

DEPARTMENT OF CHEMISTRY

Bachelor of Science CHEMISTRY MAJOR (ACS Certified Option) 2005-2006

This degree prepares students to pursue a career as a professional chemist and/or graduate studies in chemistry or chemically related fields. The degree is certified by the American Chemical Society (ACS) and represents the minimum undergraduate preparation recommended by ACS for the professional chemist. A certified degree in chemistry is a valuable personal credential that serves as national-level recognition for successfully completing a rigorous academic chemistry curriculum in an ACS approved department.

FACULTY ADVISORS:

Dr. Mohammed Ali, Dr. Marcus Bond, Dr. Sharon Coleman, Dr. Philip Crawford, Dr. Matthew Fasnacht, Dr. Bruce Hathaway, Dr. James McGill, Dr. Bjorn Olesen, Dr. Michael Readnour, Dr. David Ritter, Dr. Michael Rodgers

CAREER OPPORTUNITIES:

The chemical industry employs 66% of all chemists. The majority will be involved in research and product development (R & D), sales, or marketing. Many work in quality control analysis, and testing products. Others may work in areas such as industrial hygiene and safety or regulatory work for environmental compliance.

Academic institutions employ about 26% of all chemists. Ph.D.'s are required for most academic positions at the college or university level. High schools require the B.S. in education degree plus subject matter certification.

Government employs about 7% of all chemists. Federal, state, and local government agencies hire chemists for a variety of jobs including basic research, testing work needed to enforce government regulations, technical program managers, and writers and editors of government regulations and technical documents.

A smaller percentage of chemists (1%) work in nontraditional fields. Some are patent lawyers, science writers, information specialists, technical librarians, technical consultants, or business owners.

EMPLOYMENT OUTLOOK/SALARY:

In 2000, chemists and materials scientists held about 92,000 jobs in the U.S.A. This number is expected to grow by 10-20% by 2010. Much of this job growth will be concentrated in pharmaceutical companies and in firms that specialize in research and testing services. The median starting salary for certified BS chemists was around \$34,000 according to the ACS 2004 salary survey. (ACS data shows a direct relationship between GPA and starting salaries for BS chemists, i.e. those with higher GPA's generally start at higher salaries.) Median salary for all employed BS chemists was \$59,700 according to the ACS 2003 salary survey.

HIGH SCHOOL PREPARATION FOR MAJOR:

Ideal: 4 units of English, 3 units of Science (Biology, Chemistry, Physics), and Math through Trigonometry and Pre-calculus.

**Bachelor of Science
CHEMISTRY MAJOR
(ACS Certified Option)**

Requirements for Chemistry Major (ACS Certified), B.S. Degree

	<u>Credit Hours</u>
University Studies Core Curriculum	30*
University Studies Interdisciplinary Courses	3*
UI-100 First Year Seminar	3
Required Courses (pre-requisites)	60
CH185/005/085 General Chemistry I (MA095 or equiv)	5**
CH186 General Chemistry II (CH185)	3
CH187 Qualitative Analysis (CH186 pre or co)	2
CH271 Quantitative Analysis (CH187), offered Fall only	4
CH341 Organic Chemistry I (CH186)	4
CH342 Organic Chemistry Laboratory I (CH341 pre or co)	1
CH343 Organic Chemistry II (CH342 pre or co)	3
CH344 Organic Chemistry Laboratory II (CH343 pre or co)	2
CH311 Physical Chemistry I (CH271, PH121 or PH231, MA240 pre or co), offered Fall only	4
CH312 Physical Chemistry II (CH311), offered Spring only	3
CH313 Physical Chemistry Laboratory (CH312 pre or co), offered Spring only	3
CH498 Professional Presentation in Chemistry (UI443)	1
MA140 Analytical Geometry and Calculus I (MA133 and MA134 or equiv)	5**
MA145 Analytical Geometry and Calculus II (MA140)	4
MA240 Analytical Geometry and Calculus III (MA145)	3
PH120/020 Introductory Physics I (MA133 and MA134 or equiv.)	5
PH121/021 Introductory Physics II (PH120)	5
OR	
PH230/030 General Physics I (MA145 pre or co)	5
PH231/031 General Physics II (MA240 pre or co and PH230)	5
UI443 Professional Experience in Chemistry, offered Spring only	3**
Additional hours required for ACS certification	13
CH531/UI331 Biochemistry I (CH342), offered Fall only	3**
CH563 Inorganic Chemistry (CH313 pre or co), offered Spring only	4
CH575 Chemical Instrumentation (CH313 pre or co), offered Spring only	4
One or two additional courses, which must include a two credit-hour lab component, chosen from the following (See Note 3):	2
CH391 (1) Undergraduate Research (UI443 pre or co)	
CH392 (2) Undergraduate Research (UI443 pre or co)	
CH447 (2) Advanced NMR Techniques (CH344), offered Spring only	
CH533 (2) Biochem Lab (CH531 pre or co), offered Fall only	
CH545 (3) Organic Preps and Characterization (CH344), offered Fall only	
CH565 (2) Inorganic Preps (CH563 pre or co) offered on demand	
Electives	11
EN100 English Composition	0-3
WP003 75 Hour Writing Test	0
Minimum Degree Requirement	120

*Does not include hours for University Studies courses included in core curriculum.

**University Studies course

Notes:

1. Required courses offered in both Fall and Spring semesters unless otherwise specified.
2. **Completion of an experiential learning project in the major (undergraduate research, internship) is required of all graduates effective Spring of 2003. Requirement met by completion of CH498 Professional Presentation in Chemistry. Consult with your departmental advisor.**
3. The A.C.S. requires the completion of a total of 500 lab contact hours for certification. Students may complete the certification requirements in the following ways:
 - a) Take any one of the following courses:

CH392 Undergraduate Research (UI443 pre or co)	(2)
CH533 Biochem Lab (CH531 pre or co), offered Fall only	(2)
CH545 Organic Preps and Characterization (CH344), offered Fall only	(3)
CH565 Inorganic Preps (CH563 pre or co) offered on demand	(2)

OR

- b) Take both of the following courses:

CH391 Undergraduate Research (UI443 pre or co)	(1)
CH447 Advanced NMR Techniques (CH344), offered Spring only	(2)

OR

- c) Take the following course twice in different semesters:

CH391 Undergraduate Research (UI443 pre or co)	(1)
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BS in Chemistry (ACS Certified Option)
Suggested 8 Semester Sequence

First Semester	Hrs.	Second Semester	Hrs.
UI100 First Year Seminar	3	CH186 General Chemistry II	3
CH185 Gen. Chem. I Lec.	5	CH187 Qualitative Analysis	2
CH085 Gen. Chem. I Lab	+	MA145 Analyt. Geom. & Calc. II	4
CH005 Gen. Chem. I Rec.	+	EN140 Rhet. & Crit. Thinking	3
MA140 Analyt. Geom. & Calc. I*	5	University Studies Elective	3
EN100 English Comp.	0-3		
Third Semester**	Hrs.	Fourth Semester	Hrs.
CH271 Quantitative Analysis	4	CH343 Organic Chem. II	3
CH341 Organic Chem. I	4	CH344 Organic Chem. Lab II	2
CH342 Organic Chem. Lab I	1	PH231 Gen. Physics II Lec.	5
PH230 Gen. Physics I Lec.	5	PH031 Gen. Physics II Lab.	+
PH030 Gen. Physics I Lab	+	OR	
OR		PH121 Intro. Physics II Lec.	5
PH120 Intro. Physics I Lec.	5	PH021 Intro. Physics II Lab.	+
PH020 Intro. Physics I Lab	+	University Studies Electives	6
MA240 Analyt. Geom. & Calc. III	3		
Fifth Semester	Hrs.	Sixth Semester	Hrs.
CH311 Physical Chemistry I	4	CH312 Physical Chemistry II	3
University Studies Electives	9	CH313 Physical Chemistry Lab	3
UI331 Biochemistry I	3	University Studies Electives	6
OR		UI443 Professional Experience in Chemistry	3
CH531 Biochemistry I	3	WP003 75 Hour Writing Exam	0
Seventh Semester	Hrs.	Eighth Semester	Hrs.
ACS Approved Electives	2	CH498 Professional Presentation in Chemistry	1
UI3XX University Studies Electives	3	CH563 Inorganic Chemistry	4
University Studies Elective	3	CH575 Chemical Instrumentation	4
		Electives	3

* The calculus sequence is very important for American Chemical Society Certification. A student unable to enter this sequence as recommended should consult the Chemistry department before enrolling.

**Since all chemistry courses numbered 200 and above may only be offered one semester a year, it is strongly recommended that all chemistry majors consult with their departmental advisor before the end of their Freshman year.