

# COLLEGE OF NATURAL SCIENCES AND MATHEMATICS

The College of Natural Sciences and Mathematics emphasizes hands on experience and interaction with professors. Students in the classroom have access to state-of-the art instruments and unique facilities such as the two-story anechoic chamber for measuring sound and the well field for monitoring ground water. The College offers strong academic programs in Biological Sciences, Chemistry, Geography, Geology, Mathematics and Statistics, and Physics and Astronomy.

The College's six academic departments collectively offer 13 baccalaureate degree programs, six minor concentrations, five teaching credential programs, three certificate programs, and five Master's degree programs, including the Professional Science Master's. Unique strengths of programs within the College include the following:

## Program Descriptions

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#### Biology

The Department of Biological Sciences offers a wide array of educational opportunities in biology. Students may enroll in programs designed to give broad training across the biological sciences and earn a Bachelor of Arts or Bachelor of Science degree in General Biology. Students wishing to specialize in a sub-discipline of biology may enroll in several concentrations within the Bachelor of Science Program. Available concentrations include Biomedical Sciences, Cell and Molecular Biology, Clinical Laboratory Science, Forensic Biology, Microbiology, and Ecology, Evolution and Conservation. The Department also offers the Minor in Biological Sciences to students from other Departments. The location of Sacramento State is ideal for diverse field trip experiences from the Sierra to the Pacific as well as both laboratory and field internship opportunities with County, State, and Federal agencies. The Department also offers state-of-the-art laboratory facilities including students access to the Advanced Cell Analysis Laboratory, the Center for Interdisciplinary Molecular Biology, and Moss Landing Marine Laboratory.

At the Graduate level, the Department of Biological Sciences offers both general and specialized Masters of Arts and Masters of Science degree programs in Biological Sciences. This includes a new Masters of Arts degree in Stem Cell Biology, funded by the California Institute of Regenerative Medicine in collaboration with the University of California, Davis. The Department also offers Masters of Science concentrations in General Biology, Cell and Molecular Biology, and Ecology, Evolution and Conservation.

Graduates from the Department of Biological Sciences may pursue a variety of professions, including health and medicine, biotechnology and other laboratory-based research, and work with state and federal agencies. Many also pursue graduate education within one of the many sub-disciplines of biology.

#### Chemistry

Chemistry prepares students for a wide variety of careers in areas such as environmental chemistry and toxicology, materials science, government and industry labs, biotechnology, high school science teaching, medicine and related health sciences, pharmacy and

pharmacology, patent law, computational chemistry, forensic analysis, and many more. The Department of Chemistry offers the BS in Chemistry (certified by the American Chemical Society), a BS in Biochemistry, and BA degrees including concentrations in Biochemistry and Forensic Chemistry. A Chemistry Minor is also offered. The Department offers an MS in Chemistry and an MS in Chemistry, Biochemistry concentration. A signature feature of our programs is the extensive, hands-on experience with modern instrumentation. Our graduates are known in the region for their knowledge and ability to operate instruments. Every undergraduate degree program includes a capstone laboratory research experience in one or more upper division labs which further prepares students for industry employment and preparation for PhD programs.

#### Geography

Geography prepares students to do mapping and spatial analysis, international work, planning, and environmental management. The Department of Geography offers a BA degree that provides each student both breadth and specialization. Four concentrations are available: Geographic Information Systems (GIS) and Analysis, Human Geography, Metropolitan Area Planning, and Physical Geography. The Department also offers minors in Geography and GIS. Strengths of the program include numerous opportunities for field work and internships.

#### Geology

Geology is an interdisciplinary science that examines the processes that shape Earth's resources, hazards and environments. The Geology Department offers BA, BS, and MS degrees in Geology; a BA in Earth Science, and a Minor in Geology. This Department, in conjunction with the on-campus staff of the United States Geological Survey, offers excellent preparation for careers in Geology and graduate study.

#### Mathematics and Statistics

The Department of Mathematics and Statistics offers a variety of options to cater to the particular interests of its majors. The flexibility of the major allows students to pursue their BA degree in pure mathematics, applied mathematics and statistics, or the teaching program. Graduates have met with much success in finding employment in both the public and private sectors, particularly in high school teaching and local private industry. The Department also offers Minors in Mathematics and Statistics, and a MA degree for those who wish to pursue advanced study that can open opportunities to teach at the community college level, to pursue a PhD in mathematics, or to take jobs in industry or government.

#### Physics and Astronomy

The Department of Physics and Astronomy offers several degree options in Physics. The BS in Physics is suited for those planning to earn an advanced degree in physics or a related field. The BS with the Applied Physics Concentration combines advanced physics coursework with practical skills such as instrumentation and computing for careers in the high technology sector. Our traditional BA degree in physics provides a flexible, yet rigorous program in the liberal arts tradition, while those electing the BA with the Teacher Preparation Concentration will be very well prepared for a career as a high school or middle school educator. The Department also offers Minors in Physics and Astronomy and Certificates in Scientific Instrument Development and Scientific Computing and Simulation.

The College also supports a number of college-wide programs. Some of the larger ongoing programs are:

## Center for Science and Math Success

The Center for Science and Math Success (Success Center) serves as an umbrella for several existing programs in the College of Natural Sciences and Mathematics with the goal of providing innovative and comprehensive student and academic support services to students in math and science courses. Programs include:

- Science Education Equity (SEE) (<http://csus.edu/nsm/see>)
- Peer Assisted Learning (PAL) (<http://csus.edu/nsm/pal>)
- Learning Assistant (LA) (<https://sites.google.com/site/csuslaprogram>)
- PASS Advising (<http://csus.edu/nsm/successcenter/pass/pass%20advising/pass%20advising.html>)
- Commit to Study (<http://www.csus.edu/indiv/p/paradisj/studyskills.htm>)

The Success Center focuses on the implementation of interventions designed to contribute to overall student success, leadership, and engagement. In essence, the Success Center is a one-stop shop for students to obtain help to be a successful student as well as leadership opportunities within Center programs. For more information, contact Center Director Enid Gonzalez-Orta at [gonzalezorta@csus.edu](mailto:gonzalezorta@csus.edu). Website: <http://csus.edu/nsm/successcenter/index.html>.

## Center for Mathematics and Science Education

The mission of the MASE Center at Sacramento State is to improve the quality of mathematics and science teaching and learning in the schools of the Sacramento region. The MASE Center supports faculty from the Colleges of Natural Sciences and Mathematics and Education to develop and administer professional development projects for K-12 teachers and education research grants to improve the teaching of math and science at all levels. The MASE Center houses the Sacramento Area Science Project and the Sacramento State Mathematics Project, and hosts monthly short courses for teachers such as Science in the River City (SIRC) and Mathematics Saturday Seminars. For more information, contact Director Rich Hedman at (916) 278-5487 or [hedmanrd@csus.edu](mailto:hedmanrd@csus.edu). Website: [www.csus.edu/mase](http://www.csus.edu/mase) (<http://www.csus.edu/mase>).

## Moss Landing Marine Laboratories

Moss Landing Marine Laboratories are located on Monterey Bay. The facility is operated by a consortium of six California State University campuses and offers upper division and graduate courses in marine sciences.

## Premedical and Preprofessional Programs

The College of Natural Sciences and Mathematics offers coursework which allows students to prepare for medical, dental, optometry, podiatry, pharmacy, and veterinary school. Information on the preparation necessary for entry into these health professions is found in the Premedical pages of this catalog.

## Subject Matter Preparation (Pre-Credential Preparation)

California State University, Sacramento has programs for students who are interested in becoming high school or middle school teachers in science or mathematics. These programs consist of two parts: subject matter preparation programs (in which students learn the background in the subject matter they will teach) and credential programs (in which students develop the knowledge and skills related to how to teach). The College of Natural Sciences and Mathematics offers subject matter preparation programs in Biological Sciences, Chemistry, Mathematics, and Physics. Single Subject Teaching Credential programs are offered

by the California State University, Sacramento College of Education. Additionally, California State University, Sacramento offers a blended program in mathematics, in which students work on their subject matter preparation and teaching credential at the same time. Information on subject matter programs in Biological Sciences, Chemistry, and Physics is found in the Science Subject Matter Program pages in this catalog. Information on the subject matter program in mathematics and the blended program in mathematics is found in the Mathematics and Statistics pages.

## Departments/Programs

- Biological Sciences
- Chemistry
- Geography
- Geology
- Mathematics and Statistics
- Physics and Astronomy

## Contact Information

Joanna Mott, Dean  
 Lisa Hammersley, Interim Associate Dean  
 Laurie Wheless, Administrative Analyst/Specialist  
 Rose Castillo, Administrative Support Coordinator  
 Naomi Robinson, Administrative Support Coordinator

For more information, visit the Web site for the College of Natural Sciences and Mathematics at [www.csus.edu/nsm/](http://www.csus.edu/nsm/) (<http://www.csus.edu/nsm/>)  
 Sequoia Hall 334  
 (916) 278-4655