The School of Natural Sciences, Mathematics, and Engineering offers several courses with the SCI prefix. The courses SCI 111, 112, 213, 214, 325A and 325B are designed to satisfy the science requirements for the subject matter preparation program leading to a multiple subject credential. The courses are open to majors in Liberal Studies and Child Adolescent and Family Studies and may not be used for science major or cognate requirements. Other courses are offered as options to satisfy the General Education Theme 1 requirement in Natural Sciences and Technology.

***Lower Division***

**SCI 111 Introduction to Physics (4)**

Introduction to various fundamental principles of physics. Topics to be covered include classical mechanics, thermodynamics, electricity and magnetism, waves, and basic astronomical concepts. Laboratory exercises will be assigned to complement lecture materials. Three hours lecture and three hours laboratory. Prerequisites: Satisfaction of the Entry Level Mathematics requirement; MATH 221 recommended. Open only to majors in Liberal Studies or Child, Adolescent and Family Studies.

**SCI 112 Introduction to Chemistry (4)**

An introduction to basic chemical principles. Topics include: the periodic table of the elements, forms of matter and energy, molecular structure, chemical and physical properties. Three hours lecture and three hours laboratory. Prerequisites: Satisfaction of the Entry Level Mathematics requirement; MATH 221 recommended. Open only to majors in Liberal Studies or Child, Adolescent and Family Studies.

**SCI 213 Introduction to Biology (4)**

Introduction to basic biological principles from the cellular to the ecosystem level. Topics include: properties of living systems; structure and function of cells, organs and organ systems; DNA; inheritance; reproduction; ecosystems. Three hours lecture and three hours laboratory. Prerequisites: SCI 111 and 112 or CHEM 150. Open only to majors in Liberal Studies or Child, Adolescent and Family Studies.

**SCI 214 Introduction to Earth Science (4)**

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. Three hours lecture and three hours laboratory. Prerequisites: SCI 111 and 112 or CHEM 150. Open only to majors in Liberal Studies or Child, Adolescent and Family Studies.

**SCI 277 Special Topics in Science (1-5)**

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

***Upper Division***

**SCI 325A Integrated Life Science (4)**

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 six hours laboratory. Prerequisites: SCI 213 or BIOL 100, and SCI 214. Note: this is neither a methods of teaching nor curriculum development course; the focus is on science content and process for science literacy. Open only to majors in Liberal Studies or Child, Adolescent and Family Studies.

**SCI 325B Integrated Earth Science (4)**

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 lecture and six hours laboratory. Prerequisites: SCI 213 or BIOL 100, and SCI 214. Note: this is neither a methods of teaching nor curriculum development course; the focus is on science content and process for science literacy. Open only to majors in Liberal Studies or Child, Adolescent and Family Studies.

**SCI 351A Introduction to Weather Dynamics (5)**

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. Prerequisites: Successful completion of General Education Areas A and B. **GE T1**

**SCI 351B Energy and Technology (5)**

Energy in a technological society. Sources and resources of energy. Effects of energy on the environment. This course may not be used to satisfy physics major or minor requirements. Prerequisites: Successful completion of General Education Areas A and B. **GE T1**

**SCI 351C An Intro to the Modern Cosmos (5)**

An Introduction to the Modern Cosmos. This course is a survey of basic concepts in modern cosmology. The class starts with a brief historical overview of ideas which have led the field from ancient beliefs and views to Newton’s discoveries in the 1600s. The class then 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. Prerequisites: Junior status and completion of lower division Area A and B general education requirements. **GE T1**

**SCI 352A California Geology and Society (5)**

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. **GE T1**

**SCI 352B Water and the West (5)**

This course examines historical and present-day issues regarding the use of surface and ground water in the arid southwestern U.S. particularly California in an objective and scientific manner. The course is intended for non-science majors and is designed to make them aware of the heavy impact that waste and contamination have on our finite water supply. Prerequisites: Successful completion of General Education Areas A and B. **GE T1**

**SCI 352C Earth Systems and Global Change (5)**

Origin, development and systematic links between the atmosphere, biosphere, cryosphere, hydrosphere and lithosphere. Human effects on these systems: causes, impacts and mitigations, with emphasis on current societal issues regarding local and global climatic and environmental change. Prerequisites: Successful completion of General Education Areas A and B. **GE T1**

**SCI 353 Computers and Society (5)**

This course will provide a framework for examining the social context and consequences of information technology. Society, social change, and effects on the individual related to the use of computers will be the major concentrations. Emphases will include values, ethics, patterns, future directions, and relevant theories related to this phenomenon. Prerequisites: Successful completion of General Education Areas A and B. **GE T1**

**SCI 354A The Nature of Science and Technology in a Modern Society (5)**

The nature of science and technology will be explored with emphases placed on the structure of knowledge, and its use in society; the relationship of science and technology to a modern society will be considered in terms of approaches to problems, decision-making skills and effects on the quality of life. Prerequisites: Junior status and successful completion of General Education Areas A and B. **GE T1**

**SCI 354B The Science of Food (5)**

The nature and application of science and technology and its use in society 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 at a level appropriate for upper division general education students. Prerequisite: Junior status and successful completion of General Education Areas A and B. **GE T1**

**SCI 354C From Alchemy to LSD – The History of Chemistry (5)**

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. **GE T1**

**SCI 355A Human Biology (5)**

Current topics in human biology, which include growth and development, form and function, fitness and health, interaction with the environment, and evolution. Five hours lecture. This course may not be used to satisfy biology major or minor requirements. Prerequisites: Successful completion of General Education Areas A and B. **GE T1**

**SCI 355B Insects and People (5)**

Overview of the global impact of insects on human concerns, including the overwhelming abundance and diversity of insects, the role of insects as disease vectors to humans, livestock, and pets, and the impact of insects as agricultural pests, and pollinators. Five hours lecture. This course may not be used to satisfy biology major or minor requirements. Prerequisite: Successful completion of General Education Areas A and B. **GE T1**

**SCI 355C Biology of Sex (5)**

Why do humans have sex in private and for fun rather than procreation? Human sexual practices are unusual when compared with animals; plants and microorganisms in that humans have menopause, concealed ovulation, and monogamy. In this course human sexuality is compared against the broad spectrum of sex in all organisms. Five hours lecture. This course may not be used to satisfy biology major or minor requirements. Prerequisites: Successful completion of General Education Areas A and B. **GE T1**

**SCI 355D Microbiology and the Human Condition (5)**

Introduces the non-science student to the wonders of the incredible diversity in the unseen microbial world that flourishes in and around us. Emphasizes the relevance of microbes and their role in everyday lives, especially their roles in communicable and sexually transmitted diseases, food borne illnesses and bioterrorism. Five hours lecture. This course may not be used to satisfy biology major or minor requirements. Prerequisite: Successful completion of General Education Areas A and B. **GE T1**

**SCI 355E California Natural History (5)**

Plants, animals, ecology and biogeography of California with emphasis on fostering an appreciation of the relationships between people and California’s amazing biodiversity. Five hours lecture. This course may not be used to satisfy biology major or minor requirements. Prerequisites: Successful completion of General Education Areas A and B. **GE T1**

**SCI 477 Special Topics in Science (1-5)**

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

**SCI 490 Senior Seminar in Science Teaching (3)**

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 BA in Natural Sciences. 3 hours discussion. Prerequisite: Senior Standing.

***Graduate Courses***

**SCI 500 Applying Research Skills to Teaching** **(3)**

In-depth discussion between practicing teachers actively engaged in scientific research and beginning science teachers regarding the research process and strategies for engage grade 6-12 students in authentic research processes in the context of classroom and laboratory settings. The focus will be on the practical application of research skills to instructional design, and will include designing lessons with a research-skill focus. 3 units discussion. Prerequisite: EDSE 535 or Teaching credential.

**SCI 550A Summer Institute I (10)**

10-week Summer Institute in Year 1 consisting of 3.125 hours per day, four days per week (mornings) participation in authentic research projects either at CSUB or with appropriate community partners and 1.25 hours per day, four days per week (afternoons) of reflection and instruction in pedagogy, science content, and leadership skills. 5 units laboratory, 5 units lecture.

**SCI 550B Summer Institute II (10)**

10-week Summer Institute in Year 2 consisting of 3.125 hours per day, four days per week (mornings) work on incorporating research experiences, inquiry-based learning, and instruction on the Nature of Science in K-12 classrooms. 1.25 hours per day, four days per week (afternoons) of reflection and instruction in pedagogy, science content, and leadership skills. 5 units laboratory, 5 units lecture.

**SCI 680 Project in Science Education (2-9)**

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.