



COLLEGE *of*  
CHARLESTON

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DEPARTMENT OF  
CHEMISTRY  
AND BIOCHEMISTRY

HANDBOOK FOR MAJORS



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**The Department of Chemistry and Biochemistry of The College of Charleston is fully accredited by the Committee on Professional Training of the American Chemical Society.**

## FACULTY

GARY L. ASLESON, Professor Emeritus; Ph.D., University of Iowa, 1975; B.A., Gustavus Adolphus College, 1970; *ANALYTICAL CHEMISTRY*. Research interests: Nuclear magnetic resonance and metal ion binding by tetracyclines; chromatographic separations; trace metals in the environment. E-mail: aslesong@cofc.edu - (843) 953-8096

CHARLES F. BEAM, Jr., Professor; Ph.D., University of Maryland, 1970; B.S., City College of the City University of New York, 1963; *ORGANIC CHEMISTRY*. Research interests: Strong-base organic syntheses; organic polymer synthesis; heterocyclic synthesis from isatoic anhydrides and acetylene esters; pyrolysis. E-mail: beamc@cofc.edu - (843) 953-8099

WENDY CORY, Assistant Professor; B.S., University of Tennessee - Chattanooga; Ph.D., University of Florida; *ANALYTICAL CHEMISTRY*. Research interests: LC-MS of degradation products of pharmaceuticals. Email: coryw@cofc.edu - (843) 953-1405

JAMES P. DEAVOR, Professor and Department Chair; Ph.D., University of South Carolina, 1983; B.S., Mercer University, 1978; *ANALYTICAL CHEMISTRY*. Research interests: Atomic spectroscopy; molecular spectroscopy; chemical education. E-mail: deavorj@cofc.edu - (843) 953-8095

MARION T. DOIG, III, Professor; Ph.D., University of South Florida, 1973; B.S., College of Charleston, 1966; *BIOCHEMISTRY*. Research interests: Marine natural products; neurochemistry; cancer chemotherapy. E-mail: doigm@cofc.edu - (843) 953-8093

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FREDERICK J. HELDRICH, Professor; Ph.D., Emory University, 1980; B.S., Washington and Lee University, 1976; *ORGANIC CHEMISTRY*. Research interests: Natural products synthesis and synthetic methodology; electroorganic syntheses. E-mail: heldrichr@cof.edu - (843) 953-5515

W. FRANK KINARD, Professor; Ph.D., University of South Carolina, 1968; B.S., Duke University, 1964; *ANALYTICAL CHEMISTRY*. Research interests: Nuclear chemistry-solution chemistry of lanthanide/actinide elements; environmental chemistry; microcomputers for experimental control and analysis. E-mail: kinardf@cofc.edu - (843) 953-8091

KRISTIN D. KRANTZMAN, Professor; Ph.D., University of California, Los Angeles, 1990; B.S., Occidental College, 1986; *THEORETICAL PHYSICAL CHEMISTRY*. Research interests: Ab initio calculations and molecular dynamics simulations to model surface-gas reactions. E-mail: krantzmank@cofc.edu - (843) 953-3378

RICHARD LAVRICH, Assistant Professor; B.S., The Ohio State University; Ph.D., Kent State University; *PHYSICAL CHEMISTRY*. Research interests: Chiral interaction of organic and biological molecules, conformational preference of peptides, microwave spectroscopy. Email: lavrichr@cofc.edu - (843) 953-5272

ELIZABETH M. MARTIN, Associate Professor Emeritus; M.S., Georgia State University, 1972; M.A.T., Duke University, 1965; B.A. Winthrop College, 1964; *ANALYTICAL CHEMISTRY*. Research interests: Chemical education. E-mail: martine@cofc.edu - (843) 953-5516

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**PAMELA RIGGS-GELASCO**, Mebane Professor of Chemistry and Biochemistry; Ph.D., University of Michigan 1995; B.S. Albion College 1989; *BIOCHEMISTRY*. Research interests: Metal cluster assembly in manganese enzymes, protein purification, x-ray absorption, EPR spectroscopy, and rapid kinetic techniques. E-mail: gelascop@cofc.edu - (843) 953-7182

**AMY LEDBETTER ROGERS**, Assistant Professor and Laboratory Program Director; Ph.D., University of South Carolina, 2000; B.S. Furman University, 1994; *BIOCHEMISTRY*. Research Interests: Nitric oxide synthase; protein chemistry, chemical education. E-mail: rogersa@cofc.edu - (843) 953-7292.

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**JUSTIN K. WYATT**, Assistant Professor, BS, Oregon State, 1994; Ph.D., University of California-Davis, 2000; *ORGANIC CHEMISTRY*. Research interests: Propargylic alcohols, Enantioselective synthesis. E-mail: wyattj@cofc.edu - (843) 953-6587

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*This catalog is not a contract. The College of Charleston reserves the right to change programs of study, academic requirements, and College policies at any time, in accordance with established procedures, without prior notice.*

## **Welcome to the Department of Chemistry and Biochemistry**

Welcome to the Department of Chemistry and Biochemistry at the College of Charleston. The teaching of chemistry has been a part of the College of Charleston curriculum since its founding over 230 years ago. The Department offers the following options: BA in chemistry, BS in chemistry, and BS in biochemistry. An environmental chemistry emphasis is also offered. Students majoring in other disciplines may obtain a minor in chemistry. We feature a faculty that has as its primary focus the teaching of undergraduates and who value teacher- student interaction. We are recognized throughout the Southeast for the quality of our program, the dedication of our faculty, and the success of our students. In terms of the number of majors graduated in the 1990 and early 2000's we are the second largest public baccalaureate- degree only department in the United States, and yet our largest classes have approximately 50 students. Our graduates readily find acceptance to graduate and professional schools or placement in the chemical industry. Students going on to graduate school typically receive fellowships in excess of \$24,000 and are accepted to graduate programs throughout the southeast and beyond. In conjunction with the School of Education students may also complete a leading to certification for teaching in secondary education. All students receive the finest of liberal arts educations.

Undergraduate research is also emphasized that usually leads to students making presentations at professional meetings and being co-authors on publications in respected scientific journals. Summer research positions are available. There are also internship and coop opportunities with local industry for qualifying students.

A student may receive a certified degree from the American Chemical Society by completing a BS in either chemistry or biochemistry. We emphasize hands-on use by our students of modern instrumentation.

Chemistry is the study of matter, its composition, properties, and transformations. It is often called the "central science" as it lies at the heart of most modern science and technology. A career in chemistry will provide you with challenges and offer you great potential to benefit society. This department is able to prepare you to meet those challenges.

## **A BRIEF HISTORY OF CHEMISTRY AND BIOCHEMISTRY AT THE COLLEGE OF CHARLESTON**

Instruction in Chemistry has been a part of the program of studies at the College of Charleston from its very founding. The recommendation to the General Assembly of South Carolina in 1770 for the establishment of a college in Charles Town included in its provisions for a faculty, among others, a professor "of Physics, Anatomy, Botany, and Chemistry." Early faculty rosters list one John Chichester a Lecturer in Chemistry in 1793, and Charles Sheppard, Professor of Mathematics and Natural Philosophy. Lewis Reeve Gibbes was Professor of Natural History and Mathematics from 1839 to 1892. Among his many distinctions in the natural sciences was an early development of a periodic system of the elements (1867). E. Emmet Reid, later a distinguished professor at Johns Hopkins University, was Professor of Chemistry from 1898-1901.

The first half of the twentieth century at the College of Charleston was characterized by two professors with exceedingly long tenure as instructors of chemistry. Professor Horatio Hughes (B.S., College of Charleston, 1905; Ph.D., Johns Hopkins University, 1913) served as Professor of Chemistry from 1923 to 1950. Professor Earle DeWitt Jennings (B.S., University of North Carolina, 1922; Ph.D., 1926) was on the faculty from 1926 to 1965. Professor Jennings also served as the Dean of the College from 1949 until 1958. It is for Dr. Jennings that the biochemistry lab is named. The standards of excellence that characterizes today's Department of Chemistry at the College can largely be attributed to two men, Professor Edward E. Towell and Professor Carl J. Likes. Originally hired as an instructor in Physics, Professor Towell (B.S., College of Charleston, 1934; Ph.D., University of North Carolina, 1944) served on the faculty from 1943 until his retirement as Professor of Chemistry in 1976. In addition, Prof. Towell served as Dean of the College from 1958 to 1964 and again from 1968 to 1970. Professor Likes (B.S., College of Charleston, 1937; Ph.D., University of Virginia, 1941) served on the faculties of Tulane University and Hampden-Sydney College before joining the faculty in 1958. Professor Likes retired in 1982. Their leadership in maintaining high academic standards for students of chemistry as the College expanded its enrollment from 400 students to nearly 10,000 helped to ensure that the Department of Chemistry maintained its reputation for excellence during a period of unparalleled growth in the College's history.

Prof. Gerald W. Gibson (B.S., Wofford College, 1958; Ph.D., University of Tennessee, 1964) joined the Department of Chemistry in 1965 and served as chairman from 1967 until he left the department in 1982. Prof. Gibson presided over the growth of the Department of Chemistry from a faculty of four teaching about 150 students in 12 courses to a faculty of 10 full-time professors and two full-time teaching associates. In 1974, the Department of Chemistry moved from its former location in Randolph Hall to its present location on the third floor of the Science Center.

The Gamma Delta Chapter of the Alpha Chi Sigma Chemistry Fraternity was chartered in 1981. The chapter helps provide social and service opportunities to our

students. In 1982 Dr. W. Frank Kinard became chairman when Dr. Gibson was named Associate Provost of the College. An area of specialization leading to a Bachelor of Science in Biochemistry was added to the Department's curriculum in 1984. The program became the third largest in the state and second largest in terms of the number of ACS-certified graduates. Construction started in the spring of 1986 on the new wing of the Science Center. The Department of Chemistry occupied its newly renovated space in August of 1987. Additional space for chemistry lectures and research was included in the upgrading of facilities. At those dedication ceremonies Dr. Marion T. Doig, III was named to the first William Mebane Teaching Chair in Chemistry and Physics.

Dr. Henry Donato served as chairman from 1990-1992 during a time of tremendous growth at the College. It was during this period that the College added the title of University of Charleston and divided into schools with the Department of Chemistry placed in the School of Science and Mathematics. The Department began hosting Woodrow Wilson Institutes for High School Teacher Development during this time with Prof. Elizabeth Martin directing these efforts. From 1991-93 Professor Martin also served as a mentor for the United States Chemistry Olympiad Team. In 1993 the team had its best performance ever, earning two gold and two silver medals.

In May 1995 Professor Martin was honored with the Charles Townes Award for Support of Science and Mathematics Education from the South Carolina Governor's School for Science and Mathematics.

Professor Elizabeth Martin was honored on March 29, 1996 with the Governor's Award for Excellence in Science Awareness. The award was presented at the annual meeting of the South Carolina Academy of Science. The South Carolina Commission on Higher Education reviewed the physical science programs in the state during the spring semester 1996. On February 5, 1998 the department received a commendation for excellence for its chemistry B.A. and B.S. programs as a result of that review. The only other chemistry program so honored was USC-Columbia. In 1997 the B.S. biochemistry program was reviewed as a part of the life sciences C.H.E. review. In 1997 the department added its fourteenth tenure-track faculty member.

On March 20, 1998 the Earle D. Jennings Biochemistry Lab, a gift from his son and daughter-in-law, was dedicated in honor of Dr. Jennings who taught for many years in this department. The Department on November 5, 1998 received a commendation for excellence for its B.S. Biochemistry program from the South Carolina Commission on Higher Education, the only biochemistry program so honored. On March 26, 1999 Professor Elizabeth Martin received one of four 1999 Responsible Care Catalyst Awards from the Chemical Manufacturers Association for Excellence in teaching chemistry at the college/university level.

In 2000 Dr. Charles F. Beam, Jr. received the Chemist of the Year Award from the South Carolina Section of the American Chemical Society—the first person from a strictly undergraduate school to be so honored. He also received the School of Sciences and Mathematics Distinguished Achievement Award. In February of 2000 all six departments of the School of Science and Mathematics were honored by a joint resolution the South Carolina House of Representatives and Senate. That summer they awarded \$4 million to begin architectural and engineering design for a new science facility. In 2002 the firms of Ballenger (Philadelphia) and Liollo (Charleston) were awarded the contract.

Lee Higdon assumed the presidency of the College of Charleston in October 2001. His Fourth Century Initiative included the creation of the Undergraduate Research and Creative Activities Program with Professor Rick Heldrich as its first director. The 2002 Southeast Regional Meeting of the American Chemical Society was hosted by the Department. Over 1500 chemists from around the Southeast attended. The gala receptions were held at the South Carolina Aquarium. The annual meeting of the South Carolina Academy of Science in March 2003, Dr. Charles F. Beam received the Governor's Award for Excellence in Science Awareness in recognition of his thirty years of being a leader in South Carolina in promoting undergraduate research. At its biannual conclave in 2004 the Alpha Chi Sigma Professional Chemistry Fraternity awarded Gary Asleson its Ronald T. Pflaum Award as the outstanding chapter advisor.

In 2005 the College under the leadership of Dr. Pamela Riggs-Gelasco was part of a multi-institution consortium that received a \$17.3 million federal grant to develop innovative technology as part of the National Institutes of Health INBRE (Idea Networks of Biomedical Excellence) program. Charles F. Beam, Professor of Chemistry & Biochemistry was presented the American Chemical Society national award for Outstanding Undergraduate Research at the National American Chemical Society meeting in Atlanta GA in March 2006. The award, sponsored by the Research Corporation, is given annually to a faculty mentor whose research in an undergraduate setting has achieved wide recognition and contributed significantly to chemistry and to the professional development of undergraduate students. He is only the second recipient of the award from South Carolina since its inception in 1986.

In 2008 the College, under the leadership of Dr. Pamela Riggs-Gelasco was awarded a \$1.5 million grant from the Howard Hughes Medical Institute. A chemical biology course will be developed and an additional chemistry faculty member will be hired from the grant.

## **FACULTY HONORS**

The following faculty members have received school or college-wide honors:

1977 Carl Likes: Distinguished Teaching Award  
1984 Marion Doig: Distinguished Research Award  
1988 Elizabeth Martin: Distinguished Teaching Award  
1988 Elizabeth Martin: Distinguished Service Award  
1990 Gary Faber: Distinguished Teaching Award  
1990 Charles Beam: Distinguished Research Award  
1991 James Deavor: Distinguished Teaching Award  
1997 Kristin Krantzman: School of Science & Mathematics Outstanding Achievement Award  
1999 Elizabeth Martin: Distinguished Advising Award  
2000 Marion T. Doig: Distinguished Advising Award  
2000 Charles F. Beam, Jr.: School of Science and Mathematics Outstanding Achievement Award  
2001 Marion T. Doig: Distinguished Service Award  
2002 James P. Deavor: Distinguished Advising Award  
2002 James P. Deavor: School of Sciences and Mathematics Outstanding Achievement Award  
2003 F. J. Heldrich: School of Sciences and Math Outstanding Achievement Award  
2004 Pamela Riggs-Gelasco: School of Sciences and Math Outstanding Achievement Award  
2006 Gary L. Asleson: Distinguished Advising Award  
2008 Pamela Riggs-Gelasco: School of Sciences and Math Outstanding Achievement Award

## **CHEMISTRY AND BIOCHEMISTRY DEPARTMENT CHAIRS**

1967 - 1982	Gerald Gibson
1982 - 1989	W. Frank Kinard
1990	Charles F. Beam, Jr., interim
1990 - 1992	Henry Donato, Jr.
1992 - 1995	Charles F. Beam, Jr.
1995 - 2001	James P. Deavor
2001 - 2002	F. J. Heldrich, interim
2002 -	James P. Deavor

## **DEANS, SCHOOL OF SCIENCE AND MATHEMATICS**

1991 - 2001	Gordon Jones
2001 - 2002	James P. Deavor, Interim
2002 - 2008	Norine Noonan
2008 - 2009	George Pothering, Interim

## **WILLIAM MARION MEBANE DISTINGUISHED TEACHING CHAIR IN CHEMISTRY AND BIOCHEMISTRY**

1998	Marion T. Doig, III
1992	Elizabeth M. Martin
1996	Henry Donato, Jr.
2000	W. Frank Kinard
2004	Gary L. Asleson
2008	Pamela Riggs-Gelasco

## FACILITIES

The Department of Chemistry and Biochemistry at the College of Charleston occupies the third floor of the Science Center at the corner of George and Coming Streets. During the summer of 2010 we will move to our new facility currently being constructed on the K-Lot on the corner of Calhoun and Coming Streets. The departmental secretarial offices are located on the north end of the building in Rooms 316A and 316B. Most offices of Chemistry faculty members are located on the same floor.

The Science Center contains seven modern, well-equipped chemistry teaching laboratories. Two of these are used for introductory laboratory courses (Room 318 and 320), one for organic chemistry (301), one for analytical chemistry (303), and one for physical chemistry (304), and biochemistry (300). In addition, there are seven laboratories that are set aside for use by students and faculty members who are engaged in individual research projects. Computer terminals used by students for data analysis and computer assisted instruction are located in the Department of Chemistry Reading Room (315). Instrument rooms (304A, 325 and 329) house the major items of instrumentation used by students doing chemical analysis as part of a laboratory course or research project. The Chemistry Reading Room, which contains a number of reference books for use in course work, is used by students as a study area. A larger collection of chemical reference works, monographs and journals is housed in the Robert Scott Small Library. Our department also has electronic access to on-line journals and databases. Chemistry students at the College of Charleston also have access to the scientific library at the Medical University of South Carolina 5 blocks away and are encouraged to use these facilities. Several support rooms: a stockroom, a hydrogenation room, preparation rooms and balance room are also located on the floor with the laboratories. Chemistry lectures and seminars are conducted in Room 317 of the Science Center as well as LCTR 344, LCTR 346, and MYBK 322.

### THE CHEMISTRY DEPARTMENT FACILITIES

ROOM #	USE	ROOM #	USE
300	Biochemistry Lab	316 C	Office - Dr. Deavor (Chairman)
300A	Autoclave	317	Lecture Room
301	Advanced Synthesis Laboratory	318	Introductory Chemistry Laboratory
301A	Research Laboratory (Guirgis)	318A	Research Laboratory (Rogers)
301B	Research Lab (Overby)	318B	Office - Dr. Rogers
302	Organic Laboratory	319	Research Lab (Riggs-Gelasco)
303	Analytical Laboratory	320	Introductory Chemistry Laboratory
303A	Research Lab (Kinard)	320A	Research Lab (Cory)
303B	Research Lab (Lavrich)	321	Office - Dr. Wyatt
304	Physical Chemistry Laboratory	321 A	Research Lab (Wyatt)
304A	Instrumental Analysis Lab	322	Research Lab (Overby)
305	Office -Dr. Riggs-Gelasco	323	Research Lab (Krantzman)
306	Office - Dr. Lavrich	324	Office - Dr. Krantzman
307	Office - Dr. Asleson	325	Office - (Jones) NMR Lab
308	Office - Dr. Beam	327	Chemistry Stockroom
309	Office - Dr. Cory	328	Office - Dr. Tonks
310	Office - Dr. Kinard	329	Automated Chromatography Lab
311	Office – Dr. Taylor	330	Research Lab (Beam)
312	Office - Dr. Donato	331	Office - Dr. Overby
313	Office - Dr. Heldrich	332	Office - Dr. Doig
315	Reading Room/Student Computer Rm.	332 A	Research Lab (Doig)
316 A	Office - Administrative Assistant (Neal)		Hydrogenation Room
316 B	Office - Lab Manager (Tomlinson)		

## WHY STUDY CHEMISTRY OR BIOCHEMISTRY?

Chemistry is fundamental. To understand why an autumn leaf turns red, or why a diamond is hard, or why soap gets us clean, requires an understanding of chemistry. To design a synthetic fiber, a life-saving drug, or a space capsule requires knowledge of chemistry. The behavior of atoms, molecules, and ions determines the sort of world we have to live in, our shapes and sizes, and even how we feel on a given day. So chemistry is worth studying, first of all, just because it is such a good antidote for ignorance.

Chemistry and Biochemistry are worthwhile disciplines because they prepare us for the real world. A college graduate with a degree in chemistry or biochemistry is in a good position to choose a useful and interesting career. Food chemistry, polymer chemistry, dyestuff chemistry, chemical oceanography, chemical information, chemical sales-the list of career possibilities is long and varied. Even in times when unemployment rates are generally high, the chemist remains the scientist most in demand.

Chemists and biochemists are very much involved in tackling the problems faced by our modern society. On a given day, a chemist may be studying the mechanism of the recombination of DNA, measuring the amount of insecticide in drinking water, comparing the protein content of meats, developing a new antibiotic, or analyzing a moon rock. Participation in important and interesting projects as a competent chemical scientist begins, of course, with a study of introductory chemistry as an undergraduate.

Chemistry and biochemistry are challenging majors. The undergraduate curriculum is demanding both intellectually and in terms of time. There are no "easy courses" to be found in it. One studies inorganic chemistry, organic chemistry, biochemistry, physical chemistry and analytical chemistry, examining the most basic qualities of matter, mastering strategies of chemical synthesis, solving chemical mysteries in the laboratory, and learning to communicate facts and theories about chemistry to others. Elective courses may include environmental chemistry, or one may choose to delve more deeply into one of the other subdisciplines of chemistry. Research with a member of the chemistry faculty in the junior or senior year can provide valuable experience at the frontiers of the science.

Whether your goal is to become a surgeon or a research scientist, a teacher or an information specialist, you should examine chemistry or chemistry as a major. It isn't for everyone; but those students who do choose chemistry usually find it as interesting as it is challenging, and they always take great pride in the degree they earn as undergraduates.

## GOALS FOR THE CHEMISTRY CURRICULUM

**The student graduating in Chemistry or Biochemistry should be able to:**

make theoretical predictions based on fundamental chemical principles

rationalize from chemical principles the results of experimental data

select appropriate methods of analysis of compounds

identify compounds and elements

use common tools of chemistry (instruments, glassware, etc.)

use the scientific method properly and appropriately

appreciate the role of chemistry in our culture

apply mathematical principles in the solution of chemical problems

communicate results of scientific investigation orally and in writing

use the chemical literature appropriately

recount and explain the major laws, facts, and theories of chemistry to someone uninitiated in the subject

## The Importance of Academic Advising

The Department of Chemistry & Biochemistry is committed to supporting you throughout your academic career at the College of Charleston as you develop and achieve your educational goals in order to prepare you for your career after graduation. This is done via academic advising where one of our faculty members partners with you to serve not only as a resource in selecting courses but also to serve as a mentor as you make post-graduation plans. While you may change your mind several times as to what you want to do after you graduate, you need to start planning and continually monitor your progress in order to keep your options open. It is a collaborative effort between the student and the academic advisor.

Your advising meetings are an important part of the process which begins with your first appointment and continues until you graduate. Our faculty members will help you develop your academic plan and plan for post-graduate study or to enter the workforce directly upon graduation. You and your advisor will be discussing many things ranging from your previous experiences to your future aspirations. These different areas of discussion may include but are not limited to the following:

- Your strengths
- Your areas which need further growth
- Your future, especially your career interests
- Your background such as prior course work in high school or at the college level
- Your priorities and obligations such as outside employment and family responsibilities
- College and departmental policies and procedures
- Opportunities that will complement your educational goals such as special seminars or courses

Each semester you should meet with your academic advisor to discuss your course selection for the following semester as well as your progress towards your degree and your career plans. This meeting usually happens in October for spring semester and March for fall semester. It is your responsibility to schedule the meeting by contacting your advisor. There are a few things that you should do prior to your appointment in order to make your course selection and registration process more productive.

Before your appointment:

Review the core curriculum (General Education) requirements as well as the course requirements within the chemistry/biochemistry major in the College of Charleston Undergraduate Catalog or the Chemistry /Biochemistry Majors Handbook

Review the course schedule of courses for the next semester . This is available on-line via Cougar Trail.

Develop a list of possible classes

Check to see if you meet course prerequisites

At your appointment you can expect to:

Confirm your remaining requirements

Design a schedule that fits your needs

Academic advising is a two-way street with responsibilities resting both upon the student and the faculty member. Take every advantage of this resource.

## Cougar Trail Primer

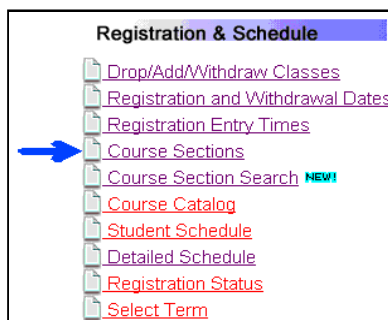
If the computer is not already logged on, do so using the instructions taped to the base of the monitor

Sign on to Cougar Trail using your student ID number and 6 digit birthdate (no dashes)

Ex. Student ID: 999-99-9999  
PIN: 072786

This PIN only works once. You will be directed to change the PIN. Create a new 6 digit NUMERIC PIN (**cannot** = your birthdate). You will also be directed to provide a clue to assist in the event you forget your password later and need to reset one.

Choose "Course Sections" and the appropriate semester



Choose from the drop down menu of subjects

Select your courses! Keep the following in mind:

1. Enroll in laboratory courses first.
2. Balance your schedule over an entire 5 day week.
3. If you must be employed while enrolled in classes, ask about "work-study" balance.
4. When signing up for classes where lecture and lab are corequisites (ex. Biology 1) write down the call number from the column on the left.
5. Go to the "Drop/Add Classes" screen (see menu at bottom of screen for link)
6. Enter the call numbers in boxes 1 and 2
7. Choose "Submit"

Academic Term: 2002 FALL

[Select Another Subject](#) | [Select Another Course](#)

Course: BIOL-111

Call Number	Section	Title	Activity	Credits	Status/Seats Available	Days	Time
12882	001	INTRO CELL MOLEC BIO	LEC	3.00	Open - 4 of 65	MWF	08:00-08:50AM
12883	002	INTRO CELL MOLEC BIO	LEC	3.00	Closed	MWF	10:00-10:50AM
12884	003	INTRO CELL MOLEC BIO	LEC	3.00	Open - 24 of 75	MWF	01:00-01:50PM
12885	004	INTRO CELL MOLEC BIO	LEC	3.00	Closed	TR	09:25-10:40AM
12886	005	INTRO CELL MOLEC BIO	LEC	3.00	Open - 1 of 75	TR	10:50-12:05PM
12887	006	INTRO CELL MOLEC BIO	LEC	3.00	Open - 32 of 75	TR	12:15-12:05PM
12888	090	INTRO CELL MOLEC BIO	LEC	3.00	Open - 41 of 50	MW	07:00-08:15PM
12889	L01	INTRO CELL MOLEC BIO LAB	LAB	1.00	Open - 9 of 24	M	07:30-10:30AM
12890	L02	INTRO CELL MOLEC BIO LAB	LAB	1.00	Closed	M	10:30-01:30PM

To see your schedule, choose "Detailed Schedule". When you have finished, print two copies of this schedule. Initial one copy and place it in your file; the other copy is for you.

Academic Term: 2002 FALL

Course ID/Course Title	Status	Credit	GT	Days	Time	Building/Room
MATH-120-008 INTRODUCTORY CALCULUS	Enrolled	4.00	*	MWF	02:00-02:50PM	MAYBANK HALL (MYBIO) 113
				R	01:40-02:55PM	MAYBANK HALL (MYBIO) 113
BIOL-101-L13 ELEMENTS OF BIOL LAB	Enrolled	1.00	*	F	10:30-01:30PM	SCIENCE CENTER (SCIC) 218
BIOL-101-090 ELEMENTS OF BIOLOGY	Enrolled	3.00	*	MW	07:00-08:15PM	SCIENCE CENTER (SCIC) 123
ENOL-101-004 COMPOSITION & LITERATURE	Enrolled	3.00	*	TR	12:15-01:30PM	R. S. SMALL LIBRARY (LIB) 001
FREN-101-000 ELEMENTARY FRENCH	Enrolled	3.00	*	MW	05:30-08:45PM	BELLSOUTH BUILDING (BELL) 310

Total Hours: 14.00

Please note: If you need to move between screens while using Cougar Trail, use the menu at the bottom of each screen (NOT the web browser back button!).

The menu links are located at the bottom of each screen.

*Be sure to return your file to a faculty member before you leave!*

## PLANNING YOUR PROGRAM IN CHEMISTRY OR BIOCHEMISTRY

Students who plan to major in chemistry or biochemistry should make an early decision as to what their ultimate career goal will be. A professional career in the field of chemistry requires graduate studies in chemistry while the medical professions require extensive training after the undergraduate degree. There are essentially three tracks to be taken in seeking a degree in chemistry or biochemistry at the College of Charleston. These tracks can be characterized as the professional chemist's degree (B.S. in Chemistry or B.S. in Biochemistry) and the liberal arts degree (B.A. in Chemistry). Some students majoring in another science area may also elect to complete a minor in chemistry.

For entering students, the distinctions between these degrees may not be appreciated, but it is extremely important that the student enroll in the Principles of Chemistry course *as early as possible, preferably in their Freshman year*. There are several reasons for this approach. First, chemistry is at the core of all sciences and some understanding of chemistry is needed to fully appreciate the fundamental concepts of other sciences. In addition, the ideal chemistry curriculum is nearly fully specified and courses must be taken in a specified sequence. Finally, for pre-medical students, it is quite important that a majority of the fundamental science courses be taken before taking the Medical College Admission Test (MCAT) in April of their Junior year.

All chemistry majors are encouraged to pursue independent research in their junior or senior year. This activity provides excellent training for graduate studies and also prepares the pre-medical student for the type of independent thinking and hypothesis testing that will characterize the clinical portion of their education. Students are encouraged to present their findings at regional and local professional society meetings such as the Southeastern Regional American Chemical Society Meeting and the Annual Meeting of the South Carolina Academy of Science. In addition, paid summer research and student teacher assistant positions are available in the Department of Chemistry for students who plan careers in chemistry or medicine.

## DECLARING YOUR MAJOR IN CHEMISTRY AND BIOCHEMISTRY

As soon as the student knows that he or she plans to major in chemistry or biochemistry, the student should declare a major and obtain an academic advisor in the Department of Chemistry and Biochemistry. The secretary in Room 316 of the Science Center has the forms necessary to declare a major with the Registrar's Office and the Department of Chemistry and Biochemistry.

Note that there is a degree "*check-list*" for chemistry and biochemistry majors in this handbook. The student should keep an independent record of his or her progress toward a degree so that proper course scheduling can be done. Your advisor in the Department of Chemistry and Biochemistry will have a similar sheet and a comparison should be made during advising and pre-registration periods.

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### Some Thoughts on Planning Your Academic Schedule

1. Pay attention to the pre-requisite and co-requisite structure for courses. This information tells the student the level at which the course is taught and the skills that the student is expected to have mastered before attempting the course. Also look at the proposed course schedules on the next few pages to see what courses should be taken in sequence. In general, 100 level courses are freshman level, 200 level course are second or third year level, 300 level courses are third year level, and 400 and 500 level courses are senior or beginning graduate level courses.
2. Plan your schedule a year in advance. Note when courses you plan to take are offered. While departments try to ensure that interdepartmental conflicts are minimized, some courses are bound to have conflicting schedules.
3. Plan to have taken all of the "core" courses in your major or pre-professional program before taking the GRE exams for graduate school or the MCAT exam for medical school. Obviously, the student who has completed more fundamental course work before taking these examinations will have an advantage in any subject area examination. The Study Skills Lab (953-5635) can assist students interested in properly preparing for standardized examinations (e.g., GRE, MCAT). Don't wait until the last minute to start preparing for these examinations. Some of our best students need to become "test wise", because they have experienced earlier difficulties with standardized examinations.
4. Ultimately, the student is responsible for seeing that all degree requirements are met and courses are correctly scheduled. If you have any doubts, ask your advisor or the department chairman. Act before any deadlines arise and your choices become limited.

## CHEMISTRY & BIOCHEMISTRY MAJORS ELECTRONIC MAILING LIST

The College of Charleston Administrative Computing & Telecommunications Services Department maintains PMDF Mailing Lists for chemistry & biochemistry majors. This is updated nightly from the SIS system. Besides being assigned a faculty member from our department to be your advisor, another reason for declaring a chemistry or biochemistry major is so that you can automatically be added to these email lists and receive important announcements regarding registration, graduation requirements, seminars, scholarships, and departmental news.

You should always check your College of Charleston email on a regular basis. If you do not use your CofC (Edisto) email account you should have your mail forwarded from it to the account that you do use. To add/remove a forward on your account, you have to login to Edisto to add/remove a forward on your account. You can access Edisto from any of the labs on campus (look for a link on the desktop). From the main menu choose #2 for Email then #4 to add or #5 to remove a forward on your account.

The webserver running CofC Webmail has set a quota for the amount of space allocatable for your mail. Users have a 5 Megabyte quota for mail stored on our server. After you have downloaded 5 MB worth of mail, you must delete some messages before reading any more new mail. This total includes messages in the INBOX, all saved-mail folders, sent-mail folders, and file attachments. Sometimes files you delete persist on the server. To correct this, next time you log in, enter username#flush\_msgs in place of your regular username and CofC WebMail will clean out the mailbox. (Mail in your folders will NOT be erased.) If you believe you are under the quota and seeing this message in error, email [webmail-help@cofc.edu](mailto:webmail-help@cofc.edu). You may download mailfolders to your local machine with the "Export Folders" command from the Folders page to save your data before deleting it from the server.

## SUMMER OPPORTUNITIES AND CAREER PLACEMENT

Traditionally, chemists have the lowest unemployment rates of any of the sciences or engineering. Since the majority of the students graduating in chemistry at the College of Charleston plan to continue their studies in graduate or professional schools, job placement is not a major issue in chemistry. However, for those students who do plan to enter industry or some other occupation after graduation, the Department of Chemistry actively assists the student in finding a satisfactory position. Employers are constantly calling the department to seek students with chemistry backgrounds for both temporary and permanent positions. Graduating students who plan to enter the work force directly after graduation should notify their advisor early in the senior year that they are planning on going to work after graduation, so that the faculty can assist in the job placement process.

For students who plan to go to graduate school in chemistry or biochemistry, teaching assistantships and fellowships are available from all graduate schools and no student attends graduate school without being paid. Currently, stipends are in the range from \$22,000 to \$24,000 at most major graduate universities. Students should prepare to apply to graduate schools in the beginning of the spring semester of their senior year by taking the Graduate Record Examinations during the *fall semester*. Students should contact their faculty advisor early in the application process for suggestions as to which graduate schools would meet their needs.

For students who have taken organic and preferably, physical chemistry before the end of their junior year, there are an increasing number of summer research positions available. Many universities run summer research programs to attract potential graduate students. Faculty at the College and MUSC can often pay students summer stipends for research from their grants. These stipends range from \$3,000 to \$3,500 for ten weeks of research and provide the student with excellent experience in the field. These summer research positions are often quite important in being accepted at the best graduate schools. Students should watch the bulletin boards or contact their advisor early in the spring semester for information about summer research positions.

## **CO-OPERATIVE EDUCATION PROGRAMS AND INTERNSHIPS FOR CHEMISTRY AND BIOCHEMISTRY**

A Co-op program is where Department of Chemistry students are employed as employees for the purpose of gaining job experience and skills training in the chemistry field with various industries. Students will be scheduled to rotate between semesters of student enrollment at the College of Charleston and full-time employment. Students must have completed their Freshman year and maintain a minimum 2.5 grade point average within their major to be eligible to participate in this program. Other prerequisites may apply depending on the industry involved. Students may be required to successfully pass a pre-employment physical which includes a drug screening test. Additionally, in subsequent returns to the work environment after a semester in school, the student may be required to pass another drug screening before they can return as a Co-op employee. One exception, individuals may be allowed time off from the normal work schedule to attend classes which, because of sequencing problems, are not scheduled during the semester when the student is in attendance at the college.

Compensation varies depending on the place of employment. The Co-op student will report to a Coordinator or Supervisor who will be responsible for the training, supervision, and evaluation of job performance. At the end of each Co-op work period, the Supervisor will prepare an evaluation form and review it with the student. The review will address progress made, areas of improvement, and future involvement, if applicable. A copy of the evaluation form will be provided to the student and another copy forwarded to the Career Services Department at the College of Charleston.

Students are eligible to receive up to 4 hours credit by enrolling in CHEM 381 Internship.

Internships are also available on a part-time or full-time basis. These must be carried out in a non-academic lab. A faculty advisor is appointed to award the grade to be received. Arrangements for the internship must be made prior to the semester in which the work is to be carried out. Students must have a junior or senior standing and maintain a minimum 2.5 GPA both overall and in the major. Students benefit from experiential learning by receiving a better understanding of the applications of chemistry and better preparing themselves for employment opportunities upon graduation. Students are required to submit a written report to the faculty advisor and secure a letter addressing the quality of the student's work from the field supervisor. Separate reports will be required for each semester in which credit is awarded. A maximum of 4 credit hours may be earned in CHEM 381. Credit is awarded on the basis of one credit hour per 45 hours of lab work completed.

Co-ops and internships are coordinated through the Office of Career Services.  
<http://www.cofc.edu/~chem/coop/coop.html>

## SUGGESTED COURSES AND PROGRAMS

The idealized schedules on the following pages are heavily loaded in the first three years. Students often take one sequence of courses in the summer to lessen their academic year course loads. Students planning on pursuing graduate studies are encouraged to take advanced chemistry courses in their senior year in addition to the research courses. Pre-medical students are advised to have completed or be enrolled in 19 hours of chemistry (through Biochemistry, CHEM 351), 16 hours of biology (including 3 hours of advanced courses) and General Physics before taking the MCAT in April of their Junior year. These requirements place a heavy lecture and laboratory load on the first two years of the chemistry curriculum. Many students have lighter loads because they qualify for advanced standing in mathematics and languages or through AP credit in introductory courses.

Your total program may be thought of as consisting of (a) liberal arts courses required to assure breadth to your undergraduate education, (b) courses required in the major to assure substantial depth to your education and (c) elective courses chosen by you in light of your personal educational and career goals.

### **BS CHEMISTRY** plus liberal arts requirements plus electives, totaling 121 hours

Freshman	Sophomore	Junior	Senior
CHEM 111/112 + labs	CHEM 231/232 + labs	CHEM 341/342 + labs	CHEM 490/492
MATH*	CHEM 221/221L	CHEM 351	CHEM 511/512L
	MATH *	CHEM 371/371L	CHEM 521/521L
	PHYS 111/112 + labs		Advanced Chemistry Electives
			Undergraduate Research

### **BS BIOCHEMISTRY** plus liberal arts requirements plus electives, totaling 121 hours

Freshman	Sophomore	Junior	Senior
BIOL 111/112 + labs	CHEM 231/232 + labs	CHEM 341/342 + labs	CHEM 490/492
CHEM 111/112 + labs	CHEM 221/221L	CHEM 351/352/354L	
MATH*	MATH *	BIOL 312/312L	
	PHYS 111/112 + labs		Advanced Chemistry or Biology Electives
			Undergraduate Research

**BA CHEMISTRY** requires less chemistry hours and is pursued by students who wish to rapidly complete a degree (transfer students or those who declare chemistry late in their college career, those who pursue a secondary teaching certificate, or those wishing double major or minor in other disciplines.

**BA CHEMISTRY** plus liberal arts requirements plus electives, totaling 121 hours

Freshman	Sophomore	Junior	Senior
CHEM 111/112 + labs	CHEM 231/232 + labs	CHEM 341/342 + labs	CHEM 490/492
MATH*	CHEM 221/221L		Advanced Chemistry or Electives
	MATH *		Undergraduate Research
	PHYS 111/112 + labs		

**PRE- PHARMACY STUDENTS:** Students interested in a pharmacy or related career need to complete 67 semester hours of preparatory course work before transferring to a pharmacy program. It is important that the students strive to do as well as possible in all of these courses, because their acceptance into the program depends upon their overall grade-point average and their grade-point average in sciences. Persons evaluating records of potential transfer applicants are favorably impressed when they see “B” or better in courses.

While it is certainly possible for prospective pharmacy students to be admitted (averaging 17 hours per semester) after two years of study at this College, it is certainly possible to be admitted at any time after that, and some students have elected to complete a B.S. in either biochemistry or chemistry. Students should consult the pharmacy schools to which they intend to make application for specific admission requirements in regards to course work and admissions tests as well as for application deadlines.

Entry level Doctor of Pharmacy prerequisites at the Medical University of South Carolina are as follows:

<b>Prerequisites for entry into MUSC</b>	<b>Hours needed</b>	<b>C of C equivalents</b>
Principles of Chemistry	8 hrs	CHEM 111-112 with labs
Organic Chemistry	8 hrs	CHEM 231-232 with labs
Physics	8 hrs	PHYS 101-102 or 111-112 with labs
General Biology	8hrs	BIOL 111-112 with labs
Anatomy / Physiology	6 hrs	BIOL 201 - 202
Math thru Calculus	6 hrs	thru MATH 120
Statistics	3 hrs	MATH 104 or 250
English Composition	6 hrs	ENGL 101-102
Literature	3 hrs	ENGL 201 or 202 or ENGL 207
Economics	3 hrs	ECON 101 or 201 or 202
Psychology	3 hrs	PSYC 103
Interpersonal Communications	3 hrs	COMM 220
Electives	9 hrs	prefer social sciences only
<b>TOTAL</b>	<b>69 hours</b>	

Note: These courses are for student planning to apply to South Carolina College of Pharmacy (MUSC or USC). Other pharmacy programs may have slightly different admission requirements. These schools

should be contacted for their particular admissions requirements. Students should contact MUSC or visit their website for application procedures, deadline dates, and any changes in the admissions requirements or the articulation agreement. The College of Charleston is not responsible for the accuracy of the content of this page.

Also, students completing the B.S. in either chemistry or biochemistry may be interested in additional. After completing their bachelors degree requirements at this College and taking the Graduate Record Examination, they may consider some of the graduate programs in Pharmaceutical Sciences.

## **MINOR IN CHEMISTRY**

It is also possible for a student to major in another discipline and minor in chemistry. Many of these students have already taken or elected to take a year of general and organic chemistry courses and at least one semester of biochemistry. By this time, they are already within a course or two of completing the requirements for a minor in chemistry. The option to minor in chemistry becomes even more attractive, because it increases their chances for full-time or part-time employment after graduation, even if they are assured of admission to a graduate or professional school program.

The student is required to complete 15 hours of chemistry beyond second semester general chemistry, CHEM 112/112L for a total of 23 hours. These hours must include quantitative analysis, CHEM 221/221L, either a full year of organic chemistry, CHEM 231/231L, 232/232L, or a full year of physical chemistry, CHEM 341/341L, 342/342L, plus 3 hours of chemistry electives at the 300 level or above (e.g., CHEM 351, biochemistry).

## **MINOR IN BIOLOGY**

Biochemistry majors oftentimes also complete a minor in biology. You should consult the Undergraduate Bulletin to see what the current requirements are.

## **MINOR IN ENVIRONMENTAL STUDIES**

The Environmental Studies minor is offered for students who have an interest in learning more about the natural environment and ecology of the planet, as well as gaining an understanding of the relationship of political, social, cultural, and economic activities to the environment. The minor requires a minimum of 19 hours. A list of requirements may be obtained from the Department of Biology office.

# BACHELOR OF SCIENCE IN CHEMISTRY

**THE PRE-PROFESSIONAL CHEMISTRY PROGRAM.** This program leads to the Bachelor of Science degree in Chemistry. The sequence of courses below is suggested as an ideal, although students who decide later in their academic career to major in Chemistry may need to alter their schedules. Two courses that are often taken during a summer session are PHYS 111/111L and PHYS 112/112L. Students completing the B.S. in chemistry program are certified by the American Chemical Society. Life Scholarship and other scholarship recipients should be aware of renewal requirements. Honors students substitute HONS 153 and 154 for CHEM 111 and 112 and may substitute other Honors Program course work where applicable. HONS Physics may also be substituted for PHYS 111/112.

## *Freshman Year*

Principles of Chemistry & Lab	CHEM 111/111L	Principles of Chemistry & Lab	CHEM 112/112L
Pre-Calculus Mathematics	MATH 111	Introductory Calculus	MATH 120
Composition & Literature	ENGL 101	Composition & Literature	ENGL 102
<u>Elementary Language</u>	<u>LANG 101</u>	Elementary Language	LANG 102
14 credits	1 lab/wk	<u>Social Science</u>	<u>XXXX xxxx</u>
		17 credits	1 lab/wk

## *Sophomore Year*

Organic Chemistry & Lab	CHEM 231/231L	Organic Chemistry & Lab	CHEM 232/232L
Calculus II	MATH 220	Quantitative Analysis	CHEM 221/221L
General Physics	PHYS 111/111L	General Physics	PHYS 112/112L
<u>Intermediate Language</u>	<u>LANG 201</u>	<u>Intermediate Language</u>	<u>LANG 202</u>
15 credits	2 labs/wk	15 credits	4 labs/wk

## *Junior Year*

Chemistry & Biochemistry Seminar <sup>3</sup>	CHEM 490	Physical Chemistry & LabLab	CHEM 342/342L
Physical Chemistry & Lab	CHEM 341/341L	Elective	XXXX xxx
Chemical Synth. & Char.	CHEM 371/371L	Humanities Elective	XXXX xxx
Elective <sup>2</sup>	MATH 221	History	HIST 102 or 104
Humanities Elective	XXXX xxx	<u>Social Science</u>	<u>XXXX xxx</u>
<u>History</u>	<u>HIST 101 or 103</u>	16 credits	1 lab/wk
18 credits	3 lab/wk		

## *Senior Year*

Biochemistry	CHEM 351	Advanced Inorganic Chemistry & Lab	CHEM 511/512L
Instrumental Analysis & Lab	CHEM 521/521L	Intro to Research II <sup>1</sup>	CHEM 472
Chemistry & Biochemistry Seminar <sup>3</sup>	CHEM 490	Senior Seminar	CHEM 492
Introd. to Research I <sup>1</sup>	CHEM 481	Elective	XXXX xxx
Humanities Elective	XXXX xxx	Humanities Elective	XXXX xxx
<u>Elective<sup>2</sup></u>	<u>XXXX xxx</u>	<u>Elective<sup>4</sup></u>	<u>CHEM XXX</u>
16 credits	3 labs/wk	16 credits	3 labs/wk

## NOTES

<sup>1</sup>All chemistry students are encouraged to participate in the research program in their junior or senior year.

<sup>2</sup>Calculus III, Math 221 is strongly recommended.

<sup>3</sup>Chemistry & Biochemistry Seminar (CHEM 490) may be taken twice for credit.

## BACHELOR OF SCIENCE IN BIOCHEMISTRY

**THE PRE-PROFESSIONAL B.S. PROGRAM IN BIOCHEMISTRY.** This program leads to a Bachelor of Science degree in Biochemistry. The Program includes both chemistry and non-chemistry courses which will prepare the student well for either a career in biochemistry or a career in medicine, dentistry or pharmacy. The program is quite similar to that proposed for the B.S. in Chemistry with the substitution of CHEM 351, 352, and 354L for CHEM 391 and 521. The 16 credit hours of biology includes BIOL 111, 111L, 112, 112L, 312, 312L and 4 hours to be selected from BIOL 212, 212L, 310, 310L, 313, 313L or 321. Life Scholarship and other scholarship recipients should be aware of renewal requirements. Honors students substitute HONS 153 and 154 for CHEM 111 and 112 and may substitute other Honors Program course work where applicable.

### *Freshman Year*

Principles of Chemistry I & Lab	CHEM 111	Social Science Elective <sup>3</sup>	XXXX xxx
Pre-Calculus Mathematics	MATH 111	Principles of Chemistry II & Lab	CHEM 112/112L
Composition & Literature	ENGL 101	Introductory Calculus	MATH 120
<u>Elementary Language</u>	<u>LANG 101</u>	Composition & Literature	ENGL 102
14 credits	1 lab/wk	<u>Elementary Language</u>	<u>LANG 102</u>
		17 credits	1 lab/wk

### *Sophomore Year*

Organic Chemistry I & Lab	CHEM 231/231L	Organic Chemistry	CHEM 232/232L
Calculus II	MATH 220	Quantitative Analysis	CHEM 22/221L
General Physics	PHYS 111/111L	General Physics	PHYS 112/112L
<u>Intermediate Language</u>	<u>LANG 201</u>	<u>Intermediate Language</u>	<u>LANG 202</u>
15 credits	2 labs/wk	15 credits	4 labs/wk

### *Junior Year<sup>1</sup>*

Chemistry & Biochemistry Seminar <sup>3</sup>	CHEM 490	Physical Chemistry II & Lab	CHEM 342/342L
Physical Chemistry I & Lab	CHEM 341/341L	Biochemistry II & Lab	CHEM 352/354L
Biochemistry I <sup>3</sup>	CHEM 351	Evolution, Ecology, & Biol.	BIOL 112/112L
Intro to Cell & Molec. Biol.	BIOL 111/111L	History	HIST 102 or 104
History	HIST 101 or 103	<u>Humanities Elective</u>	<u>XXXX xxx</u>
<u>Social Science Elective</u>	<u>XXXX xxx</u>	18 credits	<u>XXXX xxx</u>
18 credits	2 labs/wk		3 labs/wk

### *Senior Year<sup>1</sup>*

Chemistry & Biochemistry Seminar <sup>3</sup>	CHEM 490	Senior Seminar	CHEM 492
Intro. to Research I <sup>1</sup>	CHEM 481	Intro to Research II <sup>1</sup>	CHEM 482
Molecular Biology & Lab	BIOL 312/312L	Biology Elective & Lab	BIOL 3XX/3XXL
Humanities Elective	XXXX xxx	Humanities Elective	XXXX xxx
Humanities Elective	XXXX xxx	Humanities Elective	XXXX xxx
<u>Advan. Inorganic Chem</u>	<u>CHEM 511</u>	<u>Elective</u>	<u>XXXX xxx</u>
16 credits	3 labs/wk	16 credits	3 labs/wk

All chemistry students are encouraged to participate in the research program in their junior or senior year. Pre-medical students are strongly urged to complete at least through CHEM 351, PHYS 111, 112 and if possible 16 credits of biology before taking the MCAT exam in the spring of their junior year. Chemistry & Biochemistry (CHEM 490) may be taken twice for credit. Calculus III Math 221 is also strongly recommended.

## CHEMISTRY COURSES REQUIRED FOR MAJORS

### B.S. Chemistry

	When Offered (subject to change)
CHEM 111/111L Principles of Chemistry (with laboratory)	Fall, Spring, Summer I
CHEM 112 /112L Principles of Chemistry (with laboratory)	Fall, Spring, Summer I
CHEM 221/221L Quantitative Analysis (with laboratory)	Fall, Spring
CHEM 231/231L Organic Chemistry (with laboratory)	Fall, Spring, Summer I
CHEM 232/232L Organic Chemistry (with laboratory)	Fall, Spring, Summer II
CHEM 341/341L Physical Chemistry (with laboratory)	Fall, Spring
CHEM 342/342L Physical Chemistry (with laboratory)	Fall, Spring
CHEM 351 Biochemistry	Fall, Spring
CHEM 371 Chemical Synthesis and Characterization	Fall only
CHEM 490 Chemistry and Biochemistry Seminar	Fall only
CHEM 492 Senior Seminar	Spring only
CHEM 511 Advanced Inorganic Chemistry	Spring only
CHEM 512L Advanced Inorganic Chemistry Laboratory	Spring only
CHEM 521/521LL Instrumental Analysis (with laboratory)	Fall only
PHYS 111 and 112 General Physics (with laboratory)	
MATH 220 Calculus II	

### B.A. Chemistry

CHEM 111/111L Principles of Chemistry (with laboratory)	Fall, Spring, Summer I
CHEM 112 /112L Principles of Chemistry (with laboratory)	Fall, Spring, Summer I
CHEM 221/221L Quantitative Analysis (with laboratory)	Fall, Spring
CHEM 231/231L Organic Chemistry (with laboratory)	Fall, Spring, Summer I
CHEM 232/232L Organic Chemistry (with laboratory)	Fall, Spring, Summer II
CHEM 341/341L Physical Chemistry (with laboratory)	Fall, Spring
CHEM 342/342L Physical Chemistry (with laboratory)	Fall, Spring
CHEM 492 Senior Seminar	Fall only
Elective: one three-hour course at the 300 level or above, exclusive of CHEM 583.	

### B.S. Biochemistry

CHEM 111/111L Principles of Chemistry (with laboratory)	Fall, Spring, Summer I
CHEM 112 /112L Principles of Chemistry (with laboratory)	Fall, Spring, Summer I
CHEM 221/221L Quantitative Analysis (with laboratory)	Fall, Spring
CHEM 231/231L Organic Chemistry (with laboratory)	Fall, Spring, Summer I
CHEM 232/232L Organic Chemistry (with laboratory)	Fall, Spring, Summer II
CHEM 341/341L Physical Chemistry (with laboratory)	Fall, Spring
CHEM 342/342L Physical Chemistry (with laboratory)	Fall, Spring
CHEM 351 Biochemistry	Fall, Spring
CHEM 352 Biochemistry II	Fall, Spring
CHEM 354L Biochemistry Laboratory	Fall, Spring
CHEM 490 Chemistry and Biochemistry Seminar	Fall only
CHEM 492 Senior Seminar	Spring only
CHEM 511 Advanced Inorganic Chemistry	Spring only
BIOL 111/111L Introduction to Cell and Molecular Biology (with laboratory)*	
BIOL 112/112L Evolution, Form, and Function of Organisms (with laboratory)*	
BIOL 312/312L Molecular Biology (with laboratory)	
PHYS 111 and 112 General Physics (with laboratory)*	
MATH 220 Calculus II	

### Four hours in advanced laboratory courses selected from:

BIOL 305/305L Genetics (with laboratory)
BIOL 310/310L General Microbiology (with laboratory)
BIOL 313/313L Cell Biology (with laboratory)
BIOL 321/321L General and Comparative Physiology (with laboratory)

# CHEMISTRY GRADUATION CHECK LIST

Name: \_\_\_\_\_

Student # \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_

Advisor: \_\_\_\_\_

Chemistry Degree B.A.: \_\_\_ B.S.: \_\_\_ Biochemistry B.S.: \_\_\_

Semester	1	2	3	4	5	6	7	8	9	10
Total Credits										
G.P.A.										

- English [6]** ENGL 100 \_\_\_ ENGL 101 \_\_\_ ENGL 102 \_\_\_
- History [6]** HIST 101 \_\_\_ HIST 102 \_\_\_ or HIST 103 \_\_\_ HIST 104 \_\_\_
- Mathematics or Logic [6]** MATH 111 \_\_\_ MATH 120 \_\_\_ MATH 220 \_\_\_ MATH 221 \_\_\_  
 MATH 203 \_\_\_ MATH 323 \_\_\_ (Note: Must include MATH 120 and 200)
- Social Sciences [6]** \_\_\_\_\_ To be selected from POLS, PSYS, SOCY.
- Humanities [12]** \_\_\_\_\_

ENGL (no more than 6 hours in literature), HIST (except 101, 102), PHIL (except 215, 216) and FINA (except performance courses).

- Languages [12]** FREN 101 \_\_\_ FREN 102 \_\_\_ FREN 201 \_\_\_ FREN 202 \_\_\_ LANG 101 \_\_\_  
 FREN 100 \_\_\_ FREN 200 \_\_\_ LANG 102 \_\_\_  
 SPAN 101 \_\_\_ SPAN 102 \_\_\_ SPAN 201 \_\_\_ SPAN 202 \_\_\_ LANG 201 \_\_\_  
 SPAN 100 \_\_\_ SPAN 200 \_\_\_ LANG 202 \_\_\_  
 GRMN 101 \_\_\_ GRMN 102 \_\_\_ GRMN 201 \_\_\_ GRMN 202 \_\_\_  
 GRMN 100 \_\_\_ GRMN 200 \_\_\_
- Language requirement may be reduced by placement examinations.

- Natural Sciences [8]** CHEM 111 \_\_\_ CHEM 111L \_\_\_ CHEM 112 \_\_\_ CHEM112L \_\_\_  
 BIOL 111 \_\_\_ BIOL 103L \_\_\_ BIOL 112 \_\_\_ BIOL104L \_\_\_  
 PHYS 111 \_\_\_ PHYS 112 \_\_\_ HONS 153 \_\_\_ HONS 154 \_\_\_
- Students who have taken PHYS 101/101L/102/102L may take an advanced course or another designated course to satisfy the chemistry degree requirement.

- Chemistry or Biochemistry Curriculum Core [2]** CHEM 221 \_\_\_ CHEM 231 \_\_\_ CHEM 231L \_\_\_ CHEM 342 \_\_\_  
 CHEM 232 \_\_\_ CHEM 232L \_\_\_ CHEM 341L \_\_\_ CHEM 492 \_\_\_  
 CHEM 342 \_\_\_ CHEM 342L \_\_\_ CHEM 490 \_\_\_\*\*‡ CHEM 492 \_\_\_

- B.S. Chemistry [10]** \*CHEM 511 \_\_\_ CHEM 512L \_\_\_ CHEM 521 \_\_\_ CHEM 371 \_\_\_  
 CHEM 351

- B.S. Biochemistry [15]** CHEM 351 \_\_\_ CHEM 352 \_\_\_ CHEM 354L \_\_\_ CHEM 511 \_\_\_  
 BIOL 312 \_\_\_ BIOL 312L \_\_\_
- Degree requires 4 hours of advanced biology and laboratory from the following:
- BIOL 310 \_\_\_ BIOL 310L \_\_\_ BIOL 305 \_\_\_ BIOL 305LL \_\_\_  
 BIOL 313 \_\_\_ BIOL 313L \_\_\_ BIOL 321 \_\_\_ BIOL 312L \_\_\_

- \*Electives** CHEM 351 \_\_\_ CHEM 522 \_\_\_ CHEM 522L \_\_\_ CHEM  
 531 \_\_\_  
 CHEM 541 \_\_\_ CHEM 583A \_\_\_ CHEM 583B \_\_\_ CHEM 583C \_\_\_

- Research/** CHEM 399 \_\_\_ CHEM 481 \_\_\_ CHEM 482 \_\_\_ CHEM  
 499 \_\_\_

**Tutorial** The B.A. degree requires one 3 hour elective at the 300 level or above exclusive of CHEM 583.  
 Both the B.S. Chemistry and the B.S. Biochemistry are certified by the American Chemical Society.

\* B.A. students may take one of these courses as their elective.

\*\* optional for B.A. students

‡ may be repeated once for credit

**COLLEGE OF CHARLESTON  
DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY  
POLICY ON SCIENTIFIC INTEGRITY**

*“The essence of science is the pursuit and transmission of knowledge, an endeavor that depends upon honesty, objectivity, intellectual freedom, and trust over generations, across disciplines, and across national borders. As every researcher depends on the validity of others’ previous work, and because no single individual can master every dimension of any field, the practical demands of science reinforce an inherently moral social contract among researchers”* from *“The Ethical Dimensions of the Biological Sciences.”* Laboratory courses are the core of our chemistry curriculum. You will be learning specific skills while actively practicing the methods of scientific inquiry. You are encouraged to engage your peers and challenge each other’s understanding as part of this learning experience. At all times, however, we expect that you will hold yourselves to the rigorous standards demanded by the aforementioned “moral social contract among researchers”. You are expected to:

- < Keep an open, objective mind while carrying out experiments
- < Keep dated, accurate records of your experiments in pen
- < Cross off errors in notebook calculations rather than erasing, whiting out, or obliterating them
- < Carry out your *own* experiments without bias to an expected outcome
- < Carry out replicate experiments when time permits
- < Report your findings without embellishing, altering or ignoring data you have collected
- < Make your own graphs, data tables, and interpretations when authorized to collect data in groups (unless your are told otherwise by the instructor)
- < Work independently to derive your own conclusions
- < Write in your own words the interpretation of your data
- < Cite appropriately any published materials such as handbook data, journal articles, web sites, or textbooks that were used to aid with your data interpretation
- < Formally acknowledge and state the identities of those who have provided ideas that have aided in your interpretations

The National Academy of Sciences’ Panel on Scientific Responsibility and the Conduct of Research makes the following definition:

“Misconduct in science is defined as fabrication, falsification, or plagiarism, in proposing, performing or reporting research. Fabrication is making up data or results, falsification is changing data or results, and plagiarism is using the ideas or words of another person without giving the appropriate credit.”

Because scientific integrity is central to all scientific endeavors, the faculty will vigorously prosecute any student thought to be in violation of scientific ethics at the College’s Honor Board. The following acts are examples of scientific misconduct that will not be tolerated:

- < Modifying data to conform to an expected outcome
- < Copying another student’s data into your own notebook or report
- < Using another student’s interpretation and presenting it as your own
- < Using or possessing previously interpreted data or graded reports from this lab course
- < Providing your data or graded lab reports to another student who presents it as their own
- < Presenting data collected in prior semesters for credit in the present semester

If there is any doubt as to the proper interpretation of what is allowed under this code of scientific integrity, you should consult your instructor before submitting any work for evaluation.

For a first offense, an admission of guilt *prior to the scheduling of a trial* will result in a grade of zero being assigned to the assignment. Conviction of a violation by the Honor Board or an admission of guilt once a trial has been scheduled will result in a grade of “F” being assigned for the course.

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Signature

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Date

By my signature I acknowledge have read and understood the Policy on Scientific Integrity of the Department of Chemistry and Biochemistry of the College of Charleston.

## **DEPARTMENTAL POLICY ON THE USE OF LABORATORY EQUIPMENT**

The Department of Chemistry will supply all of the equipment needed to safely perform experiments in the laboratory. When the student checks into a laboratory, the student becomes responsible for the care of all items assigned for that laboratory. Any items that are damaged or lost will be billed to the student. The following procedures are to be followed for all chemistry laboratories:

1. When a student checks into a laboratory, all equipment on the list for the assigned drawer should be present and in good condition. If an item is damaged or missing, it should be reported immediately to your Laboratory Instructor. Your laboratory Instructor will determine if an item is damaged but usable.
2. The student is then responsible for all of the equipment in the drawer. It is the student's responsibility to continue to care for the equipment and replace any lost or damaged items by checking needed items out from your Laboratory Instructor or at the stockroom (SCIC Room 327).
3. Any damage to or loss of general use equipment should be reported to the instructor immediately.
4. No chemicals should be stored in the drawers unless the student is instructed to do so.
5. A student is billed for each lab separately.
6. Check-out occurs on or before the date indicated by the laboratory instructor. IF A STUDENT WITHDRAWS FROM A LABORATORY, IT BECOMES HIS OR HER RESPONSIBILITY TO CHECK OUT OF THE LABORATORY.
7. At the end of each lab period all equipment is to be clean, dry and in usable condition. All missing or damaged items should be replaced at this time if they have not been previously.
8. Any items left in the drawer after the lab is completed are not the responsibility of the Chemistry and Biochemistry Department. Please remember to take all of your personal items with you when you leave.
9. Prices of items can be obtained at the stockroom and are subject to change without notice.

## SAFETY IN THE CHEMISTRY LABORATORY

The Department of Chemistry at The College of Charleston makes every effort to provide a safe learning environment for the chemistry student. All laboratory experiments are checked for safety when performed according to directions. STUDENTS ARE RESPONSIBLE FOR READING ALL SAFETY PRECAUTIONS FOR PERFORMING EACH EXPERIMENT. Part of the educational program in chemistry is to learn how to handle potentially hazardous materials in a safe and efficient manner. As with any activity where there is the potential for a serious accident, the fundamental responsibility for safety lies with the individual. The principle effort in conducting a safe laboratory program is thorough preparation and constant vigilance. WHENEVER THERE IS ANY DOUBT ABOUT THE SAFETY OF A PROCEDURE OR WHAT PRECAUTIONS SHOULD BE TAKEN, ASK A FACULTY MEMBER BEFORE BEGINNING THE EXPERIMENT.

The following rules should be observed in all chemistry laboratories.

1. Always wear safety glasses, apron, glove and the appropriate safety equipment.
2. "Horseplay" is strictly forbidden. Enjoy chemistry but be mature.
3. No smoking, eating, or drinking in the lab.
4. Always add acids to water, never water to acids.
5. Return caps and lids to all reagent bottles immediately; make certain tops are tightly closed.
6. Never return reagents to stock bottles.
7. Dispose of unused or contaminated reagents properly. Throw solids in waste jars, flush water-soluble liquids down the sink with a large excess of water. Non-water soluble liquids should be placed in a waste can or jar.
8. Always use a split stopper for glass tubing, thermometers, or thistle tubes rather than inserting these into a stopper. Open the split stopper and wrap it around the stem of the piece of equipment.
9. Never test for odors.
10. Never aim the opening of a test tube or flask at yourself or at anyone else.
11. Use a pipet bulb for all solutions.
12. Perform all reactions in your hood area.
13. Never leave an experiment unattended.
14. Under no conditions are unauthorized or unsupervised experiments to be performed.
15. Do not wear shorts or open-toes shoes to lab. Bare feet or sandals are not acceptable in the laboratory. You will be dismissed from lab. Failure to complete that day's assignments will result in a grade of zero.
16. Appropriate eye protection must be worn at all times. Failure to do so may result in your expulsion from the lab for that day with zeroes given for all work. Repeated violations may result in expulsion from the course. After the Drop Date this will result in a grade of "F".
17. If you have long hair, tie it back to keep it out of flames.
18. Report any accident, however minor, to your instructor or advisor **at once**.
19. You are advised to avoid wearing synthetic finger nails in the chemistry laboratory. Synthetic finger nails are made of extremely flammable polymers which burn to completion and are not easily extinguished.
20. **AT ALL TIMES THINK ABOUT WHAT YOU ARE DOING!**

## DEPARTMENTAL AWARDS/SCHOLARSHIPS

The Department of Chemistry and Biochemistry at the College of Charleston offers a number of awards and honors to students in all classes based on scholarship, leadership and academic activities within the Department. These awards take the form of engraved cups, departmental plaques, certificates, chemistry journal subscriptions, and monetary gifts. Many of these awards are described in more detail in the Bulletin of the College of Charleston.

Departmental scholarship recipients must attempt a minimum of 15 credit hours per semester with at least three credit hours being CHEM courses. A 3.0 GPA must be maintained and at least 30 credit hours must be earned per academic year. No student may receive a scholarship beyond 4 years or while seeking a second degree. Scholarships are dependent upon income generated from endowments and may or may not be available in any given year..

### **Outstanding Student in Chemistry Award**

This award is given to the outstanding graduating chemistry student selected by the Department of Chemistry and Biochemistry faculty on the basis of his/her accomplishments as an undergraduate. Emphasis is placed on the student's overall academic record and their accomplishments in contributions to the Department and research activities. The award is sponsored by the College of Charleston.

### **Outstanding Student in Biochemistry Award**

The award is given to outstanding graduating biochemistry students selected by the Department of Chemistry and Biochemistry faculty on the basis of their accomplishments as undergraduates. Emphasis is placed on the student's overall academic record and their accomplishments in contributions to the Department and research activities. This award is sponsored by the College of Charleston and the Department of Chemistry.

### **Departmental Honors**

Departmental Honors may be earned in either chemistry or biochemistry. A student must complete at least 12 hours of courses at the 400 level or above, which must include CHEM 481 and 482, have a minimum 3.5 GPA in the major, and performed undergraduate research culminating in a written report or complete a bachelors essay.

### **South Carolina Section of the American Chemical Society Outstanding Student Award.**

This award is given by vote of the faculty to the outstanding chemistry or biochemistry student of the senior class. The award is presented at the Section's annual banquet.

### **The Mary and Carl Likes Physical Chemistry Award**

The award is given in recognition of academic excellence in the study of physical chemistry as demonstrated by lecture and laboratory performance in CHEM 341/341L and CHEM 342/342L and by demonstration of leadership abilities, participation in departmental activities, willingness to share knowledge with others, honesty, optimism, responsibility, and serious endeavor. The sponsors of this award are Alpha Chi Sigma and the Friends of Carol and Mary Likes.

### **Elizabeth M. Martin Award**

The award is given to the outstanding graduating chemistry major who is minoring in secondary education. This award is sponsored by the Department of Chemistry and Biochemistry.

### **The Organic Chemistry Award**

The award is given for excellence in organic chemistry to the two students who make the highest score on the American Chemical Society standard examination in Organic Chemistry given at the end of CHEM 232. This award is sponsored by the Department of Chemistry.

### **The Analytical Chemistry Award**

Selection of the recipient is made by the analytical faculty from among students majoring in chemistry who have an outstanding interest and ability in analytical chemistry. This award is supported by the Analytical Chemistry Division of the American Chemical Society.

### **The Quantitative Analysis Award**

This award is given to the student who earns the highest score on the American Chemical Society standardized examination in Quantitative Analysis given as the final examination in CHEM 221. The Department of Chemistry sponsors this award.

### **The Freshman Chemistry Award**

This award is given to the four students who earn the highest scores on the American Chemical Society standardized examination in General Chemistry given as the final examination in CHEM 112. The Department of Chemistry sponsors this award.

### **Brewer Scholarship**

The scholarship recipient is selected by the Faculty of the Department of Chemistry and Biochemistry from among the junior and senior chemistry and biochemistry majors who are South Carolina residents and have demonstrated ability in chemistry, are of honorable character and show promise for future excellence. The scholarship is a donation of Mr. and Mrs. O. W. Brewer in appreciation for the education received by their son and daughter-in-law, Drs. Greg and Cindy Brewer, B.S. chemistry majors at the College of Charleston.

### **The American Institute of Chemists and Chemical Engineers Award**

This award is given annually by vote of the chemistry faculty to a student who has shown a strong interest in the field of chemistry and has demonstrated the qualities of scholarship, leadership and integrity that characterize successful professionals in the discipline of chemistry. The award is sponsored by the American Institute of Chemists and Chemical Engineers.

### **The Edward Emerson Towell Chemistry Scholarship**

This scholarship has been established in honor of Dr. Edward E. Towell, by his former students and colleagues. It is normally awarded to an entering freshman, who has elected to major in Chemistry or Biochemistry. They are renewable for four years as long as standards for continuation are met. Criteria for consideration for the scholarship include: [1] application and acceptance to the College of Charleston; [2] declaration of major in either Chemistry or Biochemistry; [3] an outstanding high school record as evidenced by being in the top 5% in high school class rank, or by scoring above 1200 in the S.A. T.; [4] a strong interest in science as evidenced by advanced science courses and science related extra-curricular activities; and [5] a letter of recommendation from the student's high school chemistry teacher.

### **Major Field Test Award**

The award is given to all seniors who score at the 90<sup>th</sup> percentile or higher on the Major Field Test of the Educational Testing Service that is administered to all graduating seniors in CHEM 492 Chemistry Seminar.

### **Lense Scholarship**

The scholarship recipient is selected by the Faculty of the Department of Chemistry and Biochemistry from among junior and senior chemistry and biochemistry majors. The scholarship was endowed by Mr. and Mrs. Howard Iserman in honor of Frederick Lense.