

# Chemistry

In the College of Sciences

**OFFICE: Geology/Mathematics/Computer Science 209**

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**<http://www.sci.sdsu.edu/chemistry>**

Accredited by the American Chemical Society.

## Faculty

Emeritus: Abbott, Bennett, Cobble, Dahms, Grubbs, Hellberg, Isensee, Jensen, Jones, Joseph, Landis, Leberz, Malik, Mathewson, O'Neal, Richardson, Ring, Stewart, Walba, Woodson  
Chair: Carrano  
Professors: Carrano, Grotjahn, Metzger, Roeder, Stumph, Tong  
Associate Professors: Bergdahl, Chatfield, Cole, Cooksy, McAlpine, Pullman, Smith  
Assistant Professors: Beauvais, Huxford, Kalyuzhny, Liang, Love, van der Geer

## Offered by the Department of Chemistry and Biochemistry

Doctor of Philosophy degree in chemistry.

Master of Arts degree in chemistry.

Master of Science degree in chemistry.

Major in chemical physics with the B.S. degree in applied arts and sciences.

Major in chemistry with the B.S. degree in applied arts and sciences with the Certificate of the American Chemical Society.

Emphasis in biochemistry.

Major in chemistry with the B.A. degree in liberal arts and sciences, with or without the Certificate of the American Chemical Society.

Teaching major in chemistry for the single subject teaching credential in science.

Minor in chemistry.

## The Major

Through the study of chemistry students can better understand their environment and develop new materials that provide for a higher quality of life. Chemists are involved in a wide range of careers in research, development and the production of new goods. Basic chemical research provides society with discoveries of new substances and the means to predict their chemical and physical properties. In developmental chemistry, professionals find ways to put them to use. There are careers in methods of production to provide these materials to society in a cost-effective way. In each of these areas, there are specialties in analytical, biochemical, inorganic, organic, and physical chemistry.

The Department of Chemistry and Biochemistry offers five degree programs leading to the Bachelor of Arts degree, the Bachelor of Science degree, the Master of Arts degree, the Master of Science degree, and the Doctor of Philosophy degree (with the University of California, San Diego).

There are several options available in the undergraduate program for those wishing either a major or a minor in chemistry. A chemistry major with the Bachelor of Science degree and certificate of the American Chemical Society is designed to qualify students for many types of positions as chemists and for admission to graduate study.

The chemistry major with the Bachelor of Arts degree and certificate of the American Chemical Society is specifically designed to prepare students for careers and graduate work requiring a strong chemistry background. With an appropriate choice of electives, graduates can meet the requirements for admission to medical, dental and pharmaceutical schools. A minor in biology is recommended.

The use of chemistry electives allows a student to focus on a particular area in chemistry such as analytical chemistry, biochemistry, chemical physics, inorganic chemistry, organic chemistry, or physical chemistry.

## Major Academic Plans (MAPs)

Visit <http://www.sdsu.edu/mymap> for the recommended courses needed to fulfill your major requirements. The MAPs Web site was created to help students navigate the course requirements for their majors and to identify which General Education course will also fulfill a major preparation course requirement.

## Chemistry Major

### With the B.S. Degree in Applied Arts and Sciences (Major Code: 19051) and Certificate of the American Chemical Society

All candidates for a degree in applied arts and sciences must complete the graduation requirements listed in the section of this catalog on "Graduation Requirements."

A minor is not required with this major.

**Preparation for the Major.** Chemistry 200, 201, 231, 251; Mathematics 150, 151, 252; and Physics 195, 195L, 196, 196L. (39 units) Recommended: Physics 197 and 197L.

**Graduation Writing Assessment Requirement.** Passing the Writing Proficiency Assessment with a score of 10 or above or completing one of the approved upper division writing courses (W) with a grade of C (2.0) or better. See "Graduation Requirements" section for a complete listing of requirements.

**Major.** A minimum of 36 upper division units to include Chemistry 410A-410B, 417, 427, 431, 457, 520A-520B, 550, 560, one unit of 498, and eight units of upper division electives in chemistry. Six of the eight units may be in related subjects with the approval of the department.

### Emphasis in Biochemistry

**Preparation for the Major.** Chemistry 200, 201, 231, 251; Biology 201B; Mathematics 150, 151, 252; Physics 195, 195L, 196, 196L. (43 units) Recommended: Physics 197 and 197L.

**Graduation Writing Assessment Requirement.** Passing the Writing Proficiency Assessment with a score of 10 or above or completing one of the approved upper division writing courses (W) with a grade of C (2.0) or better. See "Graduation Requirements" section for a complete listing of requirements.

**Major.** A minimum of 36 upper division units to include Chemistry 410A-410B, 431, 457, 550, 560, 567; four units selected from Chemistry 562, 563, 564; one unit of Chemistry 498; and the remaining units selected from Chemistry 496, 497, 498, and any 500-level chemistry course; Biology 350, 352, 549, 551, 570, 585, 590, 595. The addition of Chemistry 417, 427, and 520A qualifies this program for ACS certification.

## Chemistry Major

### With the B.A. Degree in Liberal Arts and Sciences (Major Code: 19051) and Certificate of the American Chemical Society

All candidates for a degree in liberal arts and sciences must complete the graduation requirements listed in the section of this catalog on "Graduation Requirements." No more than 49 units in chemistry courses can apply to the degree.

A minor is not required with this major.

**Preparation for the Major.** Chemistry 200, 201, 231, 251; Mathematics 150, 151, 252; and Physics 195, 195L, 196, 196L. (39 units) Recommended: Physics 197 and 197L.

**Language Requirement.** Competency (successfully completing the third college semester or fifth college quarter) is required in one foreign language to fulfill the graduation requirement. Refer to section of this catalog on "Graduation Requirements."

CHEM

**Graduation Writing Assessment Requirement.** Passing the Writing Proficiency Assessment with a score of 10 or above or completing one of the approved upper division writing courses (W) with a grade of C (2.0) or better. See "Graduation Requirements" section for a complete listing of requirements.

**Major.** A minimum of 30 upper division units in chemistry to include Chemistry 410A-410B, 417, 427, 431, 457, 520A, 550, 560; one unit of Chemistry 498, and five units of electives selected from Chemistry 496, 498, or any 500-level course in chemistry.

## Chemistry Major

**With the B.A. Degree in Liberal Arts and Sciences**  
(Major Code: 19051)

All candidates for a degree in liberal arts and sciences must complete the graduation requirements listed in the section of this catalog on "Graduation Requirements." No more than 48 units in chemistry courses can apply to the degree.

**Preparation for the Major.** Chemistry 200, 201, 231, 251; Biology 201A, 201B; Mathematics 150, 151, 252; and Physics 195, 195L, 196, 196L. (47 units) Recommended: Physics 197 and 197L.

**Language Requirement.** Competency (successfully completing the third college semester or fifth college quarter) is required in one foreign language to fulfill the graduation requirement. Refer to section of this catalog on "Graduation Requirements."

**Graduation Writing Assessment Requirement.** Passing the Writing Proficiency Assessment with a score of 10 or above or completing one of the approved upper division writing courses (W) with a grade of C (2.0) or better. See "Graduation Requirements" section for a complete listing of requirements.

**Major.** A minimum of 24 upper division units in chemistry to include Chemistry 410A-410B, 417, 431, 457, 550, and seven units of electives in chemistry. Chemistry 560A is recommended for all pre-medical students.

**Minor.** A minor in biology is expected for preprofessional students.

## Chemistry Major (Teaching Credential Only)

**In preparation for the Single Subject Teaching Credential in Science/Chemistry**

**With the B.A. Degree in Applied Arts and Sciences**  
(Major Code: 19051)

The chemistry major in preparation for the single subject teaching credential in science/chemistry has been submitted to the California Commission on Teacher Credentialing for approval. Contact Dr. Phoebe Roeder for additional information.

One of the requirements for acceptance into the College of Education's post-baccalaureate credential program is to either pass the appropriate CSET examinations or complete an approved academic program. The single subject teaching credential in science preparation program described below satisfies the academic requirements for a student planning to teach integrated science and chemistry at the secondary level. Entrance into the post-baccalaureate credentialing program in part requires certification of subject matter competency by this department. This certification requires completion of the academic program with the required grades, submission of a satisfactory portfolio, and the recommendation of the department. Contact the subject matter preparation program adviser. In addition, all candidates for a Single Subject Teaching credential at San Diego State University must complete the requirements outlined in the catalog under Teacher Education or Policy Studies. Contact the School of Teacher Education or the Policy Studies in Language and Cross-Cultural Education Department for up-to-date information on prerequisites.

All candidates for a degree in applied arts and sciences must complete the graduation requirements listed in the section of this catalog on "Graduation Requirements." Candidates who wish to graduate with 122 units must complete one of two American Institutions courses at the upper division level or satisfy the California state and local government portion of American Institutions by passing the California Government examination available through the Student Testing, Assessment and Research Office.

A minor is not required for this major.

**Preparation for the Major.** Astronomy 109, 201; Biology 201A, 201B; Chemistry 200, 201, 231, 251; Communication 103; Mathematics 150, 151; Physics 180A, 180B, 182A, 182B and Mathematics 252 *OR* Physics 195, 195L, 196, 196L, 197, 197L; Teacher Education 211. (55 units)

**Graduation Writing Assessment Requirement.** Passing the Writing Proficiency Assessment with a score of 10 or above or completing one of the approved upper division writing courses (W) with a grade of C (2.0) or better. See "Graduation Requirements" section for a complete listing of requirements.

**Major.** A minimum of 31 upper division units to include Chemistry 410A, 410B, 417, 431, 457, 497 (1 unit), 520A, 550, 560; Geological Sciences 412; Natural Science 315.

**Additional Requirements for Subject Matter Preparation Certification**

**Satisfactory Grades.** At most one course with a C- or lower among the courses listed under Preparation for the Major, and at most one course with a C- or lower among the courses listed under the Major. If a course is repeated, the highest grade will count.

**Formative Assessment.** Completion of a satisfactory, preliminary portfolio two semesters prior to graduation. Contact the subject matter preparation adviser for information.

**Summative Assessment.** Completion of a satisfactory, final portfolio, and a positive recommendation from a committee consisting of the senior project supervisor, the Department of Chemistry and Biochemistry chair, and the subject matter preparation program adviser with input from the student's upper division laboratory instructors.

## Chemical Physics Major

**With the B.S. Degree in Applied Arts and Sciences**  
(Major Code: 19081)

All candidates for a degree in applied arts and sciences must complete the graduation requirements listed in the section of this catalog on "Graduation Requirements." Individual master plans for each student are filed with the chemistry and physics undergraduate advisers and the Office of Advising and Evaluations.

A minor is not required with this major.

**Preparation for the Major.** Chemistry 200, 201, 231, 251; Mathematics 150, 151, and 252; Physics 195, 195L, 196, 196L, 197, 197L. (43 units)

Recommended: A course in computer programming.

**Graduation Writing Assessment Requirement.** Passing the Writing Proficiency Assessment with a score of 10 or above or completing one of the approved upper division writing courses (W) with a grade of C (2.0) or better. See "Graduation Requirements" section for a complete listing of requirements.

**Major.** A minimum of 39 upper division units to include Chemistry 410A-410B, 417, 550; Mathematics 342A, 342B; Physics 311, 350, 400A, 410; six units selected from Chemistry 431, 457, 510, Physics 357, 360, 400B, Chemistry 538 or Physics 538; and Research Project: Chemistry 497 (3 units) or Chemistry 498 (3 units) or Physics 498A and 498B (3 units).

## Chemistry Minor

The following courses are prerequisite to the chemistry minor and do not count toward the 15 units required for the minor: Chemistry 200, 201. (10 units.)

The minor in chemistry consists of 15 units in chemistry to include Chemistry 231 and 251; and six units of upper division electives. Chemistry 410A-410B\* are strongly recommended.

Courses in the minor may not be counted toward the major, but may be used to satisfy preparation for the major and general education requirements, if applicable. A minimum of six upper division units must be completed in residence at San Diego State University.

\* Additional prerequisites in mathematics and physics required for these courses.