

SUBJECT MATTER PROGRAM (CHEMISTRY)

Units required for the Subject Matter Program: 84

Program Description

The Science Subject Matter Program (SSMP), with emphases in Biological Sciences, Chemistry, and Physics, leads to a BA degree in the area of emphasis. It also meets the latest California Commission on Teacher Credentialing (CCTC) subject-matter requirement to enter a teaching credential program in California. In order to obtain a California K-12 Teaching Credential, a program of professional education preparation (a teaching credential program) is required in addition to completing the SSMP. Completing the SSMP and teaching credential program allows graduates to teach all four sciences (biology, chemistry, geoscience, and physics) at the general/integrated 7th-12th grade science level, in addition to the student's area of concentration at the advanced high school level. A typical credential might read, for example, SCIENCE: Chemistry.

The Chemistry SSMP provides the minimum preparation for chemistry majors interested in pursuing the single subject teaching credential in the sciences with a concentration in chemistry. This program meets the standards for academic preparation set by the California Commission on Teacher Credentialing and qualifies students to teach general science in all the four natural sciences and chemistry at the high school level.

A grade of at least a "C-" in all required Science Subject Matter Program courses is necessary in order to meet subject matter requirements for admission to a teaching credential program. If a grade of "C-" is not achieved in all SSMP courses, then the current CTC approved subject matter exam must be successfully passed in order to be eligible for admission to a teaching credential program (the current exam is the CSET, tests I, II, and III). At least 15 units of the coursework or equivalent work experience must be current, i.e., completed within the past six years.

It is also possible to obtain admission to the Professional Education Program by passing a series of subject-matter examinations specified by the CTC in lieu of this Science Subject Matter Program. For information about this option contact the Teacher Preparation Program Office, Eureka Hall 216, (916) 278-6403.

Special Features

- At Sacramento State all of the departments in the College of Natural Sciences and Mathematics have strong BA and BS programs supported by an active faculty and with modern laboratory facilities. The College is committed to the education and development of new science teachers and have a solid record of providing professional activities and support for local experienced teachers through the work of the Center for Mathematics and Science Education.
- This subject matter program is based on the concept that, if well-educated science majors pursue teaching careers in K-12 education, science instruction will improve. To this end, the Sacramento State Science Subject Matter Program embodies the following features.

The program:

- emphasizes breadth in sciences.
- requires depth of study in one of the natural sciences. All credential candidates must complete the BA requirements in one of the emphases. Through deeper study of science, credential candidates

become learners in the discipline and develop the ability to be creative teachers and models for their students.

- emphasizes laboratory and field work so that credential candidates learn to use the many tools of science including computers. This will enable them to develop laboratory programs and structure field experiences for students in their schools.
- emphasizes science for all students. The College recognizes the need for programs that address the needs of underrepresented groups in science

Notes:

- Credential candidates who complete the SSMP will have gained the confidence and ability to do science. They will understand that science is a creative and dynamic process which, when applied, can lead to understanding and appreciation of the natural world. This attitude will be reflected in their classrooms and will make them good models for pre-college students.
- Science majors who intend to pursue a teaching credential should see a faculty advisor or the department chair in the department of their academic major. It is recommended that they do so as early as it is critical that their science coursework be carefully planned and coordinated with the professional teacher preparation program. In addition, students are encouraged to become involved with education related activities like grading, assisting in labs, tutoring K-12 students, and visiting schools; all experiences that can be arranged through your advisor.

Minimum Grade Requirement

A minimum grade "C-" is required in all courses required for the Chemistry major. Grades below "C-" in prerequisite courses do not satisfy prerequisite requirement.

Program Requirements

Code	Title	Units
Required Lower Division Core Courses (60 Units)		
ASTR 4A	Introduction to the Solar System ¹	3
or ASTR 4B	Introduction to Stars, Galaxies, and Cosmology	
or ASTR 4C	Introduction to Astrobiology	
BIO 1	Biodiversity, Evolution and Ecology ¹	5
BIO 2	Cells, Molecules and Genes ¹	5
CHEM 1A	General Chemistry I ¹	5
CHEM 1B	General Chemistry II	5
CHEM 24	Organic Chemistry Lecture I	3
CHEM 25	Organic Chemistry Laboratory	3
CHEM 31	Quantitative Analysis	4
ENVS 10	Introduction to Environmental Science ¹	3
GEOL 10	Physical Geology ¹	3
GEOL 10L	Physical Geology Lab ¹	1
MATH 30	Calculus I ¹	4
MATH 31	Calculus II ¹	4
MATH 32	Calculus III	4
PHYS 5A	General Physics: Mechanics, Heat, Sound ¹	4
PHYS 5B	General Physics: Light, Electricity and Magnetism, Modern Physics ¹	4
Required Upper Division Courses (24 Units)		
CHEM 124	Organic Chemistry Lecture II	3

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CHEM 140A	Physical Chemistry Lecture I	3
CHEM 140B	Physical Chemistry Lecture II	3
Select additional courses to a minimum of 24 upper division units in Chemistry including at least two lecture courses and two laboratory courses. ²		15
Total Units		84

¹ Course also satisfies General Education (GE)/Graduation Requirement.

² Elective courses should be selected in consultation with an advisor.

General Education Requirements¹

Code	Title	Units
Area A: Basic Subjects (9 Units)		
A1	Oral Communication	3
A2	Written Communication	3
A3	Critical Thinking	3
Area B: Physical Universe and Its Life Forms (3 Units)		
B1	Physical Science ²	0
B2	Life Forms ²	0
B3	Lab (Note: Lab experience to be taken with one of the following: B1, B2 or B5) ²	0
B4	Math Concepts ²	0
B5	Additional Course (Any B to reach 12 units) - Take upper-division course to complete Area & upper division requirements.	3
Area C: Arts and Humanities (12 Units)		
C1	Arts	3
C2	Humanities	3
C1/C2	Area C Course	3
C1/C2	Area C Course - Take upper-division course to complete Area & upper division requirements.	3
Area D: The Individual and Society (12 Units)		
Area D Course		3
Area D Course		3
Area D Course		3
Area D Course - Take upper-division course to complete Area & upper division requirements.		3
Area E: Understanding Personal Development (3 Units)		
Area E Course		3
Total Units		39

¹ To help you complete your degree in a timely manner and not take more units than absolutely necessary, there are ways to use single courses to meet more than one requirement (overlap). For further information, please visit the General Education page (<http://catalog.csus.edu/colleges/academic-affairs/general-education>).
Note: There is no way to list all possible overlaps so please consult with a professional advisor. The Academic Advising Center can be visited online (<http://www.csus.edu/acad>), by phone (916) 278-1000, or email (advising@csus.edu).

² Required in Major; also satisfies GE.

Graduation Requirements¹

Code	Title	Units
Graduation Requirements (required by CSU) (9 Units)		
American Institutions: U.S. History		3
American Institutions: U.S. Constitution & CA Government		3
Writing Intensive (WI)		3
Graduation Requirements (required by Sacramento State) (12 Units)		
English Composition II		3
Race and Ethnicity in American Society (RE)		3
Foreign Language Proficiency Requirement ²		6

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² If not satisfied before entering Sacramento State, it may be satisfied in General Education Area C2 (Humanities). "C- or better required." The alternative methods for satisfying the Foreign Language Proficiency Requirement are described here: <https://www.csus.edu/wll/flgr/>