

Students who intend to proceed with graduate study should take the Graduate Record Examination (GRE) during their senior year. For specific information on graduate degree programs, consult the *Graduate Catalog*.

Courses of Instruction

All Courses of Instruction are located in one section at the back of this catalog.

Course and Subject Guide

The “Course and Subject Guide,” found in the Courses of Instruction section of this book, serves as a table of contents and provides quick access to subject areas and prefixes.

Department of Chemistry

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Ruthanne D. Thomas, Chair

Faculty

Professors Acree, Borden, Chyan, Cundari, Kelber, J. Marshall, P. Marshall, Richmond, Schwartz, Theriot, Thomas. *Associate Professors* Golden, Mason, Omary, Wilson. *Assistant Professors* Cooke, Selby, Verbeck. *Lecturers* Dandekar, Schaake.

Introduction

Chemistry, the study of matter and its reactions, provides basic understandings needed to deal with a variety of societal and scientific needs, including energy, food production, health and medicine, biotechnology, new materials, environmental concerns, new processes, and national defense. Chemistry is a science central to the study of modern physics, biology and medicine.

Current frontiers of experimental chemical investigation involve the areas of chemical reactions and reactivity, synthesis, analytical methods, catalysis and life processes.

Preprofessional Programs

See “Preprofessional Programs” in the College of Arts and Sciences section of this catalog.

Programs of Study

The department offers undergraduate and graduate programs in the following areas:

- Bachelor of Arts with a major in chemistry;
- Bachelor of Science in Chemistry;
- Master of Science, and
- Doctor of Philosophy, both with a major in chemistry.

Concentrations under the chemistry major at the master’s and doctoral level are available in chemistry education, analytical chemistry, computational chemistry, inorganic chemistry, organic chemistry, physical chemistry and industrial chemistry (MS only).

Recipients of the BS in Chemistry, and in some cases the BA, are certified by the American Chemical Society (ACS) if all requirements for professional training of chemists are met. Courses required for ACS certification may be obtained from the department’s Undergraduate Affairs Committee.

Bachelor of Science in Chemistry

This degree is designed for students planning for graduate study or positions in the chemical industry.

Degree Requirements

Candidates for the Bachelor of Science in Chemistry must meet the following requirements.

1. **Hours Required and General/College Requirements:** A minimum of 132 semester hours, of which 42 must be advanced, and fulfillment of degree requirements for the Bachelor’s degree as specified in the “General University Requirements” in the Academics section of this catalog and the College of Arts and Sciences requirements (excluding foreign language and natural and life sciences). The laboratory science requirement is satisfied only by physical sciences.
2. **Major Requirements:** Minimum of 42 hours, including CHEM 1410/1430 or 1413/1430; 1420/1440 or 1423/1440; 2370/3210, 2380/3220, 3451/3452, 3510/3230, 3520/3240, 4610/4620 and 4631/4632, plus 6 additional hours at the 4000 level or above (BIOC 4540 to satisfy ACS certification requirements). CHEM 4940 may not be used to meet degree requirements for the chemistry major.
3. **Minor Requirements:** A minor of at least 18 hours in mathematics, computer science, physics, biology or

geology (if taken as a laboratory science), of which 6 must be advanced.

4. **Other Course Requirements:** MATH 1710, 1720, 2700, 2730, PHYS 1710/1730 and 2220/2240.

5. **Electives:** See four-year plan.

6. **Other Requirements:** GPA of 2.5 on all advanced courses attempted in science and engineering courses (biochemistry, biology, chemistry, computer science, engineering, mathematics, physics).

BS in Chemistry

Following is one suggested four-year degree plan. Students are encouraged to see their adviser each semester for help with program decisions and enrollment. Students are responsible for meeting all course prerequisites.

FRESHMAN YEAR

FALL	HOURS
CHEM 1410, General Chemistry I, or CHEM 1413, Honors General Chemistry**	3
CHEM 1430, Laboratory Sequence for General Chemistry**	1
ENGL 1310, College Writing I*	3
HIST 2610, United States History to 1865*	3
MATH 1650, Pre-Calculus*	<u>5</u>
Total	15

SPRING	HOURS
CHEM 1420, General Chemistry II, or CHEM 1423, Honors General Chemistry**	3
CHEM 1440, Laboratory Sequence for General Chemistry**	1
ENGL 1320, College Writing II*	3
HIST 2620, United States History Since 1865*	3
Elective	3
Social and Behavioral Sciences*	<u>3</u>
Total	16

SOPHOMORE YEAR

FALL	HOURS
CHEM 2370, Organic Chemistry	3
CHEM 3210, Organic Chemistry Laboratory	1
MATH 1710, Calculus I	4
Cross-Cultural, Diversity and Global Studies*	3
Elective	3
Humanities*	<u>3</u>
Total	17

SPRING	HOURS
CHEM 2380, Organic Chemistry	3
CHEM 3220, Organic Chemistry Laboratory	1
MATH 1720, Calculus II	3
Communication*	3
Elective	3
Literature**	3
Wellness*	<u>3</u>
Total	19

JUNIOR YEAR

FALL	HOURS
CHEM 3230, Physical Chemistry Laboratory Sequence	1
CHEM 3451, Quantitative Analysis	3
CHEM 3452, Quantitative Analysis Laboratory	1
CHEM 3510, Physical Chemistry	3
MATH 2730, Multivariable Calculus	3
PHYS 1710, Mechanics	3
PHYS 1730, Laboratory in Mechanics	<u>1</u>
Total	15

SPRING	HOURS
CHEM 3240, Physical Chemistry Laboratory Sequence	1
CHEM 3520, Physical Chemistry	3
PSCI 1040, American Government*	3
Minor/Elective (advanced)	3
Minor/Elective (advanced)	3
Visual and Performing Arts*	<u>3</u>
Total	16

SENIOR YEAR

FALL	HOURS
CHEM 4610, Advanced Inorganic Chemistry	3
CHEM (4000 level) or BIOC 4540, Biochemistry I	3
PHYS 2220, Electricity and Magnetism	3
PHYS 2240, Laboratory in Wave Motion, Electricity, Magnetism and Optics	1
PSCI 1050, American Government*	3
Minor/Elective (advanced)	<u>3</u>
Total	16

SPRING	HOURS
CHEM 4620, Advanced Inorganic Chemistry Laboratory	1
CHEM 4631, Instrumental Analysis	3
CHEM 4632, Instrumental Analysis Laboratory	1
MATH 2700, Linear Algebra and Vector Geometry	3
Minor/Elective	2
Minor/Elective (advanced)	3
Minor/Elective (advanced)	3
Minor/Elective (advanced)	<u>2</u>
Total	18

**See the University Core Curriculum section of this catalog for approved list of course options.*

***See Arts and Sciences requirements section of this catalog for approved list of course options.*

Actual degree plans/audits may vary depending on availability of courses in a given semester.

Some courses may require prerequisites not listed.

Students may wish to use opportunities for electives to complete a minor of their choice or secondary education courses for teacher certification.

Bachelor of Arts

Major in Chemistry

The Bachelor of Arts degree with a major in chemistry is designed for students who want a technical degree with liberal arts orientation; for those who want minors in such areas as business administration, economics and education with teacher certification; and for students interested in life and health sciences.

Degree Requirements

1. **Hours Required and General/College Requirements:** A minimum of 128 semester hours, of which 42 must be advanced, and fulfillment of degree requirements for the Bachelor of Arts degree as specified in the "General University Requirements" in the Academics section of this catalog and the College of Arts and Sciences requirements.

2. Major Requirements:

Option I Required Courses: Minimum of 31 hours, including CHEM 1410/1430 or 1412/1430 or 1413/1430; 1420/1440 or 1422/1440 or 1423/1440; 2370/3210, 2380/3220, 3230, 3240, 3451/3452, 3510 and 3520, plus 3 additional hours of chemistry at the 4000 level (except CHEM 4940) or BIOC 3621/3622. This option is recommended for those planning to pursue advanced studies in chemistry.

Option II Required Courses: Minimum of 31 hours, including CHEM 1410/1430 or 1413/1430; 1420/1440 or 1423/1440; 2370/3210, 2380/3220, 3230, 3451/3452 and 3510, plus 7 additional hours, which may include BIOC 3621/3622 and any 4000-level chemistry course (except CHEM 4940).

Option III Required Courses: Minimum of 31 hours, including CHEM 1410/1430 or 1413/1430; 1420/1440 or 1423/1440; 2370/3210, 2380/3220, 3451/3452 and 3530, plus 7 additional hours, which may include BIOC 3621/3622 and any 4000-level chemistry course (except 4940).

3. **Other Course Requirements:** MATH 1710 and 1720; PHYS 1410/1430, 1420/1440 or 1510/1530, 1520/1540 or 1710/1730, 2220/2240 (required of all students who expect to take further course work in physics).

4. **Minor:** Optional.

5. **Electives:** See four-year plan.

6. **Other Requirements:** GPA of 2.5 on all advanced courses attempted in science and engineering courses (biochemistry, biology, chemistry, computer science, engineering, mathematics, physics).

BA with a Major in Chemistry

Following is one suggested four-year degree plan. Students are encouraged to see their adviser each semester for help with program decisions and enrollment. Students are responsible for meeting all course prerequisites.

FRESHMAN YEAR

FALL	HOURS
CHEM 1410, General Chemistry I or CHEM 1413, Honors General Chemistry**	3
CHEM 1430, Laboratory Sequence for General Chemistry**	1
ENGL 1310, College Writing I*	3
HIST 2610, United States History to 1865*	3
MATH 1650, Pre-Calculus	5
Total	15

SPRING	HOURS
CHEM 1420, General Chemistry, II or CHEM 1423, Honors General Chemistry**	3
CHEM 1440, Laboratory Sequence for General Chemistry**	1
ENGL 1320, College Writing II*	3
HIST 2620, United States History Since 1865*	3
Communication**	3
Elective	3
Total	16

SOPHOMORE YEAR

FALL	HOURS
CHEM 2370, Organic Chemistry	3
CHEM 3210, Organic Chemistry Laboratory	1
LANG 2040, Foreign Language (intermediate)**	3
MATH 1710, Calculus I	4
Humanities*	3
Wellness*	3
Total	17

SPRING	HOURS
CHEM 2380, Organic Chemistry	3
CHEM 3220, Organic Chemistry Laboratory	1
LANG 2050, Foreign Language (intermediate)**	3
MATH 1720, Calculus II	3
Literature**	3
Minor/Elective (advanced)	3
Total	16

JUNIOR YEAR

FALL	HOURS
CHEM 3230, Physical Chemistry Laboratory Sequence, or CHEM (advanced)	1
CHEM 3451, Quantitative Analysis	3
CHEM 3452, Quantitative Analysis Laboratory	1
CHEM 3510, Physical Chemistry, or CHEM (advanced)	3
PSCI 1040, American Government*	3
Minor/Elective (advanced)	3
Social and Behavioral Sciences*	3
Total	17

SPRING

CHEM 3240, Physical Chemistry Laboratory Sequence and	
CHEM 3520, Physical Chemistry; or	
CHEM 3530, Physical Chemistry for Life Science; or CHEM (advanced)	4
PSCI 1050, American Government*	3
Minor/Elective (advanced)	3
Minor/Elective (advanced)	3
Science Elective (advanced)	<u>3</u>
Total	16

SENIOR YEAR

FALL	HOURS
CHEM (4000 level), or	
BIOC 3621/3622, Elementary Biochemistry with Laboratory	3-4
PHYS 1410, General Physics I	3
PHYS 1430, General Physics Laboratory I	1
Cross-Cultural, Diversity and Global Studies*	3
Natural Sciences*	4
Visual and Performing Arts*	<u>3</u>
Total	17-18

SPRING

	HOURS
PHYS 1420, General Physics II	3
PHYS 1440, General Physics Laboratory II	1
Minor/Elective (advanced)	3
Minor/Elective (advanced)	3
Minor/Elective (advanced)	<u>4</u>
Total	14

*See the University Core Curriculum section of this catalog for approved list of course options.

**See Arts and Sciences degree requirements section of this catalog for approved list of course options.

Actual degree plans/audits may vary depending on availability of courses in a given semester. Some courses may require prerequisites not listed. Students may wish to use opportunities for electives to complete a minor of their choice of secondary education courses for teacher education.

Minor in Chemistry

Recommended minor: CHEM 1410/1430 or 1413/1430; 1420/1440 or 1423/1440; 2370/3210, 2380/3220, plus, 3451/3452, or 3530 or 4670 (plus 1 advanced hour) or BIOC 3621/3622. CHEM 4940 may not be used to meet degree requirements for the chemistry minor.

Minor for Chemical Technicians

Completion of this minor satisfies course requirements for certification as a "Certified Chemical Technician" by the American Institute of Chemists: CHEM 1410/1430 or 1413/1430; CHEM 1420/1440 or 1423/1440; CHEM 2370/3210, 2380/3220 or

HOURS 3601/3602; CHEM 3451/3452 or 3610; and CHEM 4631/4632.

Teacher Certification

The College of Arts and Sciences encourages students to explore teaching at the secondary level as a career option. The student's academic adviser in the Dean's Office for Undergraduates and Student Advising in GAB, Room 220, can assist students with specific requirements for teacher certification.

Requirements utilizing the BA degree in Chemistry with Certification in Chemistry: CHEM 1410/1430 or 1412/1430 or 1413/1430; CHEM 1420/1440 or 1422/1440 or 1423/1440; CHEM 2370/3210, 2380/3220, 3451/3452; CHEM 3530 or 3510/3230; CHEM 4700, 4900 (Research Experience); 3 hours of approved chemistry; BIOC 3621/3622; PHYS 1510/1530, 1520/1540. Upon completion of this program, students will be prepared to sit for the certification examinations in Chemistry.

Requirements utilizing the BA degree in Chemistry with Certification in Physical Science: CHEM 1410/1430 or 1412/1430 or 1413/1430; CHEM 1420/1440 or 1422/1440 or 1423/1440; CHEM 2370/3210, 2380/3220, 3451/3452; CHEM 3530 or 3510/3230; CHEM 4700, 4900 (Research Experience); 3 hours of approved 4000-level chemistry; BIOC 3621/3622; PHYS 1510/1530 or 1710/1730; PHYS 2220/2240, 3010/3030. Upon completion of this program, students will be prepared to sit for the certification examinations in Physical Science.

See major for additional course work and GPA requirements.

Students must also complete the required 21 hours in upper-level education courses (EDSE 3800, 3830, 4060, 4070, 4108, 4118, 4840) and meet all GPA requirements to apply for state certification. In order to enroll for the first required education course, the student must make application to the certification program in the College of Education in Matthews Hall, Room 105.

All state certification requirements and information on required examinations is available on the web site of the State Board for Educator Certification (SBEC), www.sbec.state.tx.us.

Certificate in Biomedical Criminalistics

Advances in technology have created a need for students in basic sciences to apply the tools of technology to a wide variety of criminal investigations. The forensic science program offers a certificate in biomedical criminalistics for biological sciences and chemistry students. The certificate is designed to enable students in degree programs in biological

sciences and chemistry to begin careers in forensic laboratories. Students must complete 20 hours of course work, including CJUS 3330, 4360; BIOL 3331, 4240; and CHEM 4631/4632, 4670 and completion of the General Knowledge Exam offered by the American Board of Criminalistics. Contact the forensic science program office or visit the web site for more information (www.forensic.unt.edu).

Graduate Degrees

The department offers degree programs leading to the Master of Science and Doctor of Philosophy. For information, consult the *Graduate Catalog*.

Courses of Instruction

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Course and Subject Guide

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Department of Communication Studies

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Jay Allison, Chair

Faculty

Associate Professors Allison, Gossett, Taylor.
Assistant Professors Anderson, Lain, Richardson, Trudeauux.

Introduction

Communication studies examines communication in human affairs and the symbolic processes through which humans interact by focusing on five basic behaviors associated with communication:

analysis of self and others, effectively using and responding to verbal messages, effectively using and responding to non-verbal messages, listening and responding appropriately, and appropriately adapting messages to others. The curriculum is designed to facilitate student mastery of theory and research, to enhance communication skills and to enhance student preparation for a variety of careers or for graduate study. Many communication graduates pursue careers in education, consulting, organizational administration and management, training and development, and political communication. Others find communication to be a useful major in preparing for law, the ministry, politics and community relations.

The department offers course work in rhetorical, performance and social science traditions. Students are afforded opportunities to explore communication from applied and theoretical perspectives in organizational settings and through co-curricular activities. Course work features the investigation of communication in organizational, interpersonal, aesthetic, health, legal, political, cultural, intercultural and international contexts. Students encounter topics such as gender and diversity issues, social change, conflict, narrative and cultural studies.

Programs of Study

The department offers undergraduate and graduate programs in the following areas:

- Bachelor of Arts,
- Master of Arts, and
- Master of Science, all with a major in communication studies.

Bachelor of Arts

Admission to the Communication Major

Entering students interested in majoring in communication studies will be classified as pre-majors and will be advised by the department. Admission to the university does not guarantee admission to the communication studies major. To be admitted to major status (and become eligible to enroll in certain advanced courses), a pre-major must meet the following requirements:

1. Complete at least 30 hours of college credit, and
 - a. complete the university core English composition requirement with a grade of C or better in each course, and
 - b. complete COMM 1010, 2020, 2060 and 2140 with a grade of C or better in each course.
2. Have a UNT grade point average of 2.5 or higher.

A student who has completed 90 hours with at least a 3.5 grade point average is eligible to write a