

## *Department of Chemistry*



## *Undergraduate Handbook*

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## Table of Contents

THE CHAIRMAN'S WELCOME	7
CAREER PATHS IN CHEMISTRY AND MEDICINAL CHEMISTRY	8
CHEMISTRY PROGRAMS AT UB	11
ADMISSION TO THE PROGRAM	14
CHANGING YOUR MAJOR TO CHEMISTRY/ MEDICINAL CHEMISTRY	14
ADVISEMENT	15
UB HUB	15
REPEAT POLICY	15
CONTROLLED ENROLLMENT COURSES (IMPACTED COURSES)	15
PETITIONING PROCEDURE	16
DROP & ADD POLICY	16
AUDITING OF COURSES	17
REGISTRATION IN GRADUATE COURSES	17
RESIGNATION FROM COURSES	18
LEAVE OF ABSENCE	18
INFORMATION FOR TRANSFER STUDENTS	20
TUTORING	22
CHEMISTRY BA PROGRAM	23

CHEMISTRY BS PROGRAM	24
MEDICINAL CHEMISTRY BS PROGRAM	25
FIVE YEAR BS/MS PROGRAM IN MEDICINAL CHEMISTRY	26
IMPORTANT INFORMATION ABOUT THE COMBINED BS/MS IN MEDICINAL CHEMISTRY:	28
LIST OF TECHNICAL ELECTIVES	29
SAMPLE COURSE SELECTION FOR BA DEGREE IN CHEMISTRY	33
SAMPLE COURSE SELECTION FOR BS DEGREE IN CHEMISTRY	34
SAMPLE COURSE SELECTION FOR BS DEGREE IN MEDICINAL CHEMISTRY	35
SAMPLE COURSE SELECTION FOR THE COMBINED BS/MS DEGREE IN MEDICINAL CHEMISTRY	36
CHEMISTRY & MEDICINAL CHEMISTRY COURSE LISTINGS AND SYLLABI	37
GENERAL EDUCATION REQUIREMENTS	38
WRITING SKILLS	38
WORLD CIVILIZATION	38
LIBRARY SKILLS	38
MATHEMATICAL SCIENCES	38
NATURAL SCIENCES	38
LANGUAGE REQUIREMENT	39
AMERICAN PLURALISM OR COGNATE (APPROVED EQUIVALENT COURSE)	39

	5
LITERATURE AND THE ARTS	39
SOCIAL AND BEHAVIORAL SCIENCES	39
JUNIOR/SENIOR SCIENCE OR COGNATE (AN APPROVED EQUIVALENT COURSE)	40
WRITING SKILLS	41
LIBRARY SKILLS	41
MATHEMATICS SKILLS	41
KNOWLEDGE AREAS AND COURSES	42
GRADUATION	43
AMERICAN CHEMICAL SOCIETY CERTIFICATION OF CHEMISTRY MAJORS	45
UNDERGRADUATE RESEARCH OPPORTUNITIES	46
INTERDISCIPLINARY RESEARCH ACTIVITIES	47
LIBRARY	48
COMPUTER RESOURCES	48
INSTRUMENT CENTER	49
FELLOWSHIP OPPORTUNITIES	50
AWARDS & HONORS	51
BULLETIN BOARD FOR UNDERGRADUATES	57
CHEMISTRY DEPARTMENT E-MAIL LIST	57
LABORATORY SAFETY RULES AND REGULATIONS	58

STUDENT AFFILIATES OF THE AMERICAN CHEMICAL SOCIETY (SAACS)	61
ALPHA CHI SIGMA (ΑΧΣ)	62
UNDERGRADUATE STUDENT ASSISTANTSHIPS	63
CAREER SERVICES	64
INTERNET RESOURCES	66

## *The Chairman's Welcome*

This Undergraduate Handbook provides information to undergraduate students entering the Department of Chemistry as well as others who seek information about our department. The department consists of faculty, staff and students working together toward education in the chemical sciences and creating new knowledge through research. In this Handbook you will find information related to course descriptions, requirements for the Chemistry BA and BS degrees and Medicinal Chemistry BS degree, and a discussion of undergraduate research opportunities. I strongly encourage you to contact the Undergraduate Office (363 Natural Sciences Complex) or Professor Jerry Keister, Director of Undergraduate Studies, for elaboration or answers to questions not answered herein.

We call your attention to an active colloquium series in the Department and a University-organized annual Open House designed to introduce potential newcomers to the University at Buffalo. The honors and awards conferred by the Department are also noted, as are the career opportunities available to our graduates.

I hope you find the Handbook both useful and informative. Even more importantly, I hope you will take any opportunity to get to know our faculty better during your stay at UB. The Department of Chemistry assigns a faculty "mentor" to every major. The mentor can be a valuable source of information to the student, and therefore I encourage you to make an effort to interact with your mentor during your undergraduate studies. The Student Affiliates of the American Chemical Society also provide an opportunity to meet faculty and other undergraduate Chemistry majors. This active and dedicated group of undergraduate students sponsors a number of departmental activities throughout the academic year.

I certainly hope that you have a productive and gratifying undergraduate experience at UB. During your time in the Department of Chemistry, if you have problems or require further information, please do not hesitate to contact me.



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## *Career Paths in Chemistry and Medicinal Chemistry*

After receiving the bachelor's degree, most chemistry majors either begin graduate study or immediately seek employment as chemists or medicinal chemists. At this university, about an equal number of chemistry graduates follow each of these career paths. Approximately half of the students going on to graduate school pursue medicine, law, education or management.

Many of our majors go on to graduate school in chemistry in order to pursue the doctoral degree.

According to a recent U.S. Labor Department Bureau of Labor Statistics Study (<http://www.bls.gov/oco/ocos049.htm>), "Occupational Outlook Handbook 2010-11 Edition," 84,300 chemists were employed in 2008. This is projected to grow to 86,400 by 2018. Starting salaries for bachelor degree chemists averaged \$39,897 in 2009. The median salary for chemists in 2009 was \$66,230.

The chemistry careers we often think of first are teaching in high schools, colleges and universities and conducting laboratory research in industry, government, and other research institutions. Doing research is often an important part of chemistry faculty positions in colleges and universities. Industries employing large numbers of chemists include chemical manufacturing, pharmaceuticals, construction materials, fertilizer, food, metallurgical materials, oil and paper. Significant numbers of chemists also work in industries that make consumer and industrial products. These include the automotive industry, companies manufacturing plastics, polymers and resins used in making paints and polishes and binders used in many products such as paper towels or diapers. Substantial numbers of chemists work in local, state and federal government research in forensics laboratories and agencies such as the Environmental Protection Agency, the National Aeronautics and Space Administration, the National Science Foundation, the Armed Forces and the State Department<sup>1</sup>.

The difficult economic situation in recent years has affected chemical employment, as with all other sectors. According to Chemical & Engineering News' latest employment outlook: *The slowly recovering U.S. economy is awakening demand for the products and services of U.S. businesses that employ chemists. After years of slashing chemistry-related positions to cut costs, [employers appear ready to hire again](#), according to a survey of recruiters, university placement officers, and companies by Senior Editor [Susan Ainsworth](#). Ainsworth's reporting on the demand for chemists in 2011 seems to hint that the*

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<sup>1</sup> See "What Chemists Do", American Chemical Society:  
<http://portal.acs.org/portal/PublicWebSite/careers/whatchemistsdo/careers/index>.

*heartbreaking loss of jobs for chemists must have finally reached rock bottom and that chemists can now begin to hope for a turnaround in their employment prospects. "I do think the employment situation for chemists in 2011 will be the same or slightly better than it was in 2010," Kevin Swift tells Ainsworth. Swift is chief economist and managing director of the [American Chemistry Council](#), an industry trade group.*

*Others who talked with Ainsworth echo Swift's demand forecast, which comes, appropriately, with caveats. Hiring is going to be slow and more strategic than ever before; chemists will not see dramatic spikes in permanent positions available. It is unlikely that everyone who lost a job will get one back. Not surprisingly, prospects for jobs in big pharma are slim. Instead, the bright spots for employment are small companies doing contract research and businesses based on green chemistry<sup>2</sup>.*

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<sup>2</sup> "Hint of Hope" Chemical & Engineering News, November 2010 V88 N44, P37.

**Some Industries that Have Grown Rapidly to Become Major Employers of Chemists:**

Chemical Synthesis: the efficient conversion of raw materials (such as minerals, petroleum, natural gases, coal and biomass) into more useful molecules and products.

Chemical Catalysis: processes by which a relatively small amount of foreign material augments the rate of a chemical reaction without being consumed in the reaction.

Bioprocesses, Biotechnology and Biocatalysis: processes using biological organisms in the development of useful products, including chemical products. Bioprocesses have been used since humans first made cheese, leavened bread, fermented wine, and brewed spirits. Biotechnology is being used to make pest-resistant plants and pharmaceuticals. Biocatalysis has been important since we first used enzymes.

Materials Technology: development of new synthetic materials and replacement of traditional materials such as metals, wood, glass and natural fibers with synthetic polymers and composite materials.

Computational Technologies: a broad range of applications from molecular modeling to process simulation and control.

“Green Chemistry”: a new approach to pollution prevention through the environmentally conscious design of chemical products and processes. By reducing or eliminating the use or generation of toxic substances associated with a particular synthesis or process, chemists can greatly reduce the risks to human health and the environment. <sup>3</sup>

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<sup>3</sup> See “What Chemists Do”, American Chemical Society:  
<http://portal.acs.org/portal/PublicWebSite/careers/whatchemistsdo/careers/index>

## *Chemistry Programs at UB*

Nearly all chemistry majors graduating in recent years from this university with an average of B or better, who elected graduate study, were accepted at one or more first-rate graduate schools in the United States.

BS in  
Chemistry

Our department offers four degree programs, two in Chemistry and two in Medicinal Chemistry. The B.S. in Chemistry is primarily oriented toward students who choose Chemistry as a professional goal. This program meets the criteria for a degree suggested by the American Chemical Society, and students completing the B.S. can obtain ACS certification. Chemists are commonly categorized by their specific areas of interest.

BA in  
Chemistry

The B.A. in Chemistry program is a flexible course of study appropriate for students who desire a wider choice of options to meet their educational goals. For example, by selective substitutions in the basic program, students may broaden their background to prepare for work or further study in such fields as medicine, the biochemical and biophysical sciences, geochemistry, physics or computer science. The B.A. program also provides sufficient free electives so that students may select numerous courses from among the arts and social sciences. By taking elective courses in history, economics, English and political science, B.A. chemistry students can also prepare themselves for law or business school.

BA in  
Chemistry  
& Minor in  
Education

Also, an increasingly attractive option for many students is a B.A. in chemistry with a minor in teacher education. This four-year program can lead to New York State Teaching Certificates in general science, chemistry and also physics, biology and/or mathematics.

BS in  
Medicinal  
Chemistry

The B.S. in Medicinal Chemistry is designed to provide the student with a basic chemical understanding of life processes and biological control and the laboratory skills necessary for research in medicinal chemistry. Depending on the choice of electives, the B.S. in Medicinal Chemistry can provide an optimum background for employment as a B.S. level medicinal chemist in research institutes, industry and government; for entrance to graduate school in this or related areas; or for entrance to medical school. Another option for

**BS/MS in  
Medicinal  
Chemistry**

students is the five year combined B.S./M.S. program in Medicinal Chemistry. It is designed to produce graduates who are very well qualified as laboratory scientists for the pharmaceutical industry. Demand for lab technicians with strong experimental skills is high and this program is designed to meet this demand. This program makes it possible to obtain an M.S. degree in Medicinal Chemistry in only five years. Students who are interested in this program should have done particularly well in chemistry, have an interest in synthetic organic chemistry and be able to work full time in the lab on their Master's Thesis project during the summer following the fourth year of study. This program is intensive and designed for above average students who have a clear idea of their career goals. The advantages of completing this program of study are that it offers a more intensive laboratory program and a greater likelihood of finding a laboratory position upon graduation. It also gives the student an edge in applying for lab openings and being able to choose among potential employers and work sites.

Sample programs of study for each of the above are found in the pages of this handbook.

***Double Majors***

An attractive possibility for some students is a double major. A common choice for chemistry majors is to use biochemistry, biology, mathematics, geology, physics or computer science as a second major. With a judicious choice of electives, it is possible to complete requirements for both majors in four years. Students contemplating a double major should be aware that both degrees must be the same (for example BA/BA or BS/BS).

***Double Degrees***

Another possible degree option is the double degree. The double degree program enables students to earn two different degrees from among the B.A., B.F.A., B.P.S. and B.S. programs. Thirty hours, in addition to the baccalaureate requirement of 120 hours, must be spent earning the second degree, and requirements for each degree must be satisfied. Students should consult with the Director of Undergraduate Studies to plan their course of study.

### ***Minor in Chemistry***

Any student interested in obtaining a minor in Chemistry should apply directly through the Chemistry Department Undergraduate Office (NSC 363). For admission criteria, a student should have already completed CHE101 or CHE105 or CHE107 and MTH141 with a 2.0 average in these courses with at least a 2.0 overall average. The requirements for a minor degree are:

- CHE101-102 or CHE105-106 or CHE107-108
- CHE201-202 or CHE251-252
- MTH141-142 or MTH121-122
- 10 additional credits of Chemistry Department course at or above the 300 level. Students may use CHE214-215 as one of the required 300 level courses.

### ***Minor in Teacher Education***

An increasingly popular career choice for chemistry majors is teaching in secondary schools. Additional certificates in other subjects (such as Physics, Biology or Mathematics) can also be obtained during the usual four year undergraduate period. An Undergraduate Minor in Teacher Education is available to UB students in their senior year and is a two semester program of at least 27 credit hours. At the completion of the program a student is eligible to apply for teacher certification in grades 7-12.

The Minor in Teacher Education is administered through the “Teacher Education Institute” at UB and students interested in this program must apply directly through the TEI office located at 381 Baldy Hall, North Campus (645-2461) by February 1<sup>st</sup> of the junior year. Information about TEI can also be found on the web at <http://www.gse.buffalo.edu/>.

### ***Minor in Medicinal Chemistry***

Medicinal Chemistry could represent an exciting and relevant addition to your current major at UB. It would be particularly appropriate for those majoring in Chemistry, Biochemistry, Biology and for those students who are in the pre-med or pre-dental programs. For admission criteria, a student should

have already completed CHE101 or CHE105 or CHE107. The requirements for a minor in Medicinal Chemistry are:

- CHE101-102 or CHE105-106 or CHE107-108
- CHE201-202 or CHE251-252
- CHE301 Intermediate Organic Chemistry
- CHE 349 Physical Chemistry for the Life Sciences or CHE 319 Physical Chemistry I
- CH403 Principles of Biochemistry or CHE312 Chemistry of Biological Systems
- MCH401 Principles of Medicinal Chemistry I
- MCH402 Principles of Medicinal Chemistry II

### ***Admission to the Program***

During the second term of the freshman year, the prospective majors should apply for admission to our programs directly through the Department of Chemistry Undergraduate Office located at 363 Natural Science and Math Complex. No student is accepted whose overall academic average is less than 2.0.

Since many advanced courses have prerequisites and are offered only once a year, it is important to plan the full schedule as early in the program as possible. Sequentially required courses should be taken prior to beginning the senior year. Students are urged to consult with the Department advisor about course selection prior to each registration period.

### ***Changing Your Major to Chemistry or Medicinal Chemistry***

If you wish to change your major and join our program you should:

- Fill out the Departmental Application available in the Undergraduate Office located in room 363 Natural Science Complex.
- See the Chemistry Department Director of Undergraduate Studies to evaluate your existing course record to see what substitutions can be used and plan your future course of study.
- Inform your previous major(s).

## *Advisement*

At least once each semester, before registering for the following semester, majors should make an appointment to see the Director of Undergraduate Studies to plan their program of study or check that their progress is satisfactory. Students are encouraged to see the Undergraduate Director with their concerns, especially if they feel they may be facing academic difficulties.

## *UB HUB*

The HUB on-line system provides records, registration, and financial information and services. These are available by accessing the HUB Student Center by clicking in the HUB Student Center tab from MyUB ([www.myub.buffalo.edu](http://www.myub.buffalo.edu)). In the Student center you can manage academics, finances, and personal information, Aids to using HUB can be found at <http://hubtraining.buffalo.edu/training/index.php>.

## *Repeat Policy*

According to University at Buffalo Regulations, a student can repeat a given course **only once for grade replacement purposes**. When a course is repeated the credits earned count only once for purposes of satisfying degree requirements and for purposes of calculating the student's GPA. When a course is repeated, the grade that is counted in calculating the GPA is the grade earned the second time, **EVEN IF THAT GRADE IS LOWER** than the grade earned the first time. All courses taken and all grades earned will appear on the student's transcript.<sup>4</sup> The complete repeat policy may be viewed online: <http://undergrad-catalog.buffalo.edu/policies/grading/repeat.shtml>.

## *Controlled Enrollment Courses (Impacted Courses)*

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<sup>4</sup> Source: University at Buffalo 2011-2012 Undergraduate Catalog

The intention of the Course Enrollment Control Policy is to allow students who are registering for an impacted course for the first time to have privileged access to that course. 'Impacted courses' are those which have limited seating due to student demand; they are identified as such in the UB Undergraduate Catalog and on the syllabus of the course. Because access to these courses will be preferentially given to students taking the course for the first time, there will be little access to these courses in the Fall and Spring semesters for students who wish to repeat the course; thus students who plan to re-enroll in a Controlled Enrollment course will be expected to repeat the course during the Summer Sessions. Chemistry courses currently listed as controlled enrollment courses include CHE101, CHE102, CHE201 and CHE202.

For a few students, this policy requiring students to re-take courses in the summer may pose a significant financial or personal hardship, in which case the student may petition for a seat in the course during the Fall or Spring semester of the year following the one in which the course was originally taken. Additional information and the petition form can be found here: <http://www.cas.buffalo.edu/students/content/undergraduate/controlledEnrollmentCourse.pdf>

### *Petitioning Procedure*

If a student is having difficulty meeting a particular requirement, the Undergraduate Affairs Committee may be petitioned to waive or replace a requirement with another course of work experience. Students must submit a written petition to the Undergraduate Office (NSC363) stating why they feel that the requirement should be waived, together with any supporting documents. A response usually takes 2-3 weeks. Statistically, about half of the petitions are approved.

### *Drop & Add*

New courses may be added by registered students during the add period which lasts approximately two weeks in the fall and spring semesters by using the HUB Student Center.

The last period to drop courses without **financial** liability is the first week of class. Students may drop courses without **academic** penalty until the end of the eleventh week of classes, however financial penalties may be

incurred. For further details and deadline dates visit [registrar.buffalo.edu/registration/howtoregister/resigncourse.php](http://registrar.buffalo.edu/registration/howtoregister/resigncourse.php)

Students wanting to withdraw from the university after the resignation period must consult with their academic advisors for appropriate procedures, justification and documentation to request an academic withdrawal (grade of “W”) Academic withdrawals are approved only in circumstances where impact to academic performance due to a personal or immediate-family medical event, disability, death or active military service is documented sufficiently. Further information can be found online here: <http://undergrad-catalog.buffalo.edu/policies/registration/withdrawal.shtml>

### *Auditing of Courses*

Students may audit a class only with permission of the instructor by submitting the Audit Form to the Office of the Registrar by the end of the 7<sup>th</sup> day of classes. All students will be charged for audited courses. Further information and the form may be found online at <http://undergrad-catalog.buffalo.edu/policies/grading/explanation/shtml> Scroll down to the section “N” Audit.

### *Registration in Graduate Courses*

All undergraduate students who wish to take a graduate course for **undergraduate credit** must submit the form found online here: [registrar.buffalo.edu/pdfs/ugRegistrationGRCourse.pdf](http://registrar.buffalo.edu/pdfs/ugRegistrationGRCourse.pdf) Additional details can be found on the form. Submission deadline is the end of the drop/add period for the respective semester or summer session.

Prerequisites are:

Junior or senior standing and acceptance into an academic major or an approved special major with an overall minimum GPA of 3.0, including transfer credit and completion of prerequisites required for the graduate course;

Written recommendation from course instructor to clearly show the academic necessity and rationale for taking the course, and the endorsement of the department chair.

## *Resignation from Courses*

Students who choose to withdraw from one or more courses without financial penalty must do so before the end of the first week of classes each fall or spring semester by dropping the courses via HUB. Students may resign from courses until the end of the eleventh weeks of classes. Students who resign a course after the “drop/add” date will have an “R” grade on their transcript. Any student who is registered in a course after the end of the eleventh week may not officially resign. Courses dropped between the 7<sup>th</sup> day of classes and the eleventh week may incur financial penalties. For further details and deadline dates visit [registrar.buffalo.edu/regISTRATION/howtoregister/resigncourse.php](http://registrar.buffalo.edu/regISTRATION/howtoregister/resigncourse.php)

Certain Athletic classes that begin in the middle of the semester can be resigned via HUB.

All students have until the eleventh week of classes to resign from classes. See your advisor for details.

At the end of the Spring 1997 semester, the Faculty Senate and President Greiner approved a policy concerning retroactive, administrative resignations from undergraduate courses. Students who are seeking administrative resignations after the usual “drop” period must now withdraw from all courses for a semester based on extraordinary circumstances. If approved, a student will receive a “W” grade for the courses and this grade will not count as having been attempted for purposes of establishing academic good standing. The deadline for submission of these petitions is the end of the subsequent semester.

Students who must withdraw after the last date to resign without academic penalty should consult with their academic advisors for the appropriate procedures.

NOTE: Non-attendance of a course or courses does not free a student from academic or financial penalty.

## *Leave of Absence*

Students who are in good academic standing may take a leave of absence from the University. Leaves are granted for a maximum of two semesters, but may be extended. No more than four semesters of leave of absence are allowed during an undergraduate career. Students requesting a leave are instructed to

seek advisement prior to the leave period for information on further action needed in regards to financial aid, scholarships and re-entry to UB.

The leave of absence form is online here:  
[registrar.buffalo.edu/pdfs/leaveofAbsence.pdf](http://registrar.buffalo.edu/pdfs/leaveofAbsence.pdf)

## ***Transfer Students—Introduction***

Transfer students are particularly welcome in the Department of Chemistry. Due to the diverse backgrounds of these students, special individualized advisement by the Chemistry faculty helps ensure an efficient course of study leading to a baccalaureate degree. *Students should contact the undergraduate office by calling 645-6626 to schedule a meeting with the director for initial advisement.*

## ***Information for Transfer Students***

All of our degree programs in the Department of Chemistry expose the student to a selection of courses which prepare for entrance into graduate level programs or employment in the chemical industry. None of the degree programs are specifically recommended by the department since the educational objectives of students are so often different. For example, some students choose the flexible BA in Chemistry degree with a minor in teacher education. Other students who expect to continue their education in a field such as medicine or dentistry often follow the B.A. program with a double major in another area, for example Biology, and those who expect to continue with chemistry as a major component of their career usually elect the B.S. program. The B.A. program is often recommended to transfer students because of the flexibility it offers in meshing courses taken at two different institutions.

Transfer students from accredited institutions generally have little difficulty in making the transition to SUNY at Buffalo even though their freshman and sophomore degree requirements may not have been completed. It is recommended that applicants complete General Chemistry and College Calculus I and II in the freshman year. Organic Chemistry, Analytical Chemistry, Calculus III and the calculus-based Physics sequence should be completed by the sophomore year. If there is any doubt about the courses needed to meet our departmental requirements, courses which are specifically designated as being for science or engineering majors are the natural choice. Chemistry, Physics and Calculus courses which are designed to satisfy the needs of Social Science or Pre-med Majors should be avoided. Advanced Placement credit in Chemistry will transfer only as elective credit. Advanced Placement credit in Calculus will transfer.

The Department of Chemistry does not evaluate credit hours from the transfer institution—this is the responsibility of the Office of Admissions. However, the Director of Undergraduate Studies is able to make value judgments concerning whether or not a departmental degree requirement has been completed. The judgment is made primarily on the basis of exposure to

the subject matter and not merely on the basis of the number of credit hours earned or the title of the course. Rather, prerequisites and the number of lectures and laboratory sessions per week are used as a general guide. In almost every case the Director finds that the students have correctly evaluated the course in question. If there is a disagreement, a petitioning procedure is available to the student. Difficulties are very seldom serious enough to delay graduation beyond the fourth year of academic study. Since some of the junior and senior level chemistry courses are restricted to Chemistry majors it is important that transfer students make it known on their application that a major in Chemistry is their educational objective. This will be helpful in avoiding a forced registration procedure in these particular courses.



# Help

## *Tutoring*

Tutoring is available for undergraduates. The Student Affiliates of the American Chemical Society provide free, drop-in tutoring for students in their office located at 446 Natural Sciences Complex. The schedule for this tutoring is posted in various areas of Natural Sciences, and can also be obtained by emailing the Undergraduate Office at [chemug@buffalo.edu](mailto:chemug@buffalo.edu). The members of the Student Affiliates tutor General Chemistry, Organic Chemistry as well as Physics and Calculus.

Graduate student tutors set their own fees and times for tutoring and are not certified or approved by the Department of Chemistry. The Department does not currently keep a list of graduate students interested in tutoring. Graduate students who are Teaching Assistants cannot tutor a course in which they are teaching.

Also available in the Department of Chemistry Office, 359 Natural Sciences Complex, is a list of available office hours for Faculty and Teaching Assistants and where their offices are located.

The Learning Center and The Math Place also provide help by appointment for students that need tutoring. Call 645-2394 for an appointment. They are both located on the second floor of Baldy Hall.

Lost and Found Personal articles are frequently found by the cleaning staff in the building. These items are generally taken to the Department of Chemistry Office 359 Natural Sciences Complex, and may be claimed there.

# For Undergraduates

## *Chemistry BA Program*

### Required Chemistry Courses: (39-50 cr)

1. One general chemistry sequence chosen from the following:
 

General Chemistry	(CHE101-102)
Chemistry: Principles and Applications	(CHE105-106)
General Chemistry for Engineers	(CHE107-108)
  
2. One Organic chemistry sequence chosen from the following:
 

Organic Chemistry	(CHE201-202)
Contemporary Organic Chemistry	(CHE251-252)
  
3. The following chemistry courses:
 

Introduction to Analytical Chemistry	(CHE214-215)
Inorganic Chemistry	(CHE321)
Physical Chemistry Lecture	(CHE349) or (CHE319-320)
  
4. One intermediate laboratory course chosen from the following:
 

CHE350 or CHE301 or CHE322 or CHE 329 or CHE 330.
  
5. Three (3) technical electives (chemistry and non-chemistry) chosen from a list provided by the department.

### Required Courses Outside of Chemistry (16-18)\*

6. General Physics (PHY107-108-158) or (PHY101-102-151-152)
7. Calculus (MTH141-142) or (MTH121-122)

### General Education Requirements

See the "University at Buffalo Undergraduate Catalog" for remaining university requirements.

**\*Students who wish to switch from the B.A. program to the B.S. program MUST complete MTH141-142-241 and PHY107-108-158**

Total Required Hours in Chemistry:	39-50
Total Required Hours Outside Chemistry	16-18

*Course requirements may change. See your advisor for the most up-to-date information on your course of study.*

## *Chemistry BS Program*

### Required Chemistry Courses (52-54 cr)

1. One General Chemistry sequence chosen from the following:

General Chemistry	(CHE101-102)
Chemistry: Principles and Applications	(CHE105-106)
General Chemistry for Engineers	(CHE107-108)

2. One Organic sequence chosen from the following:

Organic Chemistry	(CHE201-202)
Contemporary Organic Chemistry	(CHE251-252)

3. The following Chemistry courses:

Introduction to Analytical Chemistry	(CHE214-215)
Inorganic Chemistry I and II	(CHE321-322)
Physical Chemistry Lecture I and II	(CHE319-320)
Physical Chemistry Laboratory	(CHE329)
Introduction to Chemical Literature	(CHE376)
Chemistry of Biological Systems	(CHE312)
One laboratory course chosen from Organic Chemistry Lab-Intermediate or Physical Chemistry Laboratory II	(CHE301 or 330)
Instrumental Analysis	(CHE413-414)

4. One additional 400 level, 3 credit hour lecture Chemistry course.

### Required Courses Outside Chemistry (27-28 cr)

- |   |                  |
|---|------------------|
| 5. General Physics  | (PHY107-108-158) |
| 6. Calculus   | (MTH141-142-241) |
| 7. One approved 200 level or higher lecture course in science or mathematics (including Chemistry). |                  |
| 8. One advanced Math course (i.e. MTH306 or MTH309).  |                  |

### General Education Requirements

See the "University at Buffalo Undergraduate Catalog" for remaining university requirements.

Total Required Hours in Chemistry	52-54
Total Required Hours Outside Chemistry	27-28

**Course requirements may change. See your advisor for the most up-to-date information on your program of study.**

**Bachelor of Science (B.S.) in Chemistry**

## *Medicinal Chemistry BS Program*

### Required Courses (Major)

1. One General Chemistry sequence chosen from the following:
 

General Chemistry	(CHE101-102)
Chemistry: Principles and Applications	(CHE105-106)
  
2. One Organic sequence chosen from the following:
 

Organic Chemistry	(CHE201-202)
Contemporary Organic Chemistry	(CHE251-252)
  
3. The following Chemistry and Medicinal Chemistry Courses:
 

Analytical Chemistry	(CHE214-215)
Physical Chemistry Lectures	(CHE319-320)
Principles of Biochemistry	(CHE312 or BCH403)
Intermediate Organic Lab	(CHE301)
Inorganic Chemistry	(CHE321)
Advanced Organic Chemistry	(CHE455)
Principles of Medicinal Chemistry I and II	(MCH401)
One laboratory course chosen from Physical Chemistry	(CHE329, 330, or 322)
Laboratory I or II or Inorganic Chemistry II	
  
4. Fifteen (15) credit hours in science electives.

### Required Courses Outside the Major

- |    |                 |                  |
|----|-----------------|------------------|
| 5. | Cell Biology    | (BIO201)         |
| 6. | General Physics | (PHY107-108-158) |
| 7. | Calculus        | (MTH141-142)     |

### General Education Requirements

See the "University at Buffalo Undergraduate Catalog" for remaining university requirements

Total Required Hours in Medicinal Chemistry	58-60
Total Required Hours outside Medicinal Chemistry	24

## ***Proposed Medicinal Chemistry Combined BS/MS Program***

*The MCH BS/MS requirements are undergoing revision. Below are the proposed requirements, which must be approved by the New York State Department of Education.*

### Required Courses (Major)

1. One General Chemistry sequence chosen from the following:

General Chemistry	(CHE101-102)
Chemistry: Principles and Applications	(CHE105-106)
General Chemistry for Engineers	(CHE107-108)

2. One Organic sequence chosen from the following:

Organic Chemistry	(CHE201-202)
Contemporary Organic Chemistry	(CHE251-252)

3. The following Chemistry and Medicinal Chemistry Courses:

Analytical Chemistry	(CHE214-215)
One of:	
Biochemical Principles	(BCH403)
Chemistry of Biological Systems	(CHE312)
Intermediate Organic Chemistry	(CHE 301)
Physical Chemistry 1	(CHE319)
Physical Chemistry 2	(CHE320)
Inorganic Chemistry 1	(CHE 321)
One of:	
Physical Chemistry Laboratory 1	(CHE 329)
Physical Chemistry Laboratory 2	(CHE330)
Inorganic Chemistry 2	(CHE322)
Physical Chemistry for Life Sciences Lab	(CHE350)
Synthetic Organic Chemistry	(CHE455)
Undergraduate Research ( <i>7 credits</i> )	(MCH498)
Medicinal Chemistry 1	(MCH501)
Graduate Organic Chemistry	(CHE501)
One of:	
Graduate Inorganic Chemistry	(CHE503)
Graduate Physical Chemistry 1	(CHE505)
Graduate Physical Chemistry 2	(CHE506)
Graduate Analytical Chemistry 1	(CHE507)
Statistics and Instrumentation	(CHE 508)

**Five Year BS/MS Program in Medicinal Chemistry**

Two of:

Heterocyclic Chemistry	(MCH517)
Medicinal Chemistry	(MCH502)
Mechanisms of Drug Action	(MCH524)
Molecular Modeling	(MCH525)
Combinatorial Chemistry	(MCH527)
Intro to Pharmacokinetics and Biopharmaceutics 1	(PHC531)
Drug Metabolism and Disposition	(PHC630)
Graduate science elective	
Graduate Research (12 <i>credits</i> )	(MCH615-616)
Thesis Guidance	(MCH700)

4. Undergraduate Science Elective (3 *credits*)

Required Courses Outside the Major

- |                    |                  |
|--------------------|------------------|
| 5. Cell Biology    | (BIO201)         |
| 6. General Physics | (PHY107-108-158) |
| 7. Calculus        | (MTH141-142)     |

*Course requirements may change. See your advisor for the most up-to-date information on your program of study.*

### ***Important Information About the Combined BS/MS in Medicinal Chemistry:***

- Student may be admitted no sooner than the end of the sophomore year and no later than the end of the junior year. A minimum GPA of 3.0 and three supportive letters of recommendation from faculty are required for consideration.
- Because of the importance of effective communications, it is recommended that the non-science electives include courses chosen to strengthen speaking and writing skills.
- In addition to taking these courses, the student must write and orally defend a thesis and must demonstrate basic computer skills.
- As shown in the sample program, the research can be carried out during the academic year. However, students desiring to reduce the work load during the academic year could carry out a portion of the research during the summer between years 3 and 4.
- One of the courses should be taken for graduate credit, the other for undergraduate credit.
- To be certain of completing the research before the end of the fifth year, students are encouraged to spend a portion of the summer between the fourth and fifth years on research.

### ***Application Procedure for the Combined BS/MS in Medicinal Chemistry:***

To be admitted to this program, students would be expected to have completed two years of undergraduate education including the courses identified as the pre-requisite courses. Students not currently enrolled in UB would need to follow the University requirements for transferring to this University.

## *List of Technical Electives*

**CHE B.S. Degree:** For the B.S. degree, one Chemistry, Science, Engineering or Math elective is required. Broadly speaking, the elective may be any 3 credit or more lecture course, sophomore (200) level or higher in a technical area other than chemistry. Required courses such as the math sequence cannot be used as technical electives.

**CHE B.A. Degree:** For the B.A. degree, three courses chosen from this list are required. They can be chemistry and non-chemistry. If there is a course that you think will fulfill this requirement and it is not listed here, please contact the Undergraduate Director for permission to use the course.

Listed below are some of the more popular choices for technical electives. Other courses such as upper level Chemistry courses can be used with the prior permission of the Director of Undergraduate Studies. See the Undergraduate Catalog for complete course descriptions and prerequisites.

**This is a partial list of courses that have been used in the past. If there is a course that you would like to use as a technical elective and it is not listed here, contact the Undergraduate Office for approval BEFORE REGISTERING FOR THE COURSE.**

### Anthropology:

APY345—Comparative Primate Anatomy

### Biochemical Pharmacology:

BCP302—Introduction to Pharmacology

BCP405—Principles of Pharmacology

### Biochemistry:

BCH403—Principles of Biochemistry

### Biological Sciences:

All 200 level and above Biology lecture courses will fulfill the technical elective requirement

### Biophysics:

BPH303—Principles of Biophysics

### Chemical Engineering:

All 200 level and above Chemical Engineering lecture courses will fulfill the technical elective requirement.

**Computer Science:**

All 200 level and above Computer Science lecture courses will fulfill the technical elective requirement.

**Engineering & Applied Sciences (EAS):**

All 200 level and above Engineering & Applied Sciences lecture courses will fulfill the technical elective requirement.

**Geography:**

GEO200—The Ocean World  
GEO201—Disasters: A Study of Hazards  
GEO347—Climatic Geomorphology  
GEO348—Landform Development  
GEO352—Introduction to Soils  
GEO355—Landscape Ecology

**Geological Sciences:**

GLY205—Mineralogy, Geochemistry & Petrology I  
GLY206—Mineralogy, Geochemistry & Petrology II  
GLY215—Soft Rock I: Sedimentology  
GLY216—Soft Rock II: Paleontology & Stratigraphy

**Mathematics:**

MTH241—College Calculus III (ONLY FOR THE BA PROGRAM)  
All 200 level and above mathematics lecture courses will fulfill the technical elective requirement, however, a student cannot, for example, use MTH242 as an advanced math course (BS program) *and* as a technical elective. In other words, taking the course once will not fulfill two requirements.

**Medical Technology:**

MT 401— Clinical Biochemistry  
MT 402—Clinical Immunology  
MT 428 —Forensic Science

**Medicinal Chemistry:**

MCH311—The Chemistry of Drug Action  
MCH401—Molecular Structure and Reaction Mechanisms in Medicinal Chemistry  
MCH403—Mechanisms of Drug Action  
MCH427—Combinatorial Chemistry

**Physics:**

All 200 level and above Physics lecture courses will fulfill the technical elective except for PHY311.

**Physiology:**

PGY300—Human Physiology

**Psychology:**

PSY207—Psychological Statistics

**Statistics:**

STA401—Probability

STA402—Statistical

**MCH B.S. Degree:** For the MCH B.S. degree, 15 credit hours of science electives are required. Broadly speaking, these are any 3 credit or more lecture courses, sophomore (200) level or higher in a technical area other than chemistry. Required courses cannot be used as technical electives. The courses listed below are approved electives.

**Anthropology:**

APY345—Comparative Primate Anatomy

**Biological Sciences:**

All 200 level and above Biology lecture courses will fulfill the technical elective requirement

**Chemistry:**

Any course not already required.

**Geological Sciences:**

GLY462—Aqueous Geochemistry

**Mathematics:**

All 200 level and above mathematics lecture courses will fulfill the technical elective requirement.

**Medicinal Chemistry:**

Any course not already required.

**Medical Technology:**

MT 401—Clinical Biochemistry

MT 402—Clinical Immunology

MT 428 —Forensic Science

**Physics:**

All 200 level and above Physics lecture courses.

**Physiology:**

PGY300—Human Physiology  
PGY 451-452

**Psychology:**

PSY207—Psychological Statistics

Students may request (by petition to the Department's Undergraduate Committee) for a course to be added to the list of approved technical electives.

## *Sample Course Selection for BA Degree in Chemistry*

### Fall Semester (Year 1)

CHE101	5 cr hr
MTH121	4 cr hr
PHY101	4 cr hr
PHY151	1 cr hr
Writing Skills I	3 cr hr

TOTAL: 17 cr hr

### Spring Semester (Year 1)

CHE102	5 cr hr
MTH122	4 cr hr
PHY102	4 cr hr
PHY152	1 cr hr
Writing Skills II	3 cr hr

TOTAL: 17 cr hr

### Fall Semester (Year 2)

CHE201	5 cr hr
CHE214	3 cr hr
Technical Elective I	3 cr hr
Elementary Language I	5 cr hr

TOTAL: 16 cr hr

### Spring Semester (Year 2)

CHE202	5 cr hr
CHE215	2 cr hr
Literature & Arts	3 cr hr
Elementary Language II	5 cr hr

TOTAL: 15 cr hr

### Fall Semester (Year 3)

CHE349**	3 cr hr
Lab Course	variable
CHE321	3 cr hr
World Civ I	3 cr hr

TOTAL: 12-16 cr hr

### Spring Semester (Year 3)

Technical Elective II	3 cr hr
Technical Elective III	3 cr hr
World Civ II	3 cr hr
Social & Behavioral Elective	3 cr hr

TOTAL: 15 cr hr

### Fall Semester (Year 4)

American Pluralism	3 cr hr
CHE481 ( <i>senior research, recommended, not required</i> )	3 cr hr
Elective	3 cr hr
Elective	3 cr hr
Elective	3 cr hr

TOTAL: 15 cr hr

### Spring Semester (Year 4)

Elective	3 cr hr
CHE481 ( <i>senior research, recommended, not required</i> )	3 cr hr
Elective	3 cr hr
Elective	3 cr hr
Elective	3 cr hr

TOTAL: 15 cr hr

Four Year Total: 122-126 cr hr (120 required to graduate)

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\*\* Physical Chemistry: For the BA degree, students may elect to complete the Physical Chemistry requirement by either completing the one semester lecture course CHE349 "Physical Chemistry for Life Sciences" or the two semester lecture course CHE319-320 "Physical Chemistry I and II". If students elect to enroll in CHE319-320 THEY MUST COMPLETE BOTH SEMESTERS, no substitutions allowed.

### *Sample Course Selection for BS Degree in Chemistry*

#### Fall Semester (Year 1)

CHE101	5 cr hr
MTH141	4 cr hr
PHY107	4 cr hr
Writing Skills I	3 cr hr

TOTAL: 16 cr hr

#### Spring Semester (Year 1)

CHE102	5 cr hr
MTH142	4 cr hr
PHY108	4 cr hr
PHY158	1 cr hr
Writing Skills II	3 cr hr

TOTAL: 17 cr hrs

#### Fall Semester (Year 2)

CHE201	5 cr hr
CHE214	3 cr hr
MTH241	4 cr hr
Elementary Language I	5 cr hr

TOTAL: 17 cr hr

#### Spring Semester (Year 2)

CHE202	5 cr hr
CHE215	2 cr hr
MTH306 or 309	4 cr hr
Elementary Language II	5 cr hr

TOTAL: 16 cr hr

#### Fall Semester (Year 3)

CHE319	3 cr hr
CHE329	2 cr hr
CHE321	3 cr hr
CHE301	3 cr hr
World Civ I	3 cr hr

TOTAL: 14 cr hr

#### Spring Semester (Year 3)

CHE312	3 cr hr
CHE320	3 cr hr
World Civ II	3 cr hr
CHE322	3 cr hr
CHE376	3 cr hr

TOTAL: 15 cr hr

#### Fall Semester (Year 4)

CHE413	3 cr hr
CHE498 (senior research, recommended, not required)	3 cr hr
Literature & Arts	3 cr hr
Social & Behavioral	3 cr hr

TOTAL: 12 cr hr

#### Spring Semester (Year 4)

CHE414	1 cr hr
CHE4XX (NOT 498)	3 cr hr
CHE498 (senior research, recommended, not required)	3 cr hr
American Pluralism	3 cr hr
Technical Elective	3 cr hr

TOTAL: 13 cr hr

Four Year Total: 120 cr hr (120 required to graduate)

Note: CHE4XX must be at least 3 cr hr lecture course.

***Sample Course Selection for BS Degree in Medicinal  
Chemistry***

<u>Fall Semester (Year 1)</u>		<u>Spring Semester (Year 1)</u>	
CHE101	5 cr hr	CHE102	5 cr hr
MTH141	4 cr hr	MTH142	4 cr hr
World Civ I	3 cr hr	BIO201	4 cr hr
Writing Skills I	3 cr hr	Writing Skills II	3 cr hr
TOTAL:	15 cr hr	TOTAL:	16 cr hr
<u>Fall Semester (Year 2)</u>		<u>Spring Semester (Year 2)</u>	
CHE201	5 cr hr	CHE202	5 cr hr
CHE214	3 cr hr	CHE215	2 cr hr
PHY107	4 cr hr	PHY108	4 cr hr
World Civ I	3 cr hr	PHY158	1 cr hr
		World Civ II	3 cr hr
TOTAL:	15 cr hr	TOTAL:	15 cr hr
<u>Fall Semester (Year 3)</u>		<u>Spring Semester (Year 3)</u>	
CHE301	3 cr hr	Social & Behavioral	3 cr hr
CHE319	3 cr hr	Literature & Arts	3 cr hr
CHE321	3 cr hr	Science Elective III	3 cr hr
CHE329	2 cr hr	CHE312	3 cr hr
Science Elective I	3 cr hr	CHE320	3 cr hr
Science Elective II	3 cr hr		
TOTAL:	17 cr hr	TOTAL:	15 cr hr
<u>Fall Semester (Year 4)</u>		<u>Spring Semester (Year 4)</u>	
MCH401	3 cr hr	MCH498	3 cr hr
MCH498	3 cr hr	CHE455	3 cr hr
American Pluralism	3 cr hr	Science Elective V	3 cr hr
Science Elective IV	3 cr hr	Elective	3 cr hr
Elective	3 cr hr		
TOTAL:	15 cr hr	TOTAL:	12 cr hr
Four Year Total: 120 cr hr (120 required to graduate).			

***Proposed Sample Course Selection for the Combined BS/MS  
Degree in Medicinal Chemistry***

Fall Semester (Year 1)

CHE101 or 105	5 cr hr
MTH141	4 cr hr
World Civ I	3 cr hr
Writing Skills I	3 cr hr

TOTAL: 15 cr hr

Spring Semester (Year 1)

CHE102 or 106	5 cr hr
MTH142	4 cr hr
BIO201	4 cr hr
Writing Skills II	3 cr hr

TOTAL: 16 cr hr

Fall Semester (Year 2)

CHE201	5 cr hr
CHE214	3 cr hr
PHY107	4 cr hr
World Civ I	3 cr hr

TOTAL: 15 cr hr

Spring Semester (Year 2)

CHE202	5 cr hr
CHE215	2 cr hr
PHY108	4 cr hr
PHY158	1 cr hr
World Civ II	3 cr hr

TOTAL: 15 cr hr

Fall Semester (Year 3)

CHE301	3 cr hr
CHE319	3 cr hr
CHE329	2 cr hr
CHE321	3 cr hr
Science Elective	3 cr hr
Literature & Arts	3 cr hr

TOTAL: 17 cr hr

Spring Semester (Year 3)

CHE312	3 cr hr
CHE320	3 cr hr
American Pluralism	3 cr hr
CHE 455	3 cr hr
Social & Behavioral	3 cr hr

TOTAL: 15 cr hr

Fall Semester (Year 4)

CHE501	3 cr hr
MCH501	3 cr hr
MCH498	4 cr hr
Grad Science Elective	3 cr hr

TOTAL: ~13 cr hr

Spring Semester (Year 4)

Grad Science Electives	6 cr hr
MCH498	3 cr hr

TOTAL: ~9 cr hr

Fall Semester (Year 5)

MCH615	6 cr hr
Grad Science Elective	variable

TOTAL: ~12 cr hr

Spring Semester (Year 5)

MCH616	6 cr hr
MCH700	1 cr hr
Grad Science Elective	variable

TOTAL: ~12 cr hr

## ***Chemistry & Medicinal Chemistry Course Listings and Syllabi***

Complete up to date listings of the Chemistry and Medicinal Chemistry Courses are now online at <http://undergrad-catalog.buffalo.edu/>. Our most recent course syllabi can be viewed at the Chemistry web page using this link: <http://chemistry.buffalo.edu/undergraduate/courses/>

Copies of archived syllabi for course articulation may be obtained by emailing the Undergraduate Office at [chemug@buffalo.edu](mailto:chemug@buffalo.edu).

## ***General Education Requirements***

This is a ***condensed*** version of the General Education requirements. Students should refer to the Undergraduate Catalog for full explanation of their individual requirements.

Students responsible for General Education requirements:

- All entering freshmen in all majors.
- Students who entered UB as freshmen between fall 1992 and thereafter whose majors are listed in the College of Arts and Sciences (B.A. and B.S. degrees).
- Freshmen and transfer students who entered UB in the fall 1997 and thereafter whose majors are in the School of Pharmacy or the School of Medicine and Biomedical Sciences.

### **Writing Skills**

Students are required to take ENG101 or 102 and ENG201 or equivalent unless exempted by your SAT score.

### **World Civilization**

Students are required to take UGC111 and then UGC112.

### **Library Skills**

All freshmen and transfer students are required to complete the *Library Skills Workbook* whether or not they are required to take ENG201. This requirement is administered by the Silverman Undergraduate Library and must be completed before graduation.

### **Mathematical Sciences**

Students must choose two courses from the list found in the Undergraduate Catalog.

### **Natural Sciences**

Students must choose two courses from the list found in the Undergraduate Catalog. At least one semester of lab is required.

## Language Requirement

Students must demonstrate intermediate proficiency in a language other than English prior to graduation (equivalent to completion of a second-year, first-semester course, e.g., FR151 or SP151).

Students continuing to study their high school language will ordinarily take two semesters of additional language study, and students beginning study of a new language will ordinarily take three semesters. Please refer to the Undergraduate Catalog for full details.

## American Pluralism or Cognate (Approved Equivalent Course)

Students are required to take UGC211 or equivalent. NOTE: World Civilization is ordinarily completed before American Pluralism.

## Literature and the Arts

Students must choose one 3 credit course offered from AAS, AMS, ART, AHI, CL, COL, ENG, FT, GER, ITA, DMS, MUS, SPA, TH, THD, WS or PHI101. The following do NOT fulfill the Literature and Arts requirement:

ENG101 and ENG201 are excluded.

Courses that satisfy the World Civilization and American Pluralism requirements are excluded.

Elementary and intermediate language courses used to satisfy the language requirement are excluded.

- Courses offered by the department of your major are excluded.

## Social and Behavioral Sciences

Students must choose one 3 credit course from APY, CDS, COM, ECO, GEO, HIS, LIN, PHI, PSC, PSY, SSC or SOC. The following do NOT fulfill the Social and Behavioral requirement:

- Courses that satisfy the Mathematical Sciences requirement are excluded.
- Courses that satisfy the World Civilization and American Pluralism requirements are excluded.
- Courses offered by the department of your major are excluded.

### **Junior/Senior Science or Cognate (An Approved Equivalent Course)**

Students must complete UGC302 or UGC303 “Great Discoveries in Science” or cognates.

- Students completing a course in the physical, biological, mathematical, medical sciences or in engineering numbered 200 or above are exempt from this requirement.
- Certain courses from the following departments also fill this requirement: APY, CDS, GEO and PSY.

***Note: S/U grading is NOT an option in any course that is to be used toward satisfying the general education requirements.***

## ***Knowledge Area General Education Requirements***

This is a **condensed** version of the knowledge area general education requirements. Students should refer to the Undergraduate Catalog for full explanation of their individual requirements.

Students responsible for the Knowledge Area General Education Requirements:

- New transfer students (entering with 24 or more hours) except majors first enrolled fall 1997 and thereafter in biochemical pharmacology, biochemistry, biophysics and the School of Pharmacy.
- Continuing students first enrolled before fall 1999 enrolled in certain majors. Please see the Undergraduate Catalog.
- Continuing students first enrolled before fall 1997 with majors in biochemistry, biophysics or the School of Pharmacy.
- Continuing students first enrolled before fall 1992.

### **Writing Skills**

Students are required to take ENG101 or 102 and ENG201 or equivalent unless exempted by SAT scores, Advanced Placement credit or transfer credit. Please see the Undergraduate Catalog for full details.

### **Library Skills**

All students (freshmen and transfer) are required to successfully complete a *Library Skills Workbook* whether or not they are required to take ENG201. This requirement is administered by the Silverman Undergraduate Library and must be completed before graduation.

### **Mathematics Skills**

Students are required to pass the math skills test or successfully complete one course from the list in the Undergraduate Catalog. S/U grading is not an option. Students transferring into UB with 24 credit hours or more are exempt from this requirement. Additional mathematics or statistics courses may be required by the major.

## Knowledge Areas and Courses

Prior to graduation, each student must complete seven knowledge area courses. The student must select one course from each of the five knowledge areas *outside the knowledge area in which the student's majors falls* AND one additional course from two of those areas. S/U grading is a student option. The knowledge areas are:

- Foreign Language and cross-cultural studies\*\*
- Historical and philosophical studies
- Life and health sciences
- Physical and mathematical sciences and technology
- Social and behavioral sciences

Courses originating in the student's major department, including cross-listed courses, may not be used to satisfy any knowledge area requirement.

\*\*Students may waive two courses in this knowledge area by demonstrating proficiency in a language other than English.

***Please see the Undergraduate Catalog (online: <http://undergrad-catalog.buffalo.edu/>) for proper selection of courses and standard exceptions.***

## ***Graduation***

### *Application for Degree:*

Undergraduate students must apply for graduation via the HUB Student Center (<http://www.myub.buffalo.edu>). The deadlines are:

#### Application Deadline

June 15<sup>th</sup>

September 15<sup>th</sup>

February 15<sup>th</sup>

#### For Graduation On:

September 1<sup>st</sup> (Summer)

February 1<sup>st</sup> (Fall)

June 1<sup>st</sup> (Spring)

Double Degree Candidates (i.e. BS and BA, two degrees awarded at one time) must also submit the Double Degree Application ([registrar.buffalo.edu/pdfs/doubleDegree.pdf](http://registrar.buffalo.edu/pdfs/doubleDegree.pdf))

Make sure your name and addresses are up to date in your HUB Student Center. Your name and address as it appear in HUB at the time of the conferral date is how your diploma will be processed.

### *Settlement of Obligation:*

All balances on your student account must be paid in full to be eligible for graduation. Students must also satisfy any financial obligations incurred in connection with student activities and return all books belonging to the Libraries. Diplomas will be sent only when all financial obligations to the University have been met.

### *Commencement:*

The “Countdown to Commencement” page (<http://www.student-affairs.buffalo.edu/commencement/ceremonies.php>) contains all the information you need for the big day. A checklist guides you step-by-step through sign-up requirements and contact information for everything from ordering your cap and gown to obtaining tickets for friends and family. Be sure to start visiting this site a semester or two prior to your expected conferral date to make sure you are ready!

The Chemistry Department participates in the commencement for the College of Arts & Sciences.. Immediately following commencement, the chair hosts an awards ceremony and reception in the Natural Sciences Complex.



# ACS

## *American Chemical Society Certification of Chemistry Majors*

The program of the Chemistry Department is approved by the American Chemical Society. Students taking the complete B.S. program offered by the Chemistry Department are certified as American Chemical Society Chemistry Majors. Such certification may be included in his or her credentials when applying for employment or graduate school following graduation and allows him or her to join the American Chemical Society without the usual annual probationary period of membership. Being certified may enhance a student's credentials for obtaining an industry position

# Certified

## *Undergraduate Research Opportunities*

All chemistry and medicinal chemistry majors are encouraged to participate in undergraduate research. To get started, review the “Faculty Research” section of the Chemistry Department website (<http://chemistry.buffalo.edu/research/>). Then simply make appointments with faculty whose research areas interest you to discuss the possibilities. Choose three or four faculty since often their research laboratories are full and their individual policies concerning undergraduate research vary widely.

Having received the faculty member’s permission to enroll in their program you must be force registered into CHE290 (1 credit) if you are a sophomore, or CHE498 (1-3) credits or MCH498 (1-6) credits if you are a junior or senior. Instructions for force registration are on our website ([http://chemistry.buffalo.edu/documents/FORCEREGISTRATIONGUIDELINES\\_003.pdf](http://chemistry.buffalo.edu/documents/FORCEREGISTRATIONGUIDELINES_003.pdf)). Most chemistry and medicinal chemistry majors do research in one or both semesters of their senior year.



### *Interdisciplinary Research Activities*

Chemistry is frequently referred to as the “Central Science”. Department of Chemistry faculty are at the center of many interdisciplinary research efforts including the Institute for Lasers, Photonics and Biophotonics; the Center for Computational Research; the Structural Biology initiative and the Surface Science Center. Undergraduate chemistry majors may conduct research in a number of interdisciplinary areas.



# Facilities

## *Library*

Research materials in the biology, chemistry, geology, physics, engineering and applied sciences are located in the Science & Engineering Library. SEL also has an extensive map and technical report collection. The Information Technology Center (a service site of UB Computing and Information Technology) is located on the second floor. Reserve materials for SEL and Undergraduate library are found at the Circulation Reserve Desk on the first floor.

Do-it-yourself Xeroxing may also be done in this library. The library also features on-line computer retrieval and other informational services.

## *Computer Resources*

The University maintains a number of public computing sites:

- Capen Cybrary: Undergraduate Library (north & south), Science & Engineering Library.
- Bell Hall Room 101
- Blake Center
- Clement 128 (south campus)
- Clinton 114
- Fronczak Hall Room 408
- Health Sciences library (south campus)
- Lockwood Cybrary 2<sup>nd</sup> and 3<sup>rd</sup> floors.

More information about the public computing sites and their use can be found at : <http://ubit.buffalo.edu/sites/>

In addition to University sites, the Department of Chemistry maintains a number of PCs for use in certain courses and all research groups in the Department also have computer facilities available to students conducting research in their groups.



### *Instrument Center*

The Chemistry Department Instrument Center maintains and operates a number of major research instruments. These include a VG 70-SE double-focusing high resolution mass spectrometer with the capabilities to do positive and negative ion studies and accurate mass measurements. A gas chromatograph is attached to allow mixture analysis. Generation techniques include electron impact and chemical ionization. Polar or thermally unstable compounds may be run by several available desorption techniques. A Perkin-Elmer series 5400 ESCA with dual Ti/MG anode is also available for angle-resolved studies, ion scattering spectroscopy and depth profiling. Nuclear Magnetic Resonance spectrometers include a Varian Gemini 300, Varian 400, 500, 600 and 750MHz NMR for state-of-the-art structure studies. A Bruker electron spin resonance spectrometer is also located in the center. The usual routine UV/VIS and infrared spectrometers are scattered throughout the Department, in addition to a Mattson Alpha Centauri Fourier transform infrared spectrometer for rapid analysis on small samples. Thermal analysis may be performed using our differential scanning color meter and thermo gravimetric analysis. An infrared microscope is available for the analysis of small amounts of solid material.

## *Fellowship Opportunities*

*Fulbright Grants*—These grants are for study for one year in a foreign country. A project proposal is required and will be judged on the basis of its creativity and ability to be completed in the one year of study.

*Luce Scholarships*—The Luce Scholarship provides one year of living and working in an Asian culture. These scholarships stipulate that the candidates must not have previously studied in the Far East. They are intended to provide a familiarity with Asian culture for Americans with leadership potential.

*National Science Foundation*—The competition is open to seniors who plan to attend graduate school in natural sciences, engineering or social sciences. The submission of a research proposal is a major component to this application. Prior research work is important.

*Rotary Fellowships*—The grants are provided by the Rotary Clubs and fund one year of study in any country where a Rotary Club is located. Applicants must have at least completed their sophomore year.

*Rhodes Scholarships*—The 32 scholarships awarded annually are for two or three years of study in any field at Oxford University, England. Students completing their junior or senior year may apply.

\*\*\*Above is just a sampling of fellowship opportunities. Please visit the University at Buffalo's "Fellowships & Scholarships" website (<http://fellowships.buffalo.edu/>) for information on many more and aids to help you present a well polished application.

# Awards & Honors

*Academic Excellence in Chemistry*—The Academic Excellence in Chemistry Award consists of a keepsake plaque given by the Department of Chemistry. It is given annually to graduating seniors with the following GPA levels: Distinction—3.20-3.499; High Distinction—3.50-3.749; Highest Distinction—3.75-4.00.

*Academic Excellence in Medicinal Chemistry*—The Academic Excellence in Medicinal Chemistry Award consists of a keepsake plaque given by the Department of Chemistry. It is given annually to graduating seniors with the following GPA levels: Distinction—3.20-3.499; High Distinction—3.50-3.749; Highest Distinction—3.75-4.00.

*American Institute of Chemists Award*—One of the activities of the American Institute of Chemists Foundation (AICF), administered by the American Institute of Chemists (AIC), is the annual student awards program to honor outstanding seniors, post-baccalaureate and post-doctoral students majoring in chemistry, chemical engineering or biochemistry. Such awards are given in recognition of a demonstrated record of ability, leadership and professional promise. Candidates are nominated by Department faculty members and selected by the Department's Undergraduate Affairs Committee. A certificate is presented at the annual Department awards ceremony.

*College of Arts & Sciences Dean's Outstanding Senior Award*—Annually, the Dean honors the best senior graduating from each department in the College of Arts and Sciences (CAS) with the "Dean's Outstanding Senior Award", consisting of a medal and certificate presented at the University Commencement ceremony. In previous years, prior to the formation of the College of Arts and Sciences, this award was named the "FNSM Deans Outstanding Senior Award". Each department in the College, along with the Interdisciplinary Degree Program and the Special Major program, is asked to select one graduating senior. The selection criteria are: (a) demonstrated academic excellence exemplified by an exceptional grade point average, (b)

election to honor societies, (c) participation in research, and (d) other academic achievements selected by the department.

*Hypercube Scholar Award*—The generosity of Hypercube supports the annual Hypercube Scholar Award, presented to a graduating Chemistry or Medicinal Chemistry senior selected by the Undergraduate Affairs Committee. This award consists of the newest version of the HyperChem software and a certificate signed by Neil S. Ostlund, the President and CEO of Hypercube, Inc. The award is presented at the Department awards ceremony on commencement day.

*Senior Merck Index Award*—Through its generosity and commitment to the chemical sciences, Merck & Co., Inc. offers this annual award to recognize outstanding graduating chemistry majors. Ultimate selection of the awardees is made by the Department's Undergraduate Affairs Committee. Each senior selected receives a copy of the Merck Index with their name embossed in gold on the cover. The University at Buffalo has taken part in honoring our seniors with this award since 1985, when the Department of Chemistry held its first annual awards ceremony.

*CRC Press Chemistry Achievement Award*—The Taylor & Francis Group and CRC Press offer this award to recognize an undergraduate student for outstanding academic achievement in chemistry and to inspire the upcoming scientists of tomorrow. One senior, selected by the Undergraduate Affairs Committee, will receive the newest edition of the CRC Handbook of chemistry and Physics, along with a commemorative bookplate.

*ACS Undergraduate Award In Inorganic Chemistry*—The American Chemical Society established this award in 2009 and is intended to recognize achievement by undergraduate students in inorganic chemistry and to encourage further study in the field. The recipient is selected by the Undergraduate Affairs Committee, and the award consists of a personalized certificate and a letter of commendation signed by the Chair of the ACS Division of Inorganic Chemistry.

*Phi Beta Kappa Omicron Chapter of NY*—Minimal requirements for nomination are 85 credits with a minimum QPA of 3.75 or 100 credits with a minimum QPA of 3.5, with at least 60 UB credits. All transfer work is considered. Additionally, each student is evaluated for excellence both in depth (defined as excellence in their chosen liberal arts major) and breadth (defined as excellence in the equivalent of UB's general education program) in liberal studies.

*Phi Lambda Upsilon*—(Honorary Chemical Society)—Qualifications: Senior standing with 30 hours of chemistry, chemical engineering and/or biochemistry completed; rank in the top 20% of seniors in their department or at their University, and possession of a minimum grade point average of 3.5/4.0.

National Office will make direct contact with students nominated and extend an invitation to them with an indication of department's nomination.

*Western New York American Chemical Society Award*--- Through its generosity the Western New York Section of the American Chemical Society (founded in 1905) offers this annual award to honor the outstanding senior students of our regional colleges and universities majoring in chemistry, medicinal chemistry and biochemistry. Presentation of the award is made at a regularly scheduled section meeting of the WNY/ACS, where the awardees (one each for chemistry and medicinal chemistry) are guests for dinner and receive an appropriate certificate and one year's paid membership in the ACS.

*Ralph F. Theuer Scholarship Award*---The family of Ralph F. Theuer, University at Buffalo alumnus, BA Chemistry 1946 and EdM. Sciences education 1950, in order to further science education, established the Ralph F. Theuer Endowment Fund in 1994. This award is presented annually to one or more outstanding students pursuing a degree in Chemistry or a graduate degree in Science Education at the State University of New York at Buffalo. Awardees are selected by the Department of Chemistry Undergraduate Affairs Committee, and students selected are presented their scholarship and certificate at the Department of Chemistry annual awards ceremony.

*Alumni Scholarship*—The Chemistry Alumni Award honors the top Chemistry and Medicinal Chemistry majors of junior or senior status for academic excellence, based on cumulative rank, and is presented by the Department of chemistry faculty at the annual Undergraduate Awards Ceremony. This award, consisting of a monetary gift and certificate, has been presented to one or more students each year since 2000.

*American Chemical Society Division of Analytical Chemistry Award*—Since 1967, the American Chemical Society, Division of Analytical Chemistry, has presented this undergraduate award to encourage student interest in analytical chemistry and to recognize students who display an aptitude for a career in the field. The recipient is selected by the Undergraduate Affairs Committee, but is to have completed the third undergraduate year before the upcoming fall semester, and is expected to enroll for the following academic year. The award consists of an 8-month subscription (16 issues) to the journal Analytical Chemistry and a certificate of recognition, which is presented at the Department of Chemistry awards ceremony on commencement day.

*Peter T. Lansbury Undergraduate Research Award*—Joseph P. Vacca, Ph.D. 1983, received the Merck Director's Award in recognition of his outstanding contributions to the discovery of Crixivan, an HIB protease inhibitor. Dr. Vacca selected the University at Buffalo as recipient of the Merck prize because of the important role UB played in his career. To honor his former Ph.D. mentor, Dr.

Peter T. Lansbury, Professor Emeritus, Dr. Vacca created the Peter T. Lansbury Chemistry Award in 1999. This award is given periodically to a deserving undergraduate chemistry major, preferably in his/her junior year. The funds may be used to carry out summer research with a UB faculty member.

*Sol J. Lederman Undergraduate Research Fellowship*—Sol J. Lederman Research Fellows will be selected by the Chemistry Department Undergraduate Affairs Committee based on applications submitted by interested students. The committee will award the fellowship(s) to student who: (1) show special promise as a researcher, (2) have a commitment from a mentor to provide matching funds in the form of a stipend, supplies, etc., and (3) have high promise of generating publishable results. At the end of the fellowship period, Sol J. Lederman Research Fellows must submit a short report (3-5 pages) summarizing their research activity and results.

*Sophomore Merck Index Award*—The Sophomore Merck Index Award honors the top 1% of sophomore students in CHE201-251 and CHE202-252, based on cumulative rank, and is presented by the Department of Chemistry faculty. This elite group has been recognized through the presentation of this award since 1985, when the Department of Chemistry held its first annual awards ceremony. Each student receives a copy of the Merck Index and a certificate.

*Freshman Chemistry Award*—The CRC Freshman Chemistry Award honors the top 1% of freshman students for academic excellence in CHE101-102, based on cumulative rank, and is presented by the Department of Chemistry faculty. This elite group has been recognized through the presentation of this award since 1985, when the Department of Chemistry held its first annual awards ceremony. Each student receives a copy of the *CRC Handbook of Chemistry and Physics* and a certificate.

*William E. Townsend Scholarship*—Mr. William E. Townsend, UB Class of 1950 with a BA degree in Chemistry, in order to recognize worthy students at his alma mater, established the William E. Townsend Scholarship Fund in 1992. This award is presented annually to one or more freshman chemistry majors, preferably from the Western New York area, with demonstrated financial need and possession of good personal characteristics in terms of attitude, personality, citizenship and leadership. Recipients are selected by the Department of Chemistry Undergraduate Affairs Committee. The award may be presented to each awardee for up to four consecutive years, provided they remain a chemistry major in good standing with the University.





### ***Bulletin Board for Undergraduates***

Chemistry majors should check the bulletin board located in the main office hallway right next to room 365 Natural Sciences Complex. The board should be consulted on a regular basis for important information regarding job possibilities, Departmental and SAACS events. Also, undergraduate research opportunities are posted here as well as events on the University level that may be of interest to students.

### ***Chemistry Department E-mail List***

The Undergraduate Office (363 NSC) currently maintains an e-mail list of current majors in the department. Announcements are sent to every major who wants to be on the list, and have included internship opportunities and reminders about University deadlines. It is recommended that when you receive your e-mail address, please inform the Undergraduate Office ([chemug@buffalo.edu](mailto:chemug@buffalo.edu)) so that you can be included on future mailings.

## ***Laboratory Safety Rules and Regulations***

1. Lab glasses (safety monogoggles only) to be worn at ALL times in the lab. NO EXCEPTIONS. You will not be permitted in the laboratory without your safety glasses.
2. Closed toed shoes must be worn in the laboratory. Sandals and flip-flops are NOT permitted.
3. Midriff shirts and/or shorts CANNOT BE WORN IN THE LABORATORY.
4. Certain experiments required to use of lab gloves. Do not wear gloves out of the lab and remove them before touching personal items such as phones, computers, pens and one's skin.
5. Know where the safety equipment such as eye wash, safety shower, and fire extinguisher is located.  
  
FIRES:      A.      Paper, wood, cloth fires: use water extinguishers.  
                  B.      Flammable and combustible solvents, electrical fires: use CO<sub>2</sub> or dry powder extinguishers.  
                  C.      Do not point a fire extinguisher directly at a flaming beaker or container. The sudden force may upset the beaker and spread the fire.
6. Horse play in the laboratory will not be tolerated. Eating and smoking are not permitted in the laboratory.
7. MSDS or Material Safety Data Sheets are available for all hazardous materials that you may encounter while working in the lab. A MSDS will provide instructions for a particular chemical's safe use and also the hazards associated with it. Contact your instructor for more information.
8. All chemicals are to be closed and returned to their proper shelf spaces after use. Clean up any broken glass and any chemical spills immediately. Baths are to be returned to their containers after use. Broken glass is to be placed in containers marked GLASS ONLY. Paper and other waster materials (besides glass) are to be placed in the receptacles at the end of the row of desks. No paper, glass, etc. is to be dropped in the sinks. Remember: Do NOT mix glass, paper and chemicals. Put into individually marked containers.

9. Unauthorized or unsafe experiments are prohibited.
10. First aid is available in the Stockroom. Use COLD water for all types of burns: e.g. fire, acid, base, etc. Report any injury, no matter how slight it may seem, to your lab instructor at once.
11. Toxic and fuming chemicals are only to be used under the hoods.
12. Mercury spills (such as broken thermometers): call instructor for proper disposal. **DO NOT HANDLE** (mercury poisoning).
13. In most cases, chemical waste is not permitted to be poured down sink drains. Only certain aqueous salt and buffer solutions are approved for drain disposal. Your instructor will inform you of which salt solutions are approved for drain disposal. All organic solvents such as liquid naphthalene, ethanol, etc. are never permitted to be poured down the sink but instead must be collected as hazardous wastes.
14. Be sure the gas line is full turned off when finished using the Bunsen burner and before leaving the laboratory.
15. When diluting acid, always pour the acid slowly into the water with stirring.
16. Some equipment, which is in short supply, may be borrowed by students from time to time. Such items must be returned at the end of each class. Students will be warned what items these are. If they fail to return them, their desks will be opened and the items removed.
17. Students are to learn the name of the equipment which they are using and to write the correct names of the item and the size on all checkout slips that they may take to the stockroom. Checkout slips are to bear the correct name (not initials) of the signer, correct desk number, date, and student number. No equipment will be given out unless the slip is written in a legible hand.
18. Each student is responsible for keeping track of his or her own equipment, including what he or she has borrowed from, or lent to, his or her neighbor. **NO ONE MAY CHECK HIS OR HER ENVELOPE TO SEE WHAT HE HAS CHECKED OUT.**
19. **Students who have breakage charges at the time of check out totaling LESS THAN \$10.00 will be required to pay these charges**

**at the time of check out in the Chemistry Office, within 24 hours. Failure to do so will result in a \$10.00 charge sent over to the Office of Students Accounts. These charges will appear on the next tuition bill.**

20. Students who have breakage charges totaling \$10.00 or MORE at the time of checkout will have these charges sent over to the Office of Student Accounts. These charges will appear on the next tuition bill.
21. When you complete or drop the course, you **MUST** check out of lab with your own Teaching Assistant (TA) during your regularly scheduled lab sessions. If you complete the course, checkout will be held on your final lab day. If you drop the course, you must checkout during your regular lab session, within one week of dropping or course, or on your final lab day for the course, whichever date occurs first. Failure to do so will mean that stockroom personnel will have to checkout the desk, and your lock will be cut off by the department. The Office of Student Accounts will be authorized to charge you the cost of any missing, broken or unusable apparatus, plus a \$100.00 service fee, if you fail to check out of lab.

***Further information about lab safety and proper treatment of chemical waste can be found at:***

UB Environmental Health and Safety:

<http://www.facilities-buffalo.org/Departments/ehs>

American Chemical Society publications:

<http://portal.acs.org/portal/PublicWebSite/about/governance/committees/chemicalsafety/publications/>

***Student Affiliates of the American Chemical Society (SAACS)***  
***Room 446 Natural Sciences Complex***  
***645-4155***

SAACS, the Student Affiliates of the American Chemical Society, is an academic club designed to unite the University's undergraduate chemistry major population.

The ACS—American Chemical Society—is the parent organization and has thousands of members across the USA. The ACS certifies the numerous SAACS clubs which are located at all major universities in the United States.

The majority of members are chemistry majors with a few biochemists and chemical engineering majors. All students are welcome to the meetings and participate in any of the activities which are planned; there is no charge for being a member. To become officially recognized by the ACS there is a nominal membership fee of \$10 per year—this includes a subscription to “*Chemical and Engineering News*” from October to May. C&EN is a weekly publication which has a few technology related articles and reports on the job situation for chemists and engineers. In addition, a wealth of information about chemistry and careers can be found on the ACS web-site: <http://www.acs.org>.

Our “Chemistry Club” is involved in a wide range of activities. They offer free, drop-in tutoring in their club office (room 446 Natural Sciences). If you are a chemistry major, a visit to their office may prove beneficial, not just for tutoring as they also have collected quite an extensive file of previous year's exams. They participate with the graduate students during “National Chemistry Week” in the local elementary schools, and serve as student representatives during the fall and spring Open House. In addition to club social activities, the Student Affiliates organize a “Faculty/Student” mixer at a local restaurant in which students and faculty members get to know each other in a relaxed atmosphere away from class.

The meetings and events sponsored by SAACS may be found posted on the bulletin board located in the main office hallway right next to room 365, or more information may be found by contacting the Undergraduate Office, or by calling the SAACS office at the above number.

### *Alpha Chi Sigma (AXΣ)*

Alpha Chi Sigma is a professional chemistry fraternity which aims to tie like-minded individuals seeking careers in chemistry or chemistry-related professions together for the purpose of promoting the science and profession of chemistry. Students who have completed one year of undergraduate chemistry and intend to make some aspect of chemistry their life work are eligible for membership. Alpha Chi Sigma was established at the University of Wisconsin in 1902 and stretches across the country; the Gamma Phi chapter here at the University at Buffalo was established in 2010. Our chapter has undergraduate, graduate, and faculty members who share these ideals. Being a professional fraternity, women as well as men may become members. Our chapter holds membership rush in both the fall and spring semesters. Students with questions about membership should see the faculty advisor, Dr. Troy Wood.



### ***Undergraduate Student Assistantships***

Several undergraduate student assistantships are available in the Department of Chemistry. Chemistry majors may apply for employment through the Undergraduate Office, Room 363 Natural Sciences Complex. Applications are accepted at all times during the year, but the majority of assistantships are awarded two weeks prior to each semester.

Chemistry students with a minimum amount of coursework dispense glassware and supplies to students enrolled in undergraduate courses. Upperclassmen are awarded assistantships which involve more advanced Chemistry knowledge and experience. These students are responsible for preparation of solutions for each course. Non-majors can apply for copy center positions. In addition to the assistantships, students with awards from Federal work study and other programs are encouraged to request Chemistry for placement.

Further questions about student employment opportunities in the Department of Chemistry can be directed to Mr. Stephen Pusztay, Room 317 Natural Sciences Complex.



## *Career Services*

Professional Job Search: Career Services provides a variety of services for job hunting students. To prepare for the job search, students can use the facilities of the office to gain information on effective resume writing and on interview and job search techniques. The office also houses a library of career literature from various employers and professional job descriptions. This material offers students an opportunity to identify and research potential employers.

Services provided by Career Services include counseling, self-assessment testing, and career information. Through the Bullseye program, students can be brought together with hundreds of employers and thousands of job and internship vacancies. Services offered are described on the next page or at the web address [www.ub-careers.buffalo.edu](http://www.ub-careers.buffalo.edu)

## CAREER SERVICES

### DISCOVER

Self-assessments to help with major and career exploration—start with MyPlan  
[ub-careers.buffalo.edu/myplantips](http://ub-careers.buffalo.edu/myplantips)

StrengthsQuest™, a self-assessment to help understand natural talents and strengths  
[ub-careers.buffalo.edu/assess](http://ub-careers.buffalo.edu/assess)

UBE 202 Career Planning course for undecided students  
[ub-careers.buffalo.edu/syllabus](http://ub-careers.buffalo.edu/syllabus)

Brent D. Arcangel Career Library at 259 Capen Hall with hundreds of books on careers  
[ub-careers.buffalo.edu/library](http://ub-careers.buffalo.edu/library)

Counselor-recommended online resources related to choosing a major and exploring careers  
[ub-careers.buffalo.edu/majorinfo](http://ub-careers.buffalo.edu/majorinfo)

**Chemistry Majors:**  
*We have resources to help you investigate graduate and professional school options as well as career options. Visit us often during your time at UB!*

### DEVELOP

Mentor Network in BullsEye, with more than 550 professionals who want to help UB students explore careers, network, job shadow, and much more  
[ub-careers.buffalo.edu/mentor](http://ub-careers.buffalo.edu/mentor)

Career fairs to encourage networking between students and local/national employers  
[ub-careers.buffalo.edu/calendar](http://ub-careers.buffalo.edu/calendar)

Alumni Career Reality Video online series featuring alumni talking about various career fields  
[ub-careers.buffalo.edu/alumvideos](http://ub-careers.buffalo.edu/alumvideos)

Career Conversations networking events throughout New York State bringing together students and alumni  
[ub-careers.buffalo.edu/careerconv](http://ub-careers.buffalo.edu/careerconv)

Graduate and professional school programming and workshops  
[ub-careers.buffalo.edu/continue](http://ub-careers.buffalo.edu/continue)

### ACHIEVE

Walk-in Quick Questions assistance and resume / cover letter reviews  
[ub-careers.buffalo.edu/student](http://ub-careers.buffalo.edu/student)

Job and internship searching resources in BullsEye, online, and in the Career Resource Library  
[bullseye.buffalo.edu](http://bullseye.buffalo.edu)  
[ub-careers.buffalo.edu/resources](http://ub-careers.buffalo.edu/resources)  
[ub-careers.buffalo.edu/jobintern](http://ub-careers.buffalo.edu/jobintern)

Workshops throughout the year to assist with the job search and application process  
[workshops.buffalo.edu](http://workshops.buffalo.edu)

Recorded practice interviews, print and online resources related to interviewing  
[ub-careers.buffalo.edu/intv](http://ub-careers.buffalo.edu/intv)

InterviewStream, an online tool offering the opportunity to practice interviewing with a webcam  
[bullseye.buffalo.edu](http://bullseye.buffalo.edu)

Going Global, an online tool to search for jobs and internships abroad and in the U.S.  
[bullseye.buffalo.edu](http://bullseye.buffalo.edu)

Career Search, an online tool to research employers and industries  
[bullseye.buffalo.edu](http://bullseye.buffalo.edu)

On-campus Testing Center offering a variety of both graduate and professional school tests  
[ub-careers.buffalo.edu/testing](http://ub-careers.buffalo.edu/testing)

Schedule your career counseling appointment today!

Call 716-645-2231  
 or stop by  
 259 Capen Hall.

## *Internet Resources for Chemistry Students*

UB Chemistry  
Department Homepage:  
<http://www.chemistry.buffalo.edu>

American Chemical  
Society Homepage:  
<http://www.acs.org>

UB's Libraries:  
<http://ublib.buffalo.edu/libraries>

Ovid (Current Contents,  
Databases, Abstracts, etc.  
from UB SEL:  
<http://ublib.buffalo.edu/libraries/e-resources>

Chemical Abstract  
Service Homepage:  
<http://www.cas.org>

NIST Chemistry  
Webbook (NIST Standard  
Reference Database No.  
69):  
<http://webbook.nist.gov/chemistry>

Chemical and  
Biochemical Reference  
Data Division  
[http://www.nist.gov/mml/chemical\\_properties/index.cfm](http://www.nist.gov/mml/chemical_properties/index.cfm)

TAURUS (searchable  
database for courses at  
other colleges equivalent  
to UB courses):  
<http://taurus.buffalo.edu/>

## *Academic & Department Info:*

[http://www.buffalo.edu/academics/schools\\_and\\_colleges.html](http://www.buffalo.edu/academics/schools_and_colleges.html)

UB Homepage:  
<http://www.buffalo.edu/>

UB Class Schedules:  
<http://www.myub.buffalo.edu>

UB Calendar of  
Registration Dates:  
<http://registrar.buffalo.edu/calendars/>

## *Contact Information for Chemistry Students*

By mail:  
Department of Chemistry  
359 Natural Sciences  
Complex  
University at Buffalo,  
The State University of  
New York  
Buffalo, NY 14260-3000  
USA

By telephone:  
Main Number: (716) 645-  
6800  
FAX: (716) 645-6963

Department of Chemistry  
Chair:  
Prof. Luis A. Colón  
(716) 645-6824  
email:  
[chechair@buffalo.edu](mailto:chechair@buffalo.edu)

Secretary to the Chair:  
Ms. Carolyn Boron  
(716) 645-6823  
email:  
[checmb@buffalo.edu](mailto:checmb@buffalo.edu)

Director of  
Undergraduate Studies:  
Prof. Jerry Keister  
(716) 645-4205  
email:  
[keister@buffalo.edu](mailto:keister@buffalo.edu)

Secretary to  
Undergraduate Director:  
Mrs. Connie Carlino  
(716) 645-6626  
email:  
[chemug@buffalo.edu](mailto:chemug@buffalo.edu)

Organic Chemistry Lab  
Director and  
Chemistry Department  
Safety Officer:  
[Dr. Khalid Ahsan](mailto:Dr.Khalid.Ahsan@buffalo.edu)  
(716) 645-4115  
email: [ahsan@buffalo.edu](mailto:ahsan@buffalo.edu)

Director, General  
Chemistry Laboratory:  
[Mrs. Priscilla Clarke](mailto:Mrs.Priscilla.Clarke@buffalo.edu)  
Office: 266 Natural  
Sciences Complex  
(716) 645-4113  
email: [pbc@buffalo.edu](mailto:pbc@buffalo.edu)

Instructional Support  
Specialist, General  
Chemistry Laboratory :  
[Dr. Valerie Frerichs](mailto:Dr.Valerie.Frerichs@buffalo.edu)  
Office: 344 Natural  
Sciences Complex  
(716) 645-4135  
Email:  
[zuccari@buffalo.edu](mailto:zuccari@buffalo.edu)

Academic Advisement:

275 Park Hall, North  
Campus, 645-6883  
<http://casadvising.buffalo.edu/>

Career Services:  
259 Capen Hall, North  
Campus, 645-2231  
<http://www.ub-careers.buffalo.edu/>

Chemistry Dept.  
Undergraduate Office:  
363 Natural Sciences  
Complex, 645-6626  
<http://www.chemistry.buffalo.edu/undergraduate/>

Counseling Center:  
120 Richmond, North  
Campus, 645-2720  
<http://ub-counseling.buffalo.edu/>

Accessibility Services:  
25 Capen Hall, North  
Campus, 645-2608,  
TDD/TTY: 645-2616

Financial Aid to  
Students:  
Located in the Student  
Response Center  
232 Capen, North  
Campus, 645-2450

Group Legal Services:  
377 Student Union,  
645-3056  
<http://subboard.com/legal/>

Health Services:  
Michael Hall, South  
Campus, 829-3316  
<http://www.student-affairs.buffalo.edu/shs/student-health/>

International Student &  
Scholar Services:  
212 Talbert, North  
Campus, 645-2258  
<http://wings.buffalo.edu/intlservices/>

Off Campus Student  
Services:  
109 Allen Hall, South  
Campus, 829-3541  
<http://subboard.com/och/contact.asp>

Off Campus Housing:  
350 & 365 Harriman  
Hall, South Campus,  
829-2224

Orientation: (Student  
Life)  
Suite 150, Student  
Union, North Campus,  
645-6125  
<http://www.student-affairs.buffalo.edu/studentlife/>

Public Safety:  
EMERGENCY 645-2222

Records & Registration:  
Now part of the Student  
Response Center  
232 Capen, North  
Campus, 645-2450

Recreation Centers:  
130 Alumni Arena,  
645-2286  
The Oasis, 150 MFAC,  
645-2322

Student Finances &  
Records:  
Located in the Student  
Response Center  
232 Capen, North  
Campus, 645-2450

Student Life:  
150 Student Union,  
North Campus, 645-2055  
<http://www.student-affairs.buffalo.edu/studentlife/>

Student Response Center  
232 Capen Hall, 645-2450  
or online:  
<http://src.buffalo.edu>

SUNY Card:  
101 The Commons, North  
Campus, 645-6344  
104 Harriman Hall,  
South Campus, 829-3682

Tuition Assistance  
Program: (TAP)  
1-518-474-5642  
99 Washington Ave.  
Albany, NY 12255

Veteran's Affairs:  
175 MFAC, Ellicott,  
645-2271

Voter Registration:  
350 Student Union,  
645-2950  
<http://www.student-affairs.buffalo.edu/votereg.shtml>

Work Study Program:  
232 Capen Hall (Student  
Response Center),  
645-2450

