

# Bachelor of Science in Chemistry

Six degree plans lead to the Bachelor of Science in Chemistry. Focus Areas I, II, III, and IV are intended to prepare students for professional careers, either upon graduation or after graduate study in chemistry or related fields. Focus Area V, Teaching, is intended to prepare students to enter the teaching profession. Focus Area VI, Chemistry Honors, is intended to prepare students for academic or research careers. Students who plan to follow Focus Area VI must be admitted to the Dean's Scholars Honors Program.

The six degree plans may also serve as the basis for work in many areas outside pure chemistry, such as materials science, medicine and other health-related fields, pharmacology, patent law, business, computation, or environmental science. Supporting work in mathematics and physics is an integral part of the degree programs. Compared to the program leading to the bachelor of arts degree, the Bachelor of Science in Chemistry degree programs are more thorough and demanding and potentially more rewarding to the student planning a career in chemistry.

## Prescribed Work Common to All Focus Areas

In the process of fulfilling degree requirements, all students must complete:

- a. Core curriculum
- b. Skills and experience flags:
  - a. Writing: two flagged courses beyond Rhetoric and Writing 306 or its equivalent, including one at the upper-division level
  - b. Quantitative reasoning: one flagged course
  - c. Global cultures: one flagged course
  - d. Cultural diversity in the United States: one flagged course
  - e. Ethics: one flagged course
  - f. Independent inquiry: one flagged courseCourses that may be used to fulfill flag requirements are identified in the Course Schedule. They may be used simultaneously to fulfill other requirements, unless otherwise specified. Please note, students may not earn the cultural diversity in the United States and the global cultures flag from the same course. Students are encouraged to discuss options with their academic advisors.
- c. The following courses:
  - a. Mathematics 408C and 408D; or 408N, 408S, and 408M; 427J
  - b. Statistics and Data Sciences 320E
  - c. One of the following sequences:
    1. Physics 301, 101L, 316, and 116L
    2. Physics 303K, 105M, 303L, and 105N
  - d. General chemistry: Chemistry 301 or 301C, 302 or 302C, and 317
  - e. Organic chemistry: Chemistry 128K, 128L, 328M, and 328N; Chemistry 128K, 128L, 328C and 329C; or Chemistry 220C, 320M, and 320N
  - f. Chemistry professional development: Chemistry 119C
  - g. Physical Chemistry: Chemistry 353 or 353M, 153K, and 354
- d. Thirty-six semester hours of upper-division coursework.
- e. At least 21 semester hours of upper-division coursework, including at least 12 semester hours of upper-division coursework in chemistry, must be completed in residence at the University.

## Additional Prescribed Work for Each Focus Area

### Focus Area I: Chemical Physics & Instrumentation

- f. All of the following:
  - i. Biology 311C
  - ii. Biochemistry 339F and 370
  - iii. Chemistry 154K, 456, 376K, and 378L
- g. Choose four of any of the following courses: Chemistry 354C, 354M, 354S, 368, 368Q, 369K, 375K, 379H; Chemical Engineering 253K, 253M, 350; Biomedical Engineering 311, 335, 339, 343, 349; Electrical and Computer Engineering 313, 347, 351K; Physics 315, 333, 338K, 345; Biochemistry 339N, 364D
- h. Enough additional coursework to make a total of 120 hours

### Focus Area II: Molecular Theory & Simulation

- f. All of the following:
  - i. Chemistry 354C, 354M, and 378L
  - ii. Statistics and Data Sciences 322 and 335
- g. Choose four of any of the following courses: Chemistry 354S, 154K, 366D, 367C, 367P, 368, 368Q, 369K, 375K, and 379H; Mathematics 368K; Physics 333, 345, and 375S; Statistics and Data Sciences 374C
- h. Enough additional coursework to make a total of 120 hours

### Focus Area III: Materials Chemistry

- f. All of the following: Chemistry 431, 456, 366C, 367C, and 378L
- g. Choose four of any of the following courses: Chemistry 341, 354S, 366C, 366D, 366E, 367P, 368, 368Q, 369K, 375K, 375P, 379H; Chemical Engineering 322, 323, 343; Electrical and Computer Engineering 334K, 339, 339S; Engineering Studies 360M; Mechanical Engineering 349; Petroleum and Geosystems Engineering 326, 421K, 427
- h. Enough additional coursework to make a total of 120 hours

### Focus Area IV: Synthesis & Chemical Biology

- f. All of the following:
  - i. Biology 311C and 311D
  - ii. Biochemistry 339F
  - iii. Chemistry 431, 456, 376K, and 378L
- g. Choose four of any of the following courses: Chemistry 341, 354C, 354S, 154K, 366C, 366D, 366E, 367C, 367P, 368, 368Q, 369K, 372C, 375K, 375P, 379H; Biochemistry 339J, 339N, 364D, 369L, 370; Biology 325, Molecular Biosciences 344; Biomedical Engineering 339, 355; Pharmacy PharmD 310K, 350K; Pharmacy Graduate Studies 388C, 396M
- h. Enough additional coursework to make a total of 120 hours

### Focus Area V: Teaching

This focus area is designed to fulfill the course requirements for certification as a middle grade or secondary school science teacher in Texas; the student chooses one of the following areas: composite science certification with chemistry as the primary teaching field; physical sciences certification; or physical science, mathematics, and engineering certification. However, completion of the course requirements does not guarantee the student's certification. Information about additional teacher certification requirements is available from the UTeach-Natural Sciences academic advisor.

- f. Mathematics 408C and 408D, or 408N, 408S, and 408M
- g. History 329U or Philosophy 329U
- h. One of the following sequences:
  - a. For students seeking composite science certification: Physics 301, 101L, 316, and 116L; or Physics 303K, 105M, 303L, and 105N; or Physics 317K, 105M, 317L, and 105N. Science 365 and Physics 108 may substitute for Physics 316 and 116L, 317L and 105N, or 303L and 105N. Physics 108 is offered on the pass/fail basis.
  - b. For students seeking either physical sciences certification or, mathematics, physical science, and engineering certification: Physics 301, 101L, 316, 116L, 315, and 115L; or 303K, 105M, 303L, 105N, 315, and 115L
- i. The requirements of one of the following certification areas:
  - a. For composite science certification:
    - i. Biology 311C and 311D
    - ii. Six hours of coursework in geological sciences; courses intended for non-science majors may not be counted toward this requirement
    - iii. Enough additional approved coursework in biology, geological sciences, or physics to provide the required 12 hours in a second field
    - iv. Chemistry 368 (Topic 1: *Research Methods: UTeach*) or, with the consent of the UTeach-Natural Sciences academic advisor, an upper-division chemistry course that includes a substantial research component
    - v. In place of requirements 3f through 3g of the prescribed work above, the following courses, for a total of at least 34 semester hours of chemistry: Biochemistry 339F or 369; Chemistry 353; and 455 or 456
  - b. For physical sciences certification:
    - i. Mathematics 427J or 427K and 427L
    - ii. Chemistry 153K, 354C and 154K
    - iii. Chemistry 354 and three hours of upper-division coursework in physics
    - iv. Chemistry 368 (Topic 1: *Research Methods: UTeach*) or, with the consent of the UTeach-Natural Sciences academic advisor, an upper-division chemistry course that includes a substantial research component
    - v. In place of requirements 3f through 3g of the prescribed work above, the following courses, for a total of at least 34 semester hours of chemistry: Biochemistry 339F or 369; Chemistry 353, and 455 or 456
  - c. For mathematics, physical science, and engineering certification:
    - i. Mathematics 315C, 375D, 427J or 427K, and 333L
    - ii. Engineering Studies 301; and Mechanical Engineering 377K upon approval of the project by the UTeach Program
    - iii. Chemistry 368 (Topic 1: *Research Methods: UTeach*) or, with the consent of the UTeach-Natural Sciences academic advisor, an upper-division chemistry course that includes a substantial research component
    - iv. In place of requirements 3f through 3g of the prescribed work above, the following courses, for a total of at least 30 semester hours in chemistry: Chemistry 353 and 153K, 455, and Biochemistry 369
- j. Eighteen semester hours of professional development coursework consisting of:
  - i. Curriculum and Instruction 651S (Topic 4: *Secondary School Teaching Practicum: Science*)
  - ii. Curriculum and Instruction 365C or UTeach-Natural Sciences 350

- iii. Curriculum and Instruction 365D or UTeach-Natural Sciences 355
- iv. Curriculum and Instruction 365E or UTeach-Natural Sciences 360
- v. UTeach-Natural Sciences 101, 110, and 170
- k. Students seeking middle grades certification must complete the following courses: Educational Psychology 350G or Psychology 301 and 304; and Curriculum and Instruction 339E
- l. Enough additional coursework, if needed, to make a total of 126 semester hours

## Focus Area VI: Chemistry Honors

- f. Breadth requirement: A three-hour honors-designated course from a department in the College of Natural Sciences. Credit earned by examination may not be counted toward this requirement
- g. A section of Undergraduate Studies 302 or 303 that is approved by the departmental honors advisor
- h. A section of Rhetoric and Writing 309S that is restricted to Dean's Scholars
- i. Chemistry 379H and a three-semester-hour upper-division research course approved by the departmental honors advisor, or six hours of Chemistry 379H
- j. Twenty-two additional hours of coursework based on Focus Area I, II, III, or IV and approved by the departmental honors advisor
- k. Six semester hours of coursework from the College of Liberal Arts and/or the College of Fine Arts
- l. Enough additional coursework to make a total of 120 semester hours

## Special Requirements

Students in all Focus Areas must fulfill both the University's [General Requirements](#) for graduation and the [college requirements](#). They must also earn a grade of at least C- in each mathematics and science course required for the degree, and a University grade point average in these courses of at least 2.00. More information about grades and the grade point average is given in the [General Information Catalog](#).

To graduate and be recommended for certification, students who follow the teaching focus area must have a University grade point average of at least 2.50. They must earn a grade of at least C- in the supporting course in requirement 8, and each of the professional development courses listed in requirement 11 and must pass the final teaching portfolio review; those seeking middle grades certification must also earn a grade of at least C- in each of the courses listed in requirement 12. For information about the portfolio review and additional teacher certification requirements, consult the UTeach-Natural Sciences academic advisor.

To graduate under Focus Area VI, students must remain in good standing in the Dean's Scholars Honors Program, must submit an honors thesis approved by the departmental honors advisor, and present their research in an approved public forum, such as the college's annual Undergraduate Research Forum. More information about the Undergraduate Research Forum is available at <https://cns.utexas.edu>

## Order and Choice of Work

Students begin the Bachelor of Science in Chemistry degree program with nine hours of introductory chemistry for science majors (Chemistry 301, 302, and 317), as well as Mathematics 408C or 408N. Students

should consult with their academic advisors about planning to choose a chemistry degree focus area, appropriate course in mathematics and physical sciences, and about course load and balance between laboratory and lecture courses. Most students will select a degree focus area by the end of the second year and take at least 21 hours of upper-division coursework in the major requirements in the third and fourth years.

- i. Engineering Studies 301; and Mechanical Engineering 377K upon approval of the project by the UTeach Program