

**Lower Division****SCI 1100 Introduction to Chemistry for Liberal Studies (2)**

This course provides an introduction to basic chemical principles. Topics include chemical and physical properties, the Periodic Table of the Elements, atomic and molecular structure, nuclear chemistry, and forms of matter and energy. 100 minutes of activity and 150 minutes of laboratory per week. Prerequisites: Satisfaction of the Entry Level Mathematics requirement, MATH 3110 is recommended. Open only to majors in Liberal Studies.

**SCI 1409 Introduction to Scientific Thinking (3)**

Development of critical thinking skills related to the analysis and evaluation of arguments. Topics include: analysis and criticism of deductive and inductive reasoning, justification and evidence, sentential and predicate calculus, naive set theory, and mathematical induction. Examples will focus on scientific arguments. The course involves writing complete, logically consistent arguments in English and in Mathematics to illustrate the correct use of the logical tools and methods discussed. Prerequisites: (1) ELM score of 50 or higher, or (2) SAT (Math) score of 550 or higher, or (3) ACT (Math) score of 23 or higher, or (4) grade of C- or better in MATH 0920. Satisfies general education requirement A3.

**SCI 1600 Physics for Liberal Studies (3)**

Introduction to various fundamental principles of physics. Topics to be covered include classical mechanics, thermodynamics, electricity and magnetism, waves and light, and basic nuclear physics principles. 150 minutes of lecture/discussion per week. Prerequisites: Satisfaction of the Entry Level Mathematics requirement. Open only to majors in Liberal Studies.

**SCI 2310 Introduction to Earth Science (2)**

Introduction to the fundamentals of Earth Science, including the solid Earth, atmosphere and hydrosphere, and the Solar System. Interactions between Earth systems including rock cycle, weathering, the hydrologic cycle, and climate. 100 minutes of lecture per week.

**SCI 2770 Special Topics in Science (1-4)**

Topics and prerequisites to be announced. May be repeated for different topics.

**Upper Division****SCI 3009 California Natural History (3)**

Plants, animals, ecology and biogeography of California with emphasis on fostering an appreciation of the relationships between people and California's amazing biodiversity. Three hours lecture. This course may not be used to satisfy biology major or minor requirements. Prerequisites: Upper-division status and completion of General Education Areas A and B. Completion or concurrent enrollment in a Junior-year

Diversity Reflection course is also required. Satisfies general education Quality of Life and upper division Area B.

**SCI 3010 Integrated Life Science (3)**

Fundamental principles of science (e.g. mechanics, thermodynamics) applied to biological systems, including ecology, evolution, and the human body. Laboratories focus on developing skills in the experimental method and processes of science with an integrated focus on biological topics. Two hours lecture and three hours laboratory. Prerequisites: Completion of lower division liberal studies science coursework. Note: this is neither a methods of teaching nor curriculum development course; the focus is on science content and process for science literacy tied to the Next Generation Science Standards. Open only to majors in Liberal Studies or Child, Adolescent and Family Studies.

**SCI 3019 Revolutionary Ideas in Human Biology (3)**

Topics in human biology including growth and development, form and function, fitness and health, disease, interaction with the environment, and human evolution. The underlying theme will be looking at these topics through the lens of historical development revealing the revolutionary ideas and innovations that led to our current understandings. Three hours lecture. Prerequisites: Junior status and completion of lower division Areas A and B general education requirements. Completion or concurrent enrollment in a Junior-year Diversity Reflection course is also required. Satisfies general education Revolutionary Ideas and upper division Area B.

**SCI 3109 The Science of Food (3)**

The nature and application of science and technology and its impact on quality of life will be explored using food as an example. This includes considering the chemistry, biochemistry, biology, biotechnology, microbiology, and physics of food as well as nutrition and toxicology considerations. Prerequisite: Junior status and completion of lower division Area A2 and B general education requirements. Meets general education Quality of Life and upper division Area B requirements.

**SCI 3119 Revolutionary Ideas in Chemistry (3)**

This course is a survey of chemical history from the early Renaissance period to the present including some philosophical analysis of those historical developments. Our main focus will be on understanding how past chemists thought about and understood the world around them and how they used this understanding to develop new (although not necessarily correct) theories and practical methods. Attention will also be paid to the practical applications of chemistry and the broader social, economic and cultural contexts in which chemistry developed, as well as its relation to other fields such as physics, biology and medicine. Prerequisite: Junior status and completion of lower division Area A and B general education requirements. Satisfies general education Revolutionary Ideas and Innovations and upper division Area B.

### **SCI 3129 Environmental Chemistry and Sustainability (3)**

This course deals with sustainability as defined by the 1987 Brundtland Report of the United Nations as “sustainable development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” This theme will be explored by discussing topics such as atmospheric chemistry and air pollution, energy production and climate change, toxic organic compounds, water chemistry and water pollution, as well as metal, soil, sediments and waste disposal. Prerequisite: Junior status and completion of lower division Area A and B general education requirements. Meets general education Sustainability and Justice and upper division Area B requirements.

### **SCI 3310 Integrated Science: Earth Science (3)**

Fundamental principles of science (e.g. mechanics of motion, electricity and magnetism, the bonding of elements, energy) applied to the Earth and Solar System through an integrated approach, with examples from California and Kern County. Two hours of lecture and three hours of laboratory work will be covered each week. Note: this is neither a methods of teaching nor curriculum development course; the focus is on science content and process for science literacy. 100 minutes of lecture and 150 minutes of laboratory per week.

### **SCI 3319 California Geology and Society (3)**

Introduction to the Geology of California with emphasis on the mutual interactions of society with its physical environment. After a brief introduction of geology fundamentals, the course will cover the geological evolution of California, geological resources (e.g., minerals, raw building materials, petroleum, soils, groundwater), geological hazards (e.g., landslides, volcanic eruptions, floods, earthquakes), and societal impacts on the physical environment. Examples will be regularly given from all over California. Prerequisite: Successful completion of General Education Areas A and B. Satisfies general education Revolutionary Ideas and Innovations and upper division Area B.

### **SCI 3329 Water and the West (3)**

A sustainable water supply to support the often competing needs of fast-growing populations, agriculture, industry, and the environment is a key long-term issue for California, other states in the arid western United States, and globally. This course reviews basic hydrologic principles, including those governing precipitation patterns and the movement of water through the Earth system. It then explores legal, historic, political, economic, environmental, and social justice issues associated with water resources sustainability. 150 minutes of lecture per week. Prerequisite: Junior status and completion of lower division Area A and B general education requirements. Satisfies general education Sustainability and Justice upper division Area B.

### **SCI 3409 Statistical Measures of Inequalities (3)**

This course uses statistical measures as a basis for exploring dimensions of social and environmental inequalities, and why

some groups are more effective than others at addressing social and environmental problems. The course will also consider the role the field of statistics has played in the development of science and industry that has contributed to the further understanding of issues in environmental inequalities. Satisfies general education Sustainability and Justice upper division Area D.

### **SCI 3609 An Introduction to the Modern Cosmos (3)**

This course is a survey of basic concepts in modern cosmology, and how these fundamental ideas have changed the way in which people have thought about the world in which they live. The class starts with a brief historical overview of influential thoughts which have led the field from ancient beliefs and views to Newton’s discoveries in the 1600s. The class further covers background material relating to the formation and lives of stars. Gravitation, Special, and General Relativity are then explored in broad terms. Topics of special interest are also discussed such as relevant experimental observations, the nature of space-time, and theoretical predictions such as black holes, gravitational waves, and dark energy and inflation. This course may not be used to satisfy physics major or minor requirements. 150 minutes lecture. Prerequisites: Upper-division status and completion of General Education Areas A and B. Completion or concurrent enrollment in a Junior-year Diversity Reflection course is also required. This course satisfies the Theme R: Revolutionary Ideas and Innovations requirement.

### **SCI 3639 Introduction to Weather Dynamics (3)**

This is an introductory course with a large on-line component on the fundamentals of atmospheric science. Current weather data are accessed via the Internet, and learning activities are keyed to the day’s weather. General topics are studied such as how one characterizes various phenomena and meteorological effects, and how these are measured. This course may not be used to satisfy physics major or minor requirements. Prerequisite: Upper division status and completion of General Education Areas A and B. This course satisfies the Theme S: Sustainability and Justice and upper division Area B requirements. 150 minutes lecture/discussion per week.

### **SCI 4110 Senior Seminar in Science Teaching (1)**

Senior Seminar in Science teaching. Student presentations and discussions of science content, lessons and lab activities relevant to the middle school science audience. Open only to individuals pursuing the foundational science concentration in the BS in Natural Sciences. 1 hour discussion per week. Prerequisite: Senior Standing.

### *Graduate Courses*

### **SCI 6901 Project in Science Education (2-6)**

Project Students complete a project in the field of science education that requires an appropriateness of topic, theory and methods applicable to the nature of the degree, conducted under supervision of the graduate advisor and committee.