

College of Natural Sciences

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Biological Sciences Building, Room 107
 (909) 537-5300 College of Natural Sciences website (<http://nsci.csusb.edu>)

Departments/Schools

- Biology (<https://www.csusb.edu/biology/>)
- Chemistry and Biochemistry (<http://chem.csusb.edu/>)
- Computer Science and Engineering (<http://cse.csusb.edu/>)
- Geological Sciences (<http://geology.csusb.edu/>)
- Health Science and Human Ecology (<http://health.csusb.edu/>)
- Kinesiology (<https://www.csusb.edu/kinesiology/>)
- Mathematics (<http://www.csusb.edu/mathematics/>)
- Nursing (<http://nursing.csusb.edu/>)
- Physics and Astronomy (<http://physics.csusb.edu/>)

Graduate Degree

Master of Science

- Materials Science (<https://catalog.csusb.edu/colleges-schools-departments/natural-sciences/mat-sci-ms/>)

Undergraduate Degree

Bachelor of Science

- Natural Science (<https://catalog.csusb.edu/colleges-schools-departments/natural-sciences/nat-sci-bs/>) with concentrations in:
 - Biology
 - Chemistry
 - Physics
 - Science and Society

Minor

Entrepreneurship in the Sciences (<https://catalog.csusb.edu/colleges-schools-departments/natural-sciences/entr-sci-minor/>)

Materials Science Courses

MSCI 6000. First Year Materials Science Seminar. Unit: 1

Introduction to materials science breadth and graduate studies in materials science. Topics include developing a graduate plan, successfully navigating the graduate experience, and campus resources including the library and disciplinary literature searching as well as an introduction to software applications in the discipline. Guest speakers and shared literature readings provide a survey of types of materials and their applications. Graded ABC/No credit.

MSCI 6050. Second Year Materials Science Seminar. Unit: 1

Semester Prerequisite: 12 units of coursework toward MS Materials Science

Introduction to the culminating experience including student expectations for thesis and projects, student journal and proposal presentations, faculty and visiting speakers, specialized software training. Graded ABC/No Credit.

MSCI 6110. Material Structure. Units: 3

Semester Prerequisite: Admission to the MS Materials Science program, or instructor consent

Survey of different types of solid-state structures with an emphasis on the states of condensed materials, such as glasses, crystals, ceramics, and liquid crystals. Classifications based upon fundamental principles of matter and energy as well as insight on how the structure of materials impacts application. Graded ABC/No Credit.

MSCI 6120. Material/Solid State Properties. Units: 3

Semester Corequisite: MSCI 6110

A survey of bonding in solids and its impact on physical, electrical, magnetic, and optical properties. Applications to topics such as semiconductors, giant and colossal magnetoresistance, multiferroics, LEDs, fiber optics and solar cells, lasers, graphene and quasicrystals will be explored. Includes insight on the relationship of materials properties to application, and the measurement of properties. Graded ABC/No Credit.

MSCI 6130. Thermodynamics of Materials. Units: 3

Semester Prerequisite: PHYS 3100 or consent of instructor

Semester Corequisite: MSCI 6110

Thermodynamics and phase equilibria applied to manufactured materials structure, properties and phase transitions; kinetic considerations considered. Graded ABC/No Credit.

MSCI 6500. Advanced Instrumentation and Experimentation in Materials Science. Units: 2

Semester Prerequisite: MSCI 6110

Theory, practice, and application in organic, inorganic, hybrid and/or polymeric materials science. Includes synthesis, sample preparation, and analysis using advanced instrumentation. Connecting materials properties and applications with the proper test procedures and instrumentation needed to best characterize them. May be repeated for credit with consent of program graduate coordinator. Materials fee required. Graded ABC/No Credit.

MSCI 6952. Graduate Research in Materials Science. Units: 2

Original individual research in materials science to be conducted under the guidance of the student's graduate advisor, and if desired, in collaboration with other members of the student's master's committee. MSCI 6952 and 6953 may be repeated for up to a total of 6 units combined. Materials fee required. Graded Credit/No Credit. Department consent required.

MSCI 6953. Graduate Research in Materials Science. Units: 3

Original individual research in materials science, to be conducted under the guidance of the student's graduate advisor, and if desired, in collaboration with other members of the student's master's committee. MSCI 6952 and 6953 may be repeated for up to a total of 6 units combined. Materials fee required. Graded Credit/No Credit. Department consent required.

MSCI 6965. Materials Entrepreneurial MS Project. Units: 5

Semester Prerequisite: Advancement to candidacy in the MS Materials Science program

Expanding on the project developed in the Entrepreneurial Concentration courses and in collaboration with the MSCI advisor and ENTR faculty, students will develop more fully an idea of potential intellectual property or business and present as both a written project and seminar talk. Graded ABC/No Credit. Department consent required.

MSCI 6973. Graduate Thesis. Units: 3

Semester Prerequisite: Advancement to candidacy in the MS Materials Science program

Independent graduate research conducted under guidance of the major advisor culminating in a written thesis. MSCI 6952 and 6953 may be repeated for up to a total of 6 units combined. Graded ABC/No Credit. Department consent required.

Natural Sciences Courses

NSCI 1110. Reacting to the Past: Natural Sciences Perspectives. Units: 3

Examination of a critical change in the natural sciences through the study of the context and impact of a specific idea, innovation or discovery. Using the Reacting to the Past approach, students play complex role-playing games informed by important historical sources (specific themes and topics may vary). Students will develop skills in information literacy, collaboration, speaking, and writing as they pursue the objectives of their assigned role by convincing classmates of their views. Following the game, debriefing will facilitate deeper understandings of the focus concepts and provide reflection about how learning occurred. These skills are critical foundations of success in any field of study at the University and beyond. Satisfies Big Ideas that Change the World: Exploring Ideas, Innovations, Discoveries pathway.

NSCI 1200. Science, Environmental Sustainability and Social Responsibility. Units: 3

Exploration of scientific ways of thinking in the context of environmental sustainability. How scientific knowledge is created and how it is communicated to those who use it to solve environmental problems and to guide responsible action. Emphasis on acquisition of academic skills that will be transferrable to other courses. Learning to see the world and environmental issues through the lens of scientific and mathematical analysis and reflection on how this lens differs from other lenses. Learning how scientific knowledge is created through collaborative processes among those with diverse perspectives. Appreciation of the scientific literature as a professional conversation that expands our understanding of the environment in which we live. Group projects will apply scientific thinking and other approaches to solving environmental problems affecting our local and global communities. Satisfies Environmental Sustainability.

NSCI 1300. Survey of Chemistry and Physics. Units: 3

Introduction to principles of chemistry and physics. Chemistry topics include chemical principles, nomenclature, and molecular structure. Physics topics include Newtonian mechanics, electromagnetism, relativity, quantum theory, and nuclear and particle physics. Intended for students with little to no background in chemistry or physics. This course is for articulation only and will not be offered.

NSCI 2020. The Science of Cooking. Units: 3

Application of scientific principles to the preparation of food. Scientific topics include heat transfer, thermodynamics, density, anatomy, biochemistry, and the chemical transformations of ingredients. Application of scientific methods in measurement, inquiry, recipe analysis and modification, and experimental design. Satisfies GE B1/5A.

NSCI 2300. Introduction to the Natural Science. Unit: 1

Introduction to the Natural Science program, its learning outcomes, and potential career options. Development of active learning and metacognitive skills. Assistance with planning a set of courses that will prepare students for their career goals. Initiation of an e-portfolio to track student achievement of the program's learning outcomes.

NSCI 3001. Scientific Perspectives on Global Challenges. Units: 3

Semester Prerequisite: Lower-division GE 2, 5A-5C must be completed. Must attain junior or senior status

Global focus on the opportunities and challenges of living in an increasingly technological, globalized world. Students learn to connect their field of study to global issues such as pandemics, artificial intelligence, climate change, sustainability, health disparities, pollution, new dynamics of vector-borne diseases, obesity, physical inactivity, climate health, and scientific, medical and environmental justice, etc. The specific topics covered will depend on instructor. Using critical thinking skills, group projects, information literacy, scientific readings, group discussion and scaffolded writing with revision after feedback, students expand their knowledge about the issue and learn to communicate scientific research with those outside the scientific community. Students also create an individual development plan to help them prepare for the career path of their choice and to increase awareness of their roles and responsibilities to become involved in and to work towards resolution of one of these global conditions. Satisfies GE B5/UD-5, G, WI designations.

NSCI 3010. Introduction to STEM and STEM Research. Units: 2

Introduction to resources for upper division transfer students, including the library, financial aid, Office of Student Research, and the Career Center. Presents expectations for and tools to help achieve success for students, including active/collaborative learning, reflective learning, and how to pursue undergraduate research and internships. Satisfies WI designation.

NSCI 3040. Introduction to Math & Science Pedagogy. Units: 2

Basic concepts in how people learn and how best to apply that to a classroom setting. Topics may include questioning strategies, prior knowledge, conceptual framework, metacognition, group work, and equity. For students working as a teaching assistant in College of Natural Science courses, or those interested in teaching in STEM or healthcare fields.

NSCI 3250. Perspectives on Gender. Units: 3

Semester Prerequisite: Junior or senior standing

This interdisciplinary course uses scientific, humanistic, and social science perspectives to foster an understanding of how gender functions in individual lives, societies, and cultures. (Offered as CAL 3250, SSCI 3250 and NSCI 3250. Students may receive credit for only one of these courses.) Satisfies GE B5/UD-5, DI designation.

NSCI 3300. Natural Science Mid-Program Assessment. Unit: 1

Semester Prerequisite: NSCI 2300

Mid-program assessment of the Natural Science program learning outcomes. Feedback on e-portfolio development. Continued development of active learning and metacognitive skills.

NSCI 3368. U-RISE Seminar I. Units: 2

Semester Prerequisite: Admissions to the URISE program and consent of instructor

A selected examination of original research articles in behavioral and biomedical sciences. Students will learn to critically read, critique, and present published scientific findings. Offered as NSCI 3368, PSYC 3368, and SSCI 3368 (students may receive credit for only one of these courses). Enrollment is limited to students whose formal application to the Undergraduate Research Training Initiative for Student Enhancement (U-RISE) program is approved. Formerly offered as NSCI 368, PSYC 369, SSCI 368.

NSCI 4300. Natural Science Capstone. Units: 2

Semester Prerequisite: NSCI 3300

Integration of knowledge and skills gained in the Natural Science program and application to complex problems, issues and policies related to science. Individual or group projects. Completion of an e-portfolio documenting and reflecting on achievement of the program learning outcomes and preparation for the student's selected career option(s). This course is intended for students in the Natural Science major and should be taken in the student's final semester at CSUSB.

NSCI 4468. U-RISE Seminar II. Units: 2

Semester Prerequisite: NSCI 3368, PSYC 3368, or SSCI 3368. Quarter Prerequisite: NSCI 368, PSYC 368 or SSCI 368

A selected examination of original research articles in behavioral and biomedical sciences focuses on improving scientific writing skills, shaping long-term research projects, and developing research funding proposals. Offered as PSYC 4468, NSCI 4468, and SSCI 4468 (students may receive credit for only one of these courses). Enrollment is limited to students whose formal application to the Undergraduate Research Training Initiative for Student Enhancement (U-RISE) program is approved. Formerly known as NSCI 468, PSCI 468, SSCI 468.

NSCI 5410. Commercializing Entrepreneurial Innovation. Units: 3

Examines the process of commercializing innovations and emerging technologies in entrepreneurial driven companies. Focus on understanding the innovation process and the strategy, tactics and behaviors necessary to manage the transition from basic development stages to commercial venture; intellectual property law and protection, technology transfer and licensing. Formerly offered as ENTR 541.

NSCI 5440. Developing the New Venture. Units: 3

Semester Prerequisite: ENTR 5430, ENTR 5435

Introduction to the process of developing a new venture concept. Focus on transitioning ideas into a viable business venture with special emphasis on developing a sustainable business model and a hands-on business planning experience. Cross-listed as NSCI 5440; students cannot receive credit for both.

NSCI 5951. Independent Study. Unit: 1

Investigations conducted under the direction of a faculty member. NSCI 5951-5953 may be repeated for credit up to a total of 6 units. Department consent required.

NSCI 5952. Independent Study. Units: 2

Investigations conducted under the direction of a faculty member. NSCI 5951-5953 may be repeated for credit up to a total of 6 units. Department consent required.

NSCI 5953. Independent Study. Units: 3

Investigations conducted under the direction of a faculty member. NSCI 5951-5953 may be repeated for credit up to a total of 6 units. Department consent required.