

# COLLEGE OF SCIENCE & MATHEMATICS

Faculty Offices East (25), Room 229

Phone: 805.756.2226

<https://cosam.calpoly.edu>

Dean: Dean E. Wendt

Associate Dean: Derek Gragson

Associate Dean: Kellie Green Hall

Associate Dean: Camille O'Bryant

Assistant Dean: Kathryn Dilworth

## Academic Programs

Program name	Program type
Actuarial Preparation	Minor
Astronomy	Minor
Biochemistry	BS
Biological Sciences	BS, MS
Biology	Minor
Biotechnology	Minor
Chemistry	BS
Cross Disciplinary Studies Minor in Bioinformatics	Minor
Cross Disciplinary Studies Minor in Data Science	Minor
Environmental Studies	Minor
Equity in Education	Minor
Exercise and Sport Studies	Minor
Geology	Minor
Kinesiology	BS
Liberal Studies	BS
Marine Sciences	BS
Mathematics	BS, MS, Minor
Microbiology	BS, Minor
Physics	BA, BS, Minor
Polymers and Coatings Science	MS
Public Health	BS
Statistics	BS, Minor

## School of Education Programs

Program name	Program type
Administrative Services	Credential
Agriculture Specialist	Teaching Credential
Curriculum and Instruction	MA
Higher Education Counseling and Student Affairs	MS
Educational Leadership and Administration	MA
Special Education	MS
Special Education (Education Specialist - Mild/Moderate Disabilities)	Credential
Multiple Subject	Teaching Credential
Single Subject	Teaching Credential

See the School of Education (<https://catalog.calpoly.edu/collegesandprograms/collegeofsciencemathematics/schoolofeducation/>) section for further information.

## Mission

The mission of the College of Science and Mathematics is to facilitate learning, understanding, and appreciation of science and mathematics as a basis for creative endeavors, intellectual pursuits, careers, and critical consideration of issues confronting society. The College has two equally important roles: (1) to provide specialized coursework for students enrolled in the College's undergraduate, graduate and minor programs, and (2) to provide support and breadth courses in science and mathematics for all students of the university. Cal Poly is a national leader in preparing college students for careers in science, technology, engineering, and mathematics (STEM) professions, including science and mathematics teaching careers.

The College of Science and Mathematics has a tradition and reputation for excellence in teaching and faculty mentored student research and is dedicated to both undergraduate and graduate instruction. The College provides a student-centered learning environment consistent with the University's "learn by doing" philosophy. In laboratories, students have access to modern instrumentation and computer technology. Classroom instruction is done in relatively small classes so that a personal approach by instructors is possible. Because of the College's large role in offering support courses to the rest of the university community, the number of faculty in each department is relatively large and favors student-faculty interaction, both inside and outside of the classroom.

## Faculty Mentors

Faculty members are subject-matter experts in their field and take an active role in academic and career advising. It is especially valuable to consult with faculty about curriculum decisions within the major, extracurricular activities, involvement in research/internships, and career/professional opportunities. Students are encouraged to obtain both faculty and professional academic advising to choose appropriate coursework to complement their interests and career goals.

## Applying to Graduate School

College of Science and Mathematics faculty have earned advanced degrees from a wide variety of universities and are excellent sources for information and advice about graduate programs, prerequisites and application procedures. Applications to graduate programs should be made in the fall for admission to the following fall term. The Graduate Record Exam (GRE) should be taken early in the application cycle. Generally, two or more letters of reference from faculty are required. Most Ph.D. granting institutions offer financial support in the form of teaching assistantships and research fellowships.

## College of Science and Mathematics Student Services

Science North (Bldg. 53), Room 211

Phone: 805.756.2615

<https://csmadvising.calpoly.edu>

Director/Advisor: Kristi Weddige

Advisor: Anya Bergman

Advisor: Meghan Farrier-Nolan

Advisor: Laura Wilson

Student Affairs Analyst: Ryan Lau

Retention Specialist: Tiffany Kwapnoski

## Advising Mission Statement

The College of Science and Mathematics Academic and Pre-Health Advisors strive to connect with each student to recognize and support their unique advising needs. Advisors collaborate with students in a manner which empowers them to make informed, self-directed decisions in order to define and pursue their academic and professional aspirations.

## Services Provided

Services include assistance with developing long-range academic plans, interpreting university and college policy and procedures, articulation agreements, scheduling classes, study abroad and informing students of their graduation requirements, as well as academic peer coaching for students experiencing academic difficulty.

The Advising Center provides pre-health career advising services and resources for Cal Poly students and alumni seeking a career in a health professions field. Students are encouraged to seek advice early and often throughout their time at Cal Poly. For more information, please refer to: pre-health career advising (<https://catalog.calpoly.edu/academicsupportandcampuslife/academicervicesandprograms/prehealthcareeradvising/>).

## School of Education

The School of Education prepares students to be effective, ethical and informed teachers, counselors and administrators, who have a particular expertise relative to current state and national needs in their respective fields through an inquiry-focused clinical approach. The School of Education offers a range of programs: multiple subject and single subject teaching credentials; agriculture specialist credential; integrated credential and M.S. in Special Education; integrated credential and M.A. Educational Leadership and Administration; M.A. in Curriculum and Instruction; and M.S. Higher Education Counseling and Student Affairs. Single subject credential programs are offered in Agriculture, English, Biology, Chemistry, Mathematics, Physics, Social Science and World Languages.

To prepare students in these fields, faculty from agriculture, science, mathematics, and the liberal arts work collaboratively with faculty in the School of Education to provide outstanding programs that maintain a balance of coursework in subject matter, foundations of education, and pedagogy, integrated with field experiences for applied practice. In the Liberal Studies Program, students can pursue a pre-professional program that leads to a B.S. degree and includes preparation toward a multiple subject credential to teach in elementary school. Cal Poly takes pride in producing school teachers and leaders through a balanced curriculum. More information on the programs offered can be found in the School of Education (<https://catalog.calpoly.edu/collegesandprograms/collegeofsciencemathematics/schoolofeducation/>) section of this catalog.

## Interdisciplinary Minors

### Actuarial Preparation Minor

Actuaries are professional risk managers that assess the likelihood and impact of future, uncertain events. They use their quantitative skills to prepare businesses for the financial impact of the risk to which they are exposed. Actuaries must meet rigorous standards for admission to professional societies. To be called an actuary in the United States, one

must become an Associate or Fellow of the Society of Actuaries (SOA) or the Casualty Actuarial Society (CAS).

The Actuarial Preparation Minor provides education in probability, financial mathematics, and mathematical statistics. The coursework will help students satisfy the Validation by Educational Experience (VEE) requirements of the SOA and CAS, and will prepare them for the actuarial exams, which are also prerequisite to SOA or CAS membership. The minor offers VEE courses in the areas of accounting and finance (BUS 214, BUS 342), economics (ECON 221, ECON 222), and mathematical statistics (STAT 425, STAT 426).

The minor is open to any major, but it is especially suited to students majoring in statistics, mathematics, and business or economics (with a Quantitative Analysis concentration). Students should be aware that courses within the minor have MATH 142, a course in computer programming (BUS 392, CPE/CSC 101, CSC 232, CSC 235, ECON 395, or STAT 331), and certain introductory statistics courses (IME 326, STAT 252, STAT 302, STAT 312, or STAT 313) as prerequisites. Many of these courses are already required for the majors most closely aligned with the actuarial profession. Students should complete these prerequisites before applying to the minor. Those interested in the minor should consult the website <https://statistics.calpoly.edu/content/actuary/> (<https://statistics.calpoly.edu/content/actuary/>).

Additional information about the actuarial profession, societies, and exams, as well as additional suggested coursework, is available at the website above.

## Biotechnology Minor

Biotechnology is one of the most important areas of growth in the biomedical sciences and has transformed medicine, chemical manufacturing, and agriculture over the last 20 years. Cal Poly's Biotechnology minor is designed to give undergraduate students a grounding in the sciences that underlie biotechnology; in addition, students engage in practical experience in biotechnology lab work.

Students completing the Biotechnology minor take a core of required courses and approved elective courses focusing on biotechnology. The Biotechnology Minor Form is available from the Dean's Office or the Advising Center in the College of Science and Mathematics. Final approval of the minor is by one of the Minor Coordinators in the College of Science and Mathematics.

The minor is open to any major except Biochemistry, Microbiology, and Biological Science General Curriculum or with concentrations in Anatomy and Physiology, and Molecular and Cellular Biology.

Biological Sciences students preparing for the minor must take CHEM 216, CHEM 217, and CHEM 369 to fulfill the organic chemistry and biochemistry (if applicable) requirements of their major.

Students interested in more information should contact the Biotechnology Minor Coordinators in the Chemistry and Biochemistry Department or the Biological Sciences Department.

Minor Requirements (<https://catalog.calpoly.edu/collegesandprograms/collegeofsciencemathematics/biotechnologyminor/>)

## Environmental Studies Minor

Students who complete a minor in Environmental Studies will be able to:

- Analyze, explain, and evaluate environmental issues from both scientific/technical and social/political/economic/ethical perspectives.
- Integrate and synthesize knowledge from multiple disciplines.
- Explain and apply the methodologies and approaches that different disciplines bring to bear on complex problems.
- Work productively and effectively with students from other disciplines and with other points of view.
- Confront and grapple with real issues of contemporary significance.
- Gain employment or pursue further study that emphasizes interdisciplinary knowledge and skills.

More information about the Environmental Studies Minor, including Subject Area Electives appropriate for students in each of the colleges, can be obtained from the College of Science and Math Advising Center in Building 53, Room 211.

## SCM Courses

### SCM 101. Introduction to Health Profession Careers. 1 unit

Term Typically Offered: SP

CR/NC

Introduction to health profession careers. Professionals from within the health care industry provide an overview of their careers. Emphasis on creating a pre-health career plan, academic course selection, obtaining appropriate experiences, and elements of a strong professional application. Intended for students undecided about their health professions career choice. Credit/No Credit grading only. 1 activity.

### SCM 150. Supplemental Workshops in Science. 1 unit

Term Typically Offered: F,W,SP,SU

CR/NC

Concurrent: Enrollment in the designated section of the associated course.

Facilitated study and discussion of the theory, concepts, and applications of content material from selected biology, chemistry, physics, and statistics courses. Credit/No Credit grading only. Total credit limited to 8 units. Maximum of 2 units for degree credit. 1 laboratory.

### SCM 220. Seminar for Science and Math Tutors. 1 unit

Term Typically Offered: F, W, SP

CR/NC

Concepts of teaching and learning as it relates to roles as K-12 grade science and math tutors and/or classroom assistants. Intended for participants in science, engineering, and mathematics tutoring and teaching assistant programs like Teaching Assistants in Mathematics and Science (TeAMS) and Mentors in Out of School Time (MOST). Participation in public schools requires mandated fingerprint clearance. Credit/No Credit grading only. Total credit limited to 3 units. 1 activity.

### SCM 230. Seminar for Learning Assistants. 2 units

Term Typically Offered: F, W, SP

CR/NC

Prerequisite: BIO 160, BIO 161, CHEM 124, CHEM 127, MATH 141, PHYS 131, or PHYS 141.

Introduction to learning theory and teaching practices for mathematics and science learning assistants regarding conceptual development, questioning techniques, cooperative learning, nature of math and science, and argumentation in mathematics and science. Restricted to students admitted to the Learning Assistant program. Total credit limited to 6 units. Degree credit limited to 4 units. 2 seminars.

### SCM 270. Selected Topics. 1-4 units

Term Typically Offered: TBD

Prerequisite: Open to undergraduate students and consent of instructor.

Directed group study of selected topics. The Class Schedule will list topic selected. Total credit limited to 8 units. 1 to 4 lectures.

### SCM 300. Early Field Experience. 4 units

Term Typically Offered: F, W, SP

CR/NC

Prerequisite: Sophomore standing; for Math majors or Science and Engineering majors only.

Historical, philosophical, and social foundations of public science and mathematics education. Public school curriculum and professional education dispositions. Structured observation and participation in K-12 public schools with attention to instructional practices for diverse learners. Credit/No Credit grading only. 2 lectures, 2 activities.

### SCM 301. Professional School Preparation for Health Profession Careers. 1 unit

Term Typically Offered: TBD

CR/NC

Prerequisite: Junior standing; completion of GE Area A with grades of C- or better; minimum of 3.0 CPSLO GPA; and consent of instructor.

Recommended: SCM 101 and completion of GWR.

Application strategies and preparation for health professions programs. Analysis of the application requirements and critique of personal application components. Credit/No Credit grading only. 1 activity.

### SCM 302. The Learn By Doing Lab Teaching Practicum. 2 units

Term Typically Offered: W, SP

CR/NC

Prerequisite: Completion of GE Areas B1 through B4, with a grade of C- or better in one course in GE Area B4 (GE Area B1 for students on the 2019-20 or earlier catalogs).

Early teaching experience in an informal science, technology, engineering, and mathematics (STEM) teaching and learning environment. Principles of inquiry-driven STEM education, lesson design, implementation and assessment. Intended for undergraduates exploring STEM teaching as a career. Total credit limited to 4 units. Credit/No Credit grading only. 1 seminar, 1 laboratory. Crosslisted as ENGR 322/SCM 302/HNRS 302.

### SCM 330. Cal Poly Land: Nature, Technology, and Society. 4 units

Term Typically Offered: SP

2020-21 or later: Upper-Div GE Area B

2019-20 or earlier catalog: GE Area B5, B6, or B7

Sustainability Focused

Prerequisite: Junior standing; completion of GE Area A with grades of C- or better; one course from GE Area B1 (GE Area B4 for students on the 2019-20 or earlier catalogs); one course from GE Area B2; and one course in GE Area B4 with a grade of C- or better (GE Area B1 for students on the 2019-20 or earlier catalogs).

Scientific investigation of the natural features of the Cal Poly landscape and their transformations by land management technology. Environmental, economic, social, and political effects of agriculture, resource extraction, construction technology. Educational, land-use, long term planning issues. 4 lectures. Crosslisted as AG/ISLA/SCM/UNIV 330. Fulfills GE Area Upper-Division B (GE Areas B5, B6, or B7 for students on the 2019-20 catalog).

**SCM 350. The Global Environment. 4 units**

Term Typically Offered: TBD

2020-21 or later: Upper-Div GE Area B

2019-20 or earlier catalog: GE Area B5, B6, or B7

Sustainability Focused

Prerequisite: Junior standing; completion of GE Area A with grades of C- or better; and completion of GE Areas B1 through B4, with a grade of C- or better in one course in GE Area B4 (GE Area B1 for students on the 2019-20 or earlier catalogs).

Interdisciplinary investigation of how human activities impact the Earth's environment on a global scale. Examination of population, resource use, climate change, and biodiversity from scientific/technical and social/economic/historical/political perspectives. Use of remote sensing maps. Sustainable solutions. Course may be offered in classroom-based, online, or hybrid format. 4 lectures. Crosslisted as AG/EDES/ENGR/GEOG/ISLA/SCM/UNIV 350. Fulfills GE Area Upper-Division B (GE Areas B5, B6, or B7 for students on the 2019-20 catalog).

**SCM 360. Selected Environmental Issues of California's Central Coast. 4 units**

Term Typically Offered: SP

2020-21 or later: Upper-Div GE Area B

2019-20 or earlier catalog: GE Area B5, B6, or B7

Sustainability Focused

Prerequisite: Junior standing; completion of GE Area A with grades of C- or better; and completion of GE Areas B1 through B4, with a grade of C- or better in one course in GE Area B4 (GE Area B1 for students on the 2019-20 or earlier catalogs).

Examination of several inter-related environmental issues currently affecting California's Central Coast region. Focuses on the role of technology in creating/mitigating environmental problems. Field trips required. 3 lectures, 1 activity. Fulfills GE Area Upper-Division B (GE Areas B5, B6, or B7 for students on the 2019-20 catalog).

**SCM 363. Public Health Fieldwork. 2 units**

Term Typically Offered: TBD

CR/NC

Prerequisite: Junior standing; a minimum GPA of 3.0; must have been enrolled at Cal Poly for at least two quarters; and consent of instructor.

Structured observational experiences for pre-health students. Designed to promote awareness and understanding of public health or allied health careers. Students participate in practical experiences under the direct supervision of an approved on-site coordinator. Limited space availability. Application process for enrollment available from CSM Student Services. Total credit limited to 6 units. Credit/No Credit grading only.

**SCM 368. Theory and Practice of STEM Tutoring. 4 units**

Term Typically Offered: SP

Prerequisite: Completion of one course in GE Area B1 (GE Area B3 for students on the 2019-20 or earlier catalogs), GE Area B2, or GE Area B4 (GE Area B1 for students on the 2019-20 or earlier catalogs).

Theories and practices central to Science, Technology, Engineering, and Mathematics (STEM) tutoring, such as collaborative learning, social dimensions of the peer/tutor relationship, and STEM literacy. Recommended for those interested in tutoring and/or careers in STEM education. Course may be offered in classroom-based, online, or hybrid format. 3 lectures, 1 activity.

**SCM 470. Selected Advanced Topics. 1-4 units**

Term Typically Offered: TBD

Prerequisite: Consent of instructor.

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. The Class Schedule will list topic selected. Total credit limited to 8 units. 1 to 4 lectures.

**SCM 471. Selected Advanced Laboratory. 1-4 units**

Term Typically Offered: TBD

Prerequisite: Consent of instructor.

Directed group laboratory study of selected topics for advanced students. Open to undergraduate and graduate students. The Class Schedule will list topic selected. Total credit limited to 8 units. 1 to 4 laboratories.