Program Description
The Departments of Biology, Chemistry, Geology, and Physics offer a Bachelor of Arts in Natural Sciences. This degree program offers the required subject matter content to help prepare prospective science teachers apply for the subject matter certification in California by taking the California Subject Matter Examinations for Teachers (CSET) in Science. The BA degree in Natural Sciences prepares the candidate for the CSET Science exams, which consist of three exams: two covering breadth in science (Biology, Chemistry, Earth/Planetary Science and Physics), and one covering depth in one of these areas, corresponding to the Primary concentration. Passage of the CSET in Science is required to certify subject matter competency before entering a teacher credential program. Consult your advisor or the School of Education for details on other entry requirements for pursuing a secondary teaching credential. The BA in Natural Sciences offers a broad foundation in all four of the natural science areas (Biology, Chemistry, Earth Science, and Physics) as well as depth preparation in two of the four areas. While this broad foundation has been developed for prospective teachers, it also serves as excellent preparation for employment in any area of business, industry or government where scientific skills are in demand.

The program consists of three components: I. Primary Concentration (major) II. Secondary Concentration (minor), and III. Cognates (breadth). A student may major in Biology, Chemistry, Geology, or Physics. They must also minor in one of the other three sciences and take cognates in the remaining two sciences, Math, and Astronomy. For example, a student might major in Chemistry with a minor in Biology and take cognates in Geology, Physics, Math, and Astronomy. Another example could be that a student might major in Geology with a minor in Physics and take cognates in Biology, Chemistry, Math, and Astronomy.

For students who already have a degree and would like to be certified as subject matter competent in the sciences, please see www.cset.nesinc.com for information on the CSET Exams.

For each concentration, SCI 351A is recommended to satisfy General Education Theme I and INST 312 for Theme II. All courses must be completed with their respective laboratory components.

Requirements for the Bachelor of Arts in Natural Sciences (choose one of four primary concentrations)

Requirements for the Bachelor of Arts Degree with a Major in Natural Sciences
The Bachelor of Arts Degree with a major in Natural Sciences requires a minimum of 180 units which includes courses for the major (and minor, if selected) and courses for the other university-wide graduation requirements: General Education, American Institutions, First-Year Experience, Gender-Race-Ethnicity, Upper Division Writing, and Foreign Language (see pages 59-63).

There are four tracks toward the major in Natural Sciences - each with a different primary concentration area. Within each of the four primary concentrations, students must select one of three secondary concentration areas.

A. Primary Concentration in Biology
2. Select one of these secondary concentrations and corresponding cognates
   a. Secondary Concentration in Chemistry & Cognates
      CHEM 211, 212, 213 plus two upper division Chemistry courses
      Cognates: GEOL 201 and 205 or 308, PHYS 110, 201 or 221, 202 or 222, and 203 or 223
   b. Secondary Concentration in Geology & Cognates
      GEOL 201, 303, and 205 or 308 plus two from GEOL 307, 309, and 320
c. **Secondary Concentration in Physics & Cognates**
   PHYS 110, 221, 222, 223, 307 and 324
   Cognates: CHEM 211 and 212, GEOL 201 and 205 or 308; MATH 201, 202, and 222.

### B. Primary Concentration in Chemistry

1. Chemistry courses: CHEM 211, 212, 213, 331, 332, 400, 490 plus one upper division Chemistry course acceptable for the Major.

2. Select one of these secondary concentrations and corresponding cognates
   a. **Secondary Concentration in Biology & Cognates**
      BIOL 201, 202, 203, 304, 305, and 306 or 470
      Cognates: CHEM 211 and 212, PHYS 110, 201 or 221, 202 or 222, and 203 or 223.
   b. **Secondary Concentration in Chemistry & Cognates**
      CHEM 211, 212, 213, and two upper division Chemistry courses
      Cognates: BIOL 201, 202, and 203, GEOL 201 and 205 or 308
   c. **Secondary Concentration in Physics & Cognates**
      PHYS 110, 221, 222, 223, 307 and 324
      Cognates: BIOL 201, 202, and 203, CHEM 211 and 212;

### C. Primary Concentration in Geology

1. Geology courses: GEOL 201, 205 or 308, 303, 306, 307, 309, 320, and 490

2. Select one of these secondary concentrations and corresponding cognates
   a. **Secondary Concentration in Biology & Cognates**
      BIOL 201, 202, 203, 304, 305, and 306 or 470
      Cognates: CHEM 211 and 212, PHYS 110, 201 or 221, 202 or 222, and 203 or 223.
   b. **Secondary Concentration in Chemistry & Cognates**
      CHEM 211, 212, 213, and two upper division Chemistry courses
      Cognates: BIOL 201, 202, and 203, GEOL 201 and 205 or 308
   c. **Secondary Concentration in Physics & Cognates**
      PHYS 110, 221, 222, 223, 307 and 324
      Cognates: BIOL 201, 202, and 203, CHEM 211 and 212; MATH 201, 202, and 222.

### D. Primary Concentration in Physics

1. Physics courses: PHYS 110, 221, 222, 223, 307, 324, 490 plus 6 units of additional upper division physics acceptable for the major: MATH 201, 202, and 222.

2. Select one of these secondary concentrations and corresponding cognates
   a. **Secondary Concentration in Biology & Cognates**
      BIOL 201, 202, 203, 304, 305, and 306 or 470
      Cognates: CHEM 211 and 212, GEOL 201 and 205 or 308
   b. **Secondary Concentration in Chemistry & Cognates**
      CHEM 211, 212, 213, and two upper division Chemistry courses
      Cognates: BIOL 201, 202, and 203, GEOL 201 and 205 or 308
   c. **Secondary Concentration in Geology & Cognates**
      GEOL 201, 303, and 205 or 308 plus two from GEOL 307, 309, and 320
      Cognates: BIOL 201, 202, and 203, CHEM 211 and 212