

# COLLEGE OF SCIENCE & MATHEMATICS

Faculty Offices East (25), Room 229

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<http://www.cosam.calpoly.edu>

Dean: Dean E. Wendt

Associate Dean: Derek Gragson

Associate Dean: Kellie Green Hall

Associate Dean: Camille O'Bryant

## Academic Programs

| Program name                                     | Program type  |
|--------------------------------------------------|---------------|
| Actuarial Preparation                            | Minor         |
| Astronomy                                        | Minor         |
| Biochemistry                                     | BS            |
| Biological Sciences                              | BS, MA, MS    |
| Biology                                          | Minor         |
| Biotechnology                                    | Minor         |
| Chemistry                                        | BS            |
| Cross Disciplinary Studies Minor in Data Science | Minor         |
| Environmental Studies                            | Minor         |
| Geology                                          | Minor         |
| Kinesiology                                      | BS, MS        |
| 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 Education             | MS                  |
| Education                                                             | MA                  |
| 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 (<http://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 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.

## 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.A. in Education with specializations in special education and educational leadership and administration; and M.A. in Education with specialization in counseling and guidance. Single subject credential programs are offered in Agriculture, English, Biology, Chemistry, Mathematics, Physics and Social Science.

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 (<http://catalog.calpoly.edu/collegesandprograms/collegeofsciencemathematics/schoolofeducation>) section of this catalog.

## CESaME

The University Center for Excellence in Science and Mathematics Education (CESaME) was created to focus Cal Poly on preschool through college (P-16) STEM education in order to improve the STEM education and workforce pipeline and to enhance the scientific and technological literacy of our citizens. As an interdisciplinary, university-wide endeavor, CESaME fosters collaborations among students, staff and faculty from across campus and nurtures partnerships with preschool through high school (P-12) teachers and community college faculty as well as

business, industry, government and foundations in support of improving STEM learning and teacher education.

CESaME leads the state in the development and implementation of model programs in teacher education and professional development, such as the Science Teacher and Researcher (STAR) program that provides summer research internships for aspiring and early career science and mathematics teachers from any CSU campus. CESaME is responsible for Cal Poly's Math and Science Teacher Initiative and fosters other programs such as Cal Poly's Noyce Scholarship program, the Learn By Doing Laboratory (a local P-16 STEM initiative) and various professional development programs for local science and mathematics teachers.

## Student Services

The College Office acts on various student-initiated petitions (change of major, curriculum substitutions, withdrawal from the university). In addition, the office has the dual function of counseling those on academic probation and notifying those undergraduate students who are eligible each quarter for the Dean's Honor List.

## Faculty Advising

Faculty members take an active role in academic and career advising. Students are encouraged to obtain academic advising prior to registration each quarter. The advisor-student relationship becomes important especially when the student needs a letter of reference for a potential employer or graduate school or needs career advice.

## College of Science and Mathematics Advising Center

Science North (Bldg. 53), Room 211  
Phone: 805.756.2615  
<https://csmadvising.calpoly.edu>

Director/Advisor: Kristi Weddige  
Advisor: Meghan Farrier-Nolan  
Advisor: Anya Bergman  
Advisor: Laura Wilson  
Advisor: Tiffany Kwapnoski  
Administrative Coordinator: Amber Vogt

The College of Science and Mathematics Advising Center provides academic advising services to students within the college. Professional advisors take a holistic approach to advising by helping students to define academic, career and personal goals, and empowering them to create an educational plan that is consistent with these goals. Services include assistance with developing long-range academic plans, interpreting university and college policy and procedures, articulation agreements, scheduling classes, and informing students of their graduation requirements, as well as academic peer coaching for students experiencing academic difficulty. In addition, the Advising Center provides pre-health career advising services and resources for students seeking a career in a health professions field upon graduation. For more information, please refer to: pre-health career advising (<http://catalog.calpoly.edu/academicsupportandcampuslife/academicservicesandprograms/prehealthcareeradvising>). Students are encouraged to seek advice early and often throughout their time at Cal Poly.

## 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.

## 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 satisfy the Validation by Educational Experience (VEE) requirements of the SOA and CAS, and will help students prepare for the actuarial exams, which are also prerequisite to SOA or CAS membership.

The minor is open to any major, but it is especially suited to students in statistics, mathematics, and business/finance. Students interested in the minor should consult the website <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 should take CHEM 216, CHEM 217, and CHEM 371 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.

## 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

CR/NC

Term Typically Offered: SP

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

CR/NC

Term Typically Offered: F,W,SP,SU

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

CR/NC

Term Typically Offered: F, W, SP

Prerequisite: MATH 142, PHYS 132, PHYS 133, PHYS 122, PHYS 123, PSC 102, or PSC 103; and consent of instructor.

Concepts of teaching and learning as it relates to roles as K-12 grade science and math tutors and/or classroom assistants. Restricted to students who are Teaching Assistants in Math and Science (TeAMS) tutors or Volunteers in Out of School Time (VOST). Participation in public schools requires mandated fingerprint clearance. 1 activity.

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

CR/NC

Term Typically Offered: F, W, SP

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. 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 Schedule of Classes will list title selected. Total credit limited to 8 units. 1 to 4 lectures.

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

CR/NC

Term Typically Offered: F, W, SP

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

CR/NC

Term Typically Offered: W

Prerequisite: Junior standing; completion of GE Area A with a grade 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

CR/NC

Term Typically Offered: W, SP

Prerequisite: Completion of GE Area B.

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 320. Technology in London. 4 units**

GE Area F

Term Typically Offered: SU

Prerequisite: Junior standing and completion of GE Area B. Concurrent: Enrollment in London Study Program.

Impact of one or two technologies in modern London. Development of the technology from the scientific/industrial revolution, as seen through London museums and industries. Technological solutions to modern problems, and their dependence on available technology. Field trips required. The Schedule of Classes will list topic selected. 2 lectures, 2 activities. Fulfills GE Area F.

**SCM 335. Nuclear Science and Society. 4 units**

GE Area F

Term Typically Offered: F, W, SP

Prerequisite: Junior standing and completion of GE Area B.

Impact of nuclear phenomena on energy production, warfare, health and medicine, and the environment. Scientific and public policy aspects of reactor design, nuclear accidents, disposal of radioactive waste, nuclear medicine, food irradiation, nuclear weapons, and fusion as potential energy source. 4 lectures. Fulfills GE Area F.

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

GE Area F

Term Typically Offered: TBD

Prerequisite: Junior standing; completion of GE Area A with a grade of C- or better; and completion of GE Area B.

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. 4 lectures. Crosslisted as AG/EDES/ENGR/GEOG/ISLA/SCM/UNIV 350. Fulfills GE Area F.

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

GE Area F

Term Typically Offered: SP

Prerequisite: Completion of GE Area B; and junior standing.

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 F.

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

CR/NC

Term Typically Offered: F, W, SP

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

Structured observational experiences for pre-health students at the County Health Agency. Designed to promote awareness and understanding of public health careers, as well as provide practical experience. Limited space availability. Application process for enrollment available from CSM Advising Office. Total credit limited to 6 units. Credit/No Credit grading only.

**SCM 451. Ethics in the Sciences. 3 units**

Term Typically Offered: TBD

Prerequisite: Junior standing.

The practice, performance and application of science from the standpoint of ethics. Includes issues involving plagiarism, data handling, fraud, safety and selected applications in specific science careers. Models for the analysis and resolution of ethical dilemmas are presented. 3 seminars. Crosslisted as PHIL/SCM 451.

**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 Schedule of Classes will list title 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 Schedule of Classes will list title selected. Total credit limited to 8 units. 1 to 4 laboratories.