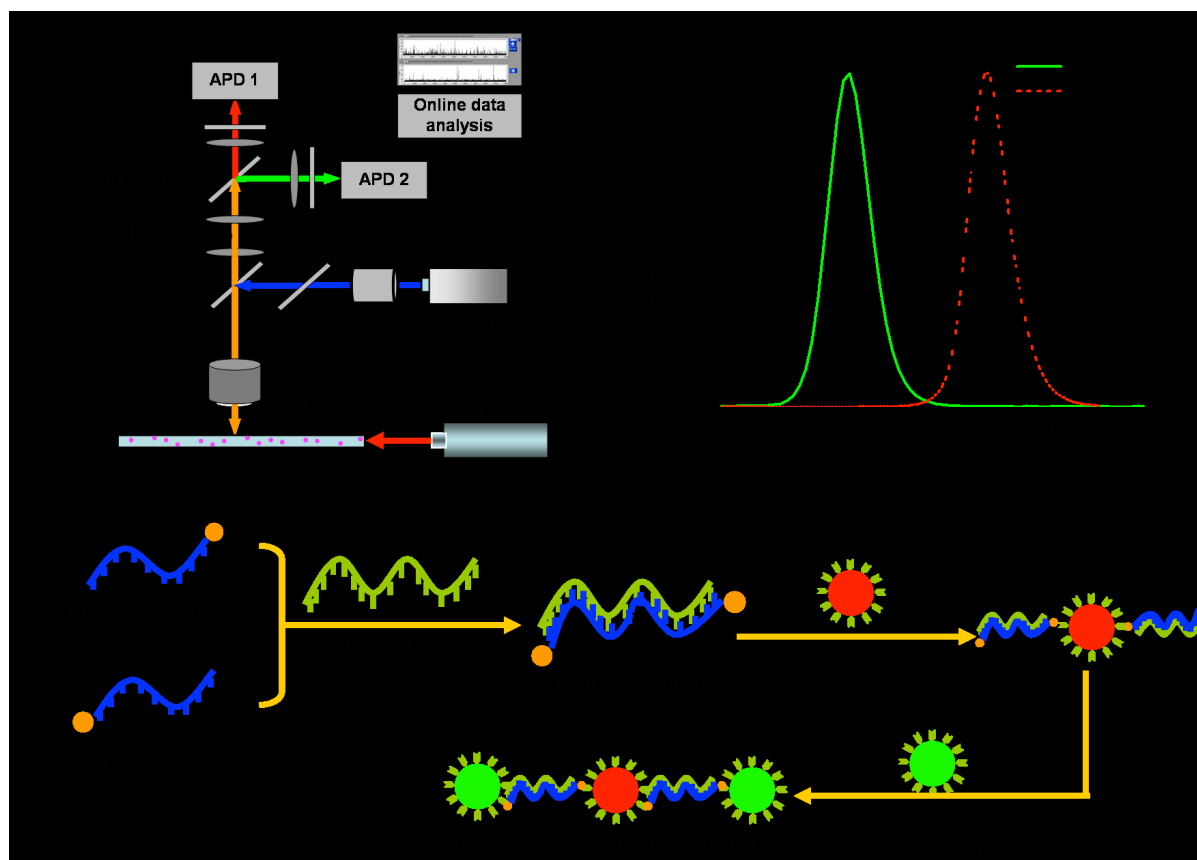


2. The pharmaceutical science major

The Board of Trustees of the City University of New York approved the major in pharmaceutical science on September 22, 2008. No students have yet been accepted into this major. It prepares students for careers in the pharmaceutical and related industries. This program will be the first B.S. in Pharmaceutical Science at CUNY, and one of very few in the tri-state area. The Chemistry Department supervises the major through an appointed Director of Pharmaceutical Science, a member of the department faculty.

A four-year curriculum planner proves that it is possible to complete all the general education and the major requirements in four years, and 105 credits. (This plan includes 8 credits to complete the foreign language requirement for general education.) For purposes of illustration, particular courses have been chosen for some general education requirements.

During the last part of the program, students take pharmaceutical science courses in the Chemistry Department. These courses include research and internship opportunities at institutions like the U.S. Food and Drug Administration at its Northeastern Regional Laboratory on campus.



YORK COLLEGE
School of Arts & Sciences
Pharmaceutical Science

Possible Four Year Plan (PHS), 2013-2014

Color Course Key
Pathways
Major Requirement
Minor or Elective

FRESHMAN – FALL	Credits 16	SPRING	Credits 16
Chemistry 108 (also meets Pathways requirements)	3.5	Chemistry 111 (also meets Pathways requirements)	3.5
Chemistry 109 (also meets Pathways requirements)	1.5	Chemistry 112 (also meets Pathways requirements)	1.5
Mathematics 121	4	Mathematics 122	4
Biology 201	4	Biology 202	4
English 125	3	English 126	3
SOPHOMORE -- FALL	16	SPRING	16
Chemistry 231	3	Chemistry 233	3
Chemistry 232	2	Chemistry 234	2
Physics 151	5	Physics 152 (also meets Pathways requirements)	5
Health Education 111	3	Biology 265	3
World Cultures & Global Issues course	3	U.S. Diversity in its Experience course	3
JUNIOR - FALL	15	SPRING	15
Chemistry 321	3	Chemistry 322	3
Chemistry 341	3	Chemistry 342	3
Chemistry 310	3	Writing 300 level	3
Foreign Language +	3	Foreign Language +	3
Pharmaceutical Science 301	3	Creative Expression course	3
SENIOR - FALL	13	SPRING	13
Pharmaceutical Science 350	3	Pharmaceutical Science 401	3
Pharmaceutical Science 480 or 490	3	Individual & Society course	3
Chemistry 412 or 330	3	General Elective	3
General Elective	4	General Elective	4
		Total	120

The goal of a Four Year Plan is to ensure that students graduate with no more than 120 credits and in four years.

+ Note 1: Menu of General Education Courses from which to Choose.

Behavioral Sciences (One course from the following:)

AAS 101 or 172
Anthropology 101, 103
Economics 101, 103
Political Science 101, 103
Psychology 103
Sociology 101

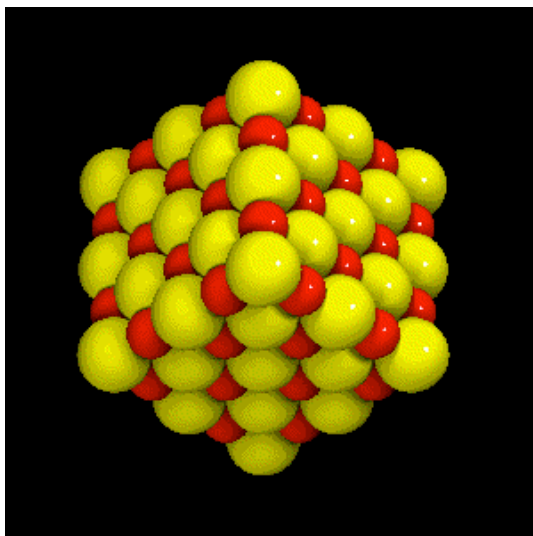
Fine and Performing Arts (One course from the following:)

Fine Arts 104, 150, 152, 155, 264, 381
Music 101, 110, 225, 250, 253
Speech Communication 160
Theater Arts 110, 114, 211, 215, 216, 217, 218, 219

Foreign Language (Placement by Foreign Language Department, Room 3C08)

History and Philosophy (One course from the following:)

History 100, 108, 113, 201, 202, 204, 257, 275, 276
Philosophy 102, 103, 121

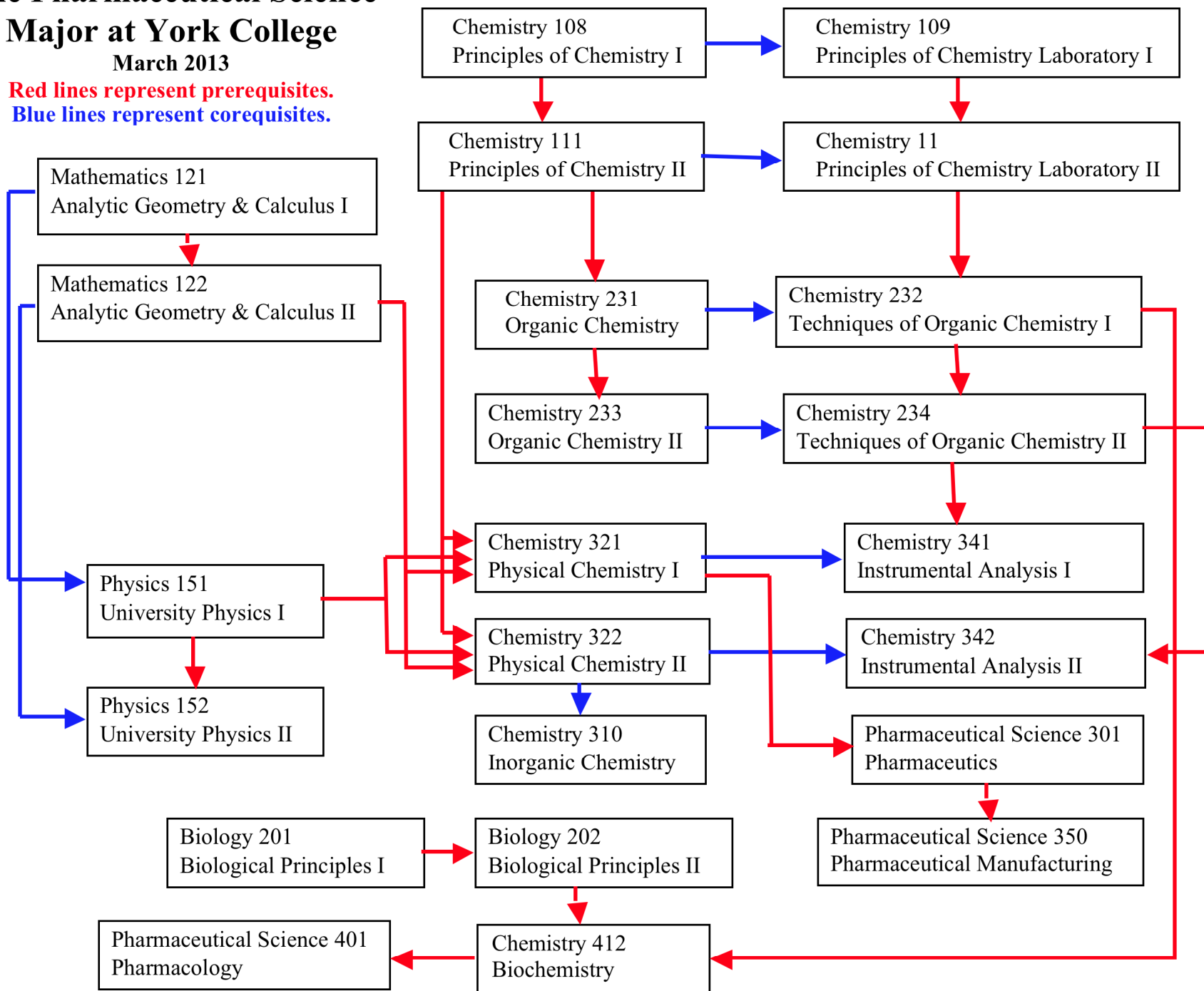


**FOR MORE INFORMATION:
Department of Chemistry, Room 3F01, (718) 262-2650**

The Pharmaceutical Science Major at York College

March 2013

Red lines represent prerequisites.
Blue lines represent corequisites.



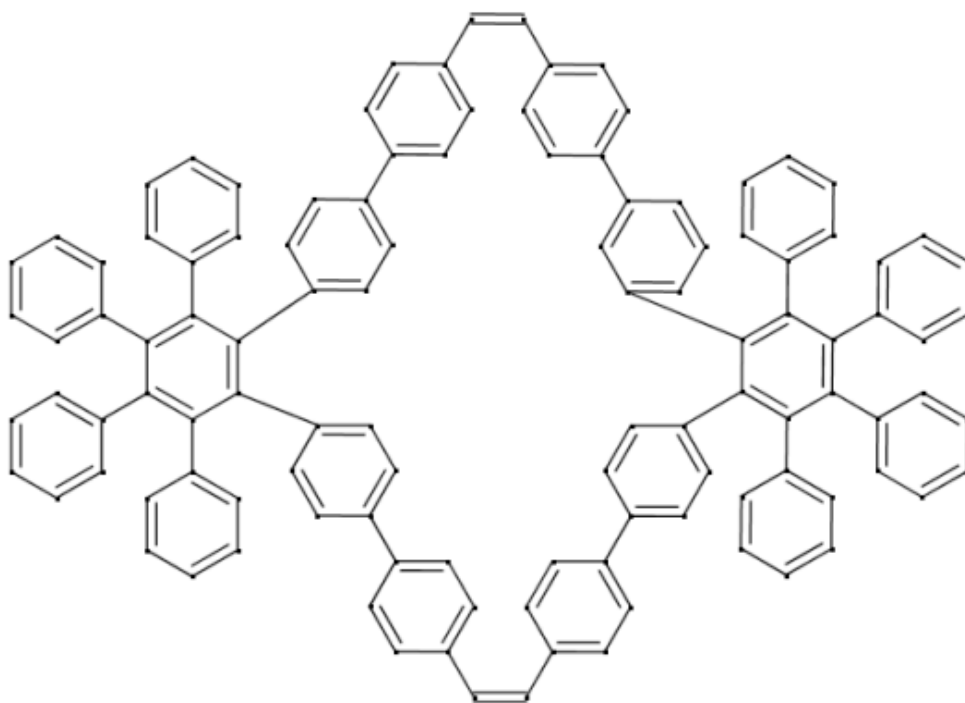
3. The Chemistry Minor

Chemistry is central to the study of many biological and physical systems. Students majoring in biology or physics (as well as pre-medical/pre-dental students) are more competitive if they complete a minor in chemistry. Chemistry 101 and 102, and Physics 151 are prerequisites for the minor program courses. Students interested in this minor will have to take these courses. The physics major requires Mathematics 122; the biology major requires Chemistry 231, 232 and 233. Majors in cell or molecular biology are required to also take Biology 412, which is identical with Chemistry 412. For students in these three cases, the chemistry minor requires only 16, 12 or 15 credits more respectively.

Students may not use Biology 412 or Chemistry 412 to satisfy both the requirement for the biology major and the elective requirement for the chemistry minor.

The minor in chemistry is outlined in the following diagram. In addition to the courses shown there, students also take one elective from the following three-credit courses:

Chemistry 310	Inorganic Chemistry
Chemistry 321	Physical Chemistry I
Chemistry 322	Physical Chemistry II
Chemistry 330	Structure and Mechanism in Biochemistry
Chemistry 341	Instrumental Analysis I
Chemistry 342	Instrumental Analysis II
Chemistry 412	Biochemistry
Chemistry 450	Advanced Topics in Chemistry

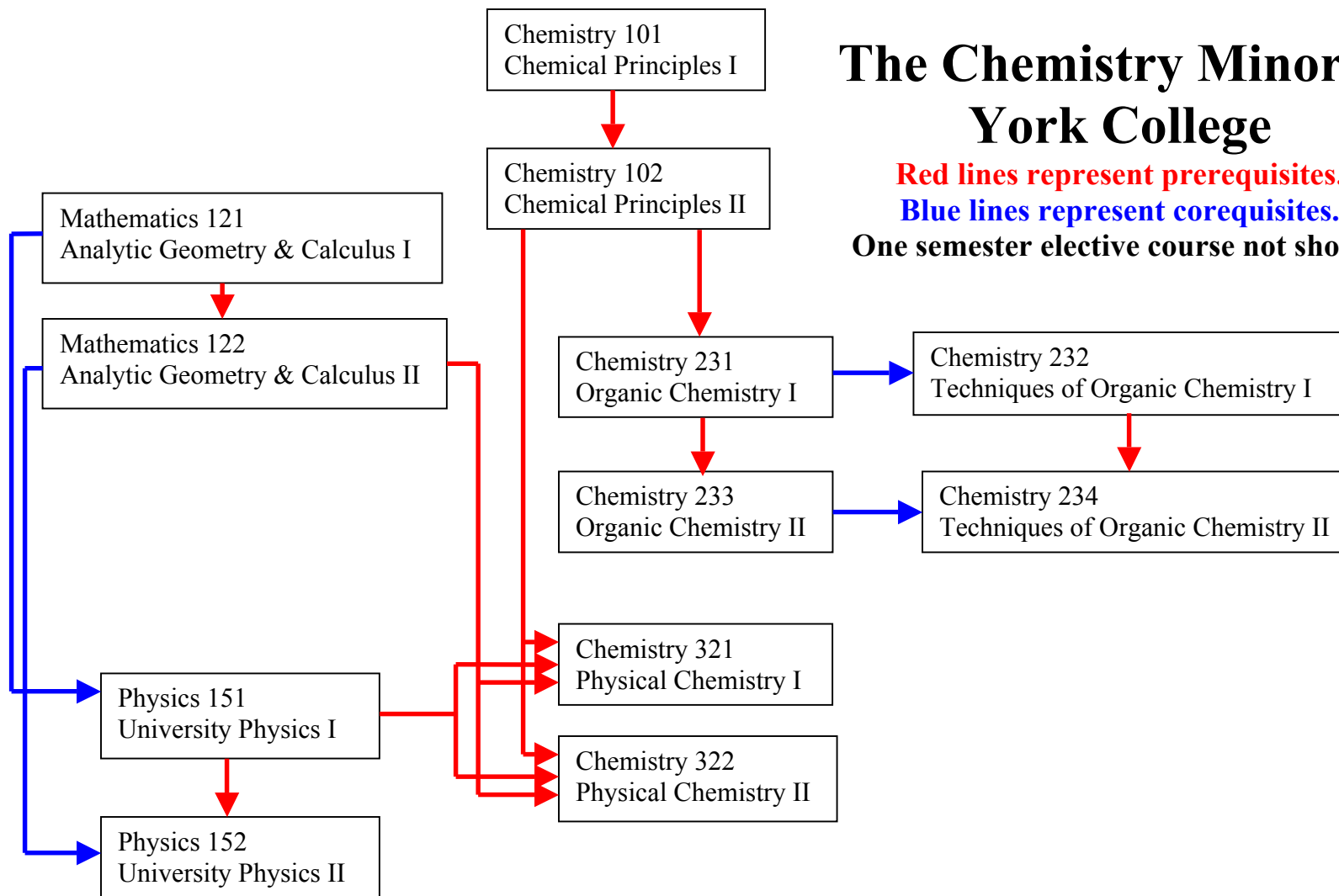


The Chemistry Minor at York College

Red lines represent prerequisites.

Blue lines represent corequisites.

One semester elective course not shown.



SPECIAL NOTE:

Beginning Fall 2013, a course number change took place as follows:

Chem 105/L becomes Chem 106/7

Chem 101/L becomes Chem 108/9

Chem 102/L becomes Chem 111/2

Special programs and/or co-curricular activities (honors societies, internships, clubs, or opportunities for study abroad.)

1. Chemistry Club

For the 2012-2013 academic year, the faculty advisors for chemistry club are:

Dr. Catherine Foster cfoster@york.cuny.edu Phone: 718-262-5314 Office: 3F01
Dr. Yolanda Small ysmall@york.cuny.edu Phone: 718-262-2592 Office: 3F01J

The chemistry club is organized and maintained by chemistry majors and some funds are provided from the department and student activities. Current activities include elections, meetings, tours of the Food and Drug Administration, and tours of National Laboratories in the New York area. Membership is open to all science majors. Past activities include organizing tutoring by upper-class students for general and organic chemistry, meetings to discuss graduate school requirements, and to discuss the structure of employment of chemists. They also sponsor special events, for instance, public talks on air chemistry and geochemistry for Earth Day.

The 2012-2013 ChemClub executive board members are:

Smita Chandan (President), Alisa Raffiudeen (Vice-President)

2. York Honors Program

The Honors Program at York is modeled on the Macaulay Honors College at CUNY. York students with a minimum 3.25 GPA and at least 60 credits yet to complete can apply to the program. They are required to attend a variety of special meetings, take two semesters of an Honors Seminar, take two regular courses as “Honors Supplemental” courses, and write a thesis. Honors students are assigned a faculty mentor, usually the same person supervising their thesis. Although the Honors Program is not limited to chemistry students, we host a disproportional fraction of students in the program. As of spring 2009, six of the 23 Honors students are chemistry majors, more than any other department. Occasionally, students request that we teach regular courses as Honors Supplements.

Coordinator of the 2012-2013 Chemistry department honors program:

Dr. Jong-Il Lee jilee@york.cuny.edu Phone: 718-262-2665

3. Chemistry Graduation Award; departmental honors

Each year the department selects the top-ranking graduating senior for the graduation award. The award consists of a monetary prize, certificate of achievement and recognition at the annual graduating students reception hosted by the department.

Of 2012 chemistry graduates, recognition goes to the following individuals:

Tony Wan – York College Valedictorian
Magid Mohammed – York College Salutatorian
Gerardine Rodriguez – Accepted to St. John’s University Pharmacy Program
Jinette Tolentino - Accepted to Queens College Masters program

4. Louis Stokes Alliance for Minority Participation in Science, Technology, Engineering, and Mathematics (LSAMP)

LSAMP is a CUNY-wide program funded by the National Science Foundation to increase the participation of underrepresented minorities in science. Science majors with a 3.0 GPA and sufficient credits are eligible to receive financial support for a research project carried out with a faculty member. The Chemistry Department has hosted several LSAMP students.

2012-2013 LSAMP Coordinator at York College is:

Mr. Lyndon Haynes – 718-262-2562, Office: AC/2C07

5. Food and Drug Administration (FDA) Scholars & FDA/York Internships

For several years the Chemistry Department has hosted the FDA/York Internship program. This program is a collaboration between York (specifically the Chemistry, Biology, Health, and Earth & Physical Sciences Departments) and the Northeast Regional Laboratory of the FDA. Students receive support to work at the FDA laboratory under the supervision of FDA scientists. They also are assigned to a professor at York to perform academic work related to the work at the FDA. Only upper-class students are eligible for this program. The Chemistry Department typically sends three or four interns to the FDA each semester, out of 10 interns.

2012-2013 FDA Internship Coordinator and Pharmaceutical Sciences Advisor:

Dr. Deb Chakravarti DChakravarti@york.cuny.edu Phone: 718-262-2661 Office: 3F01

6. Student research symposia

Each semester, students working on research in the Chemistry Department present short talks at a departmental symposium. The symposia happen at the end of the semester, and last one or two hours on each of one or two days. Usually, most of the department faculty and most of the department majors attend. Faculty from other science departments also frequently attends. Audiences range up to about 30 people. By providing refreshments, the department encourages a relaxed and friendly atmosphere for the students to practice their skills in communicating their results. These talks satisfy requirements for public presentation of results from independent study and research courses.

2012-2013 Chemistry majors actively engaged in research:

Debra Whorms	Class of 2013	Research advisor: Dr. Ruel Desamero/ Dr. Y. Small
Tekanand Singh	Class of 2013	Research advisor: Dr. Yolanda Small
Mobalaji Giwa	Class of 2013	Research advisor: Dr. Yolanda Small

7. Natural Science Seminar series

Each semester the Department runs a seminar series in conjunction with the biology and earth and physical sciences departments. This usually includes about ten talks, at least half by invited speakers, on current research. Attendance is encouraged in classes, and the audiences range up to about 50 people, including students, staff, and faculty. The current seminar schedule is available on the following website: <http://nsssyork.commons.gc.cuny.edu/>

2012-2013 Seminar Committee includes the following faculty members:

Dr. Emmanuel Chang – Chemistry Dept. (echang@york.cuny.edu, 718-262-3778)
Dr. Yolanda Small – Chemistry Dept. (ysmall@york.cuny.edu, 718-262-2592)

8. Teacher Academy

In 2005, CUNY launched the Teacher Academy. The Teacher Academy is a CUNY-wide program intended to increase the number of mathematics and science teachers in the New York City school system. Students are given full scholarships and other help in getting their teaching certificates. York College joined the Teacher Academy in 2006. The Chemistry Department has actively supported this program from its inception at York. Chemistry majors in the Teacher Academy have special meetings with their faculty mentor at which they discuss both course material and current research topics in chemistry.

9. Study Abroad/ Study Away Opportunities

Many study abroad programs are hosted by local New York Universities. A few programs include:

- a. Science in London and other NYU programs

<http://as.nyu.edu/object/pp.summer.programproposal>
<http://www.nyu.edu/admissions/study-abroad.html>

- b. CCNY Study Abroad

<http://csauth.cuny.cuny.edu/prospective/socialsci/international/studyabroad/index.cfm>



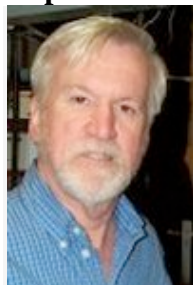
Full Time Faculty

Faculty Research/Teaching Interests and Contact Information

List of current faculty and their research interests can be found at:

<http://www.york.cuny.edu/academics/departments/chemistry/faculty-staff>

Department Chair



Johnson, Lawrence, Professor, Chair, Ph. 718-262-2650, Office: AC/3F01

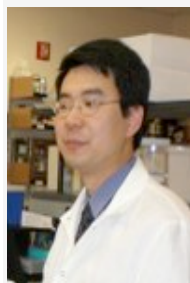
RESEARCH INTERESTS: high resolution electronic spectroscopy of porphyrins, dynamics and thermodynamics associated with the formation of RNA construct-peptide complexes using single molecule detection methods, such as dual color fluorescence correlation spectroscopy (DCFCS) and single pair fluorescence resonance energy transfer (spFRET).

Full-time Faculty



Chakravarti, Deb, Professor, Ph. 718-262-2661, Office: AC-3F01

RESEARCH INTERESTS: vaccines against several infectious diseases, application of genomics and proteomics, characterization of biomarkers and knowledge discovery using bioinformatics and systems biology.



Chang, Emmanuel, Assistant Professor, Ph. 718-262-3778, Office: AC-3F01

RESEARCH INTERESTS: biological applications of mass spectrometry, analysis and methods development for protein phosphorylation and other post-translational modifications

TEACHING INTERESTS: analytical chemistry, biochemistry, writing and data presentation, literature analysis, and innovations in introductory chemistry.



Desamero, Ruel, Associate Professor, Ph. 718-262-2657, Office: AC-3F01

RESEARCH INTERESTS: structural and dynamical aspects of protein-small molecule interactions using techniques such as vibrational spectroscopy and T-jump relaxation.



Fearnley, Stephen Philip, Assistant Professor, Ph. 718-262-2660, AC/3F01D

RESEARCH INTERESTS: development of new methodology for the construction of bioactive natural products: alkaloids, cyclic ether arrays, & C-glycosides.



Foster, Catherine, Doctoral Lecturer, Ph. 718-262-5314, Office: AC-3F01

RESEARCH INTERESTS:
TEACHING INTERESTS:



Lee, Jong-Il, Assistant Professor, Ph. 718-262-2665, Office: AC-3F01G

RESEARCH INTERESTS: development of a new drug delivery system which can target a specific organ, collect useful physiological data and release drugs when a light signal is given.



Profit, Adam, Assistant Professor, Ph. 718-262-2656, Office: AC-3F01

RESEARCH INTERESTS: design, synthesis and evaluation of novel enzyme inhibitors.



Robie, Daniel, Assistant Professor, Ph. 718-262-2669, Office: AC-3F01

RESEARCH INTERESTS: gas phase molecular reaction dynamics, vibrational energy transfer, photodissociation, chemical reactions, and the spectroscopy of gases using cavity ring-down spectroscopy, a laser-based technique.



Small , Yolanda A., Assistant Professor, Ph. 718-262-2592, Office: AC-3F01J

RESEARCH INTERESTS: (1) Quantum Mechanical/Molecular Mechanical (QM/MM) modeling and simulations and (2) electronic structure methods using Gaussian-based Density Functional Theory (DFT).

TEACHING INTERESTS: Inorganic chemistry, Physical Chemistry (Quantum Mechanics), Introductory Chemistry, Computational Methods in Chemistry.

Staff and Technicians

Allen-Michaud, Teresa, CLT

Hassan, Alireja, CLT

Pozo, Isabel, Department Secretary

Young, Lisa, Assistant (FDA)

Research Opportunities for Chemistry and Pharmaceutical Science Majors

Several faculty members at York College host active research groups. The best training that a chemistry major can get is by joining a research lab as early as their sophomore year and no later than their junior year. Speak with any of the full-time faculty members about research projects in their group. Gaining research experience is like having an internship without leaving campus.

Research and Teaching equipment in the Chemistry Department

- A. Spectroscopic Instruments
 - a. 500 MHz NMR spectrometer (Varian)
 - b. Nexus 470 and 670 FTIR (Thermo Nicolet) spectrometers (the Nexus 670 is equipped with the more sensitive liquid nitrogen cooled MCT detector)
 - c. Luminescence LS50B (Perkin Elmer) and Fluorolog (Jobin Yvon Horiba Spex) spectrofluorimeter (Fluorolog has better sensitivity and resolution, and is equipped with a lifetime measurement unit)
 - d. UV/Vis/NIR Lambda 19 and Lambda 25 spectrometer (Perkin Elmer)
 - e. J-810 CD spectropolarimeter (Jasco, Inc.)
 - f. NRS-3100 dispersive confocal micro Raman Spectrometer (Jasco Inc.)
 - g. Rigaku MiniFlex II powder x-ray diffractometer
- B. Separation instruments
 - a. HPLC (Waters)
 - b. GC-MS (Agilent Technologies) are also available for both purification and identification purposes.
- C. Mass Spec
 - a. Thermo LCQ Ion Trap Mass Spectrometers for detailed structural studies
 - b. Waters QTOF Micro for proteins/peptides
 - c. Waters MALDI-MX MALDI-time-of-flight mass spectrometer
- D. Protein Purification Instruments
 - a. Ultra and microcentrifuges (Sorvall)
 - b. Freeze dryer (Labconco)
 - c. Electrophoretic set-ups (BioRad)
- E. Kinetics Instruments
 - a. Stopped-flow mT-jump set-up (US-Biologics)
 - b. Flash photolysis device (Jobin Yvon Horiba)
- F. Computation and visualization
 - a. Computing Room AC-4E11
 - b. 24-node Linux computing cluster
 - c. 46" Monitor and rolling cart
 - d. Software: Gaussian '09, GaussView, Hyperchem, ChemDraw, JMol



Careers in Chemistry and Pharmaceutical Science

A complete list of careers in chemistry is available from the American Chemical Society (ACS):
http://portal.acs.org/portal/acs/corg/content?_nfpb=true&_pageLabel=PP_SUPERARTICLE&node_id=1188&use_sec=false&sec_url_var=region1&_uuid=65821aaf-e827-4d46-88c1-a0394568af2f

1. Sample Industry Careers (Bachelors, Masters, Ph.D.)
 - a. Pfizer chemistry careers: <http://pfizercareers.com/apply>
 - b. Merck Pharmaceutical careers: <http://www.merck.com/careers/>
 - c. ExxonMobile Oil & Gas chemistry careers: <http://exxonmobile.com/careers/>
 - d. L'Oreal Cosmetics chemistry careers:
<http://www.loreal.com/en/ww/html/careers/A-passion-for-the-job/Research-Development/Functions.aspx?&profile=&profileExcl=&>
 - e. Pepsi chemistry careers: <http://careers.pepsico.com/key/pepsi-chemistry-jobs.html>
2. Sample Academic Careers (Masters, Ph.D.)
 - a. Technical chemistry specialists: <http://www.newscientistjobs.com/>
 - b. Post graduate chemistry careers: <http://jobs.phds.org/>
 - c. College and University careers in chemistry: <http://www.higheredjobs.com/>
3. Sample Government Careers (Bachelors, Masters, Ph.D.)
 - a. Food and Drug Administration chemistry careers: www.fda.gov
 - b. Department of Energy National Laboratories chemistry careers:
<http://energy.gov/offices>
 - c. U.S. Department of Agriculture chemistry:
<http://www.ars.usda.gov/Careers/Careers.htm?modecode=19-35-37-00>
 - d. Federal Bureau of Investigations (FBI) chemistry careers:
<http://www.fbi.gov/about-us/lab/chem>

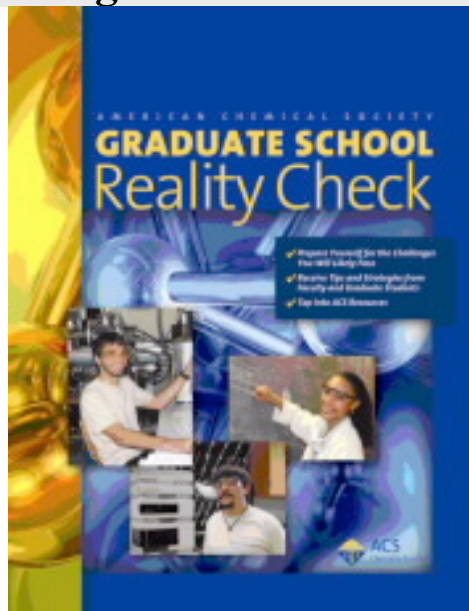


Advanced Degrees in Chemistry (Masters, Doctorate)

A complete guide to pursuing graduate education is available from the American Chemical Society (ACS):

http://portal.acs.org/portal/acs/corg/content?_nfpb=true&_pageLabel=PP_SUPERARTICLE&no_de_id=1122&use_sec=false&sec_url_var=region1&_uuid=0ec872b6-1226-44f2-b1bf-edd8e5060518

Preparing for Graduate School



Searching for graduate schools:

- <http://www.gradschools.com/search-programs/chemistry-disciplines>
- <http://pubs.acs.org/cen/education/8047/8047education2.html>
- ACS Directory for Graduate Research <http://dgr.rints.com/>
- Science Masters Education Clearing House:
<http://sciencemasters.org/descsrch.cfm?iscpst=no>
- Professional Science Masters Programs: <http://www.sciencemasters.com/>

Applying to Graduate Schools

- Prepare Graduate School Application Essays:
<http://rpi.edu/web/writingcenter/gradapp.html>
- Take the entrance exams:
 - General Graduate Record Exam (GRE): <http://www.ets.org/gre>
 - Special Interest - Chemistry GRE:
<http://www.ets.org/gre/subject/about/content/chemistry>
 - Special Interest – Pharmacy College Admission Test (PCAT):
<http://www.aacp.org/>

Chemistry Resources

Library Resources

Scopus <http://www.scopus.com/home.url>

American Chemical Society Journals

<http://pubs.acs.org/action/showPublications?display=journals>

Science Direct <http://www.sciencedirect.com/>

Chemistry Smartphone Apps

ACS Mobile <http://pubs.acs.org/page/tools/acsmobile/index.html>

ChemSpider Mobile <http://cs.m.chemspider.com/>

Mobile App of Periodic Table <http://www.webelements.com/>

Professional Societies

American Chemical Society <http://portal.acs.org/portal/acs/corg/content>

ACS New York Section <http://newyorkacs.org/>

Undergraduate Research Symposium <http://www.newyorkacs.org/meetings/urs/urs.php>

Dr. Yolanda Small – York member of the organizing committee – ysmall@york.cuny.edu

