

# SCIENCE (SCI)

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## **SCI 120 Live Science: How Scientific Issues Impact Your Daily Life 4 credits**

Not excited about taking a science general education course? This course will show you how much science affects your day-to-day life. You will learn about current issues and controversies in the areas of biology, chemistry, and environmental science, including global warming, alternative energy, fracking, recycling, vaccination, GMOs, cloning and gene therapy, and stem cells. This course will equip you to think critically, find reliable sources of information, and to make educated decisions when it comes to your health, your environment, and political issues. This course includes a lab, which will help you to learn the theory behind the scientific method and give you exposure to how scientific research is carried out.

## **SCI 250 Global Regulatory and Legal Requirements of Quality 4 credits**

This course will give students an understanding of the role of regulators with an overview of regulations as stated in the U.S. Code of Federal Regulations (CFR), EudraLex Directives and Annexes, and Emerging Market regulations for the life science industries. The faculty will demonstrate the relationship between regulatory requirements and legal accountability while introducing fundamental concepts in the regulations related to clinical trial development, management, ethics, data integrity, data security, privacy, change control, and validation. Topics such as the role of guidance documents and industry standards will be reviewed, and case studies utilized to support the program. The “why” of the regulations will support the student’s ability to enter the life science industry with an understanding of how to optimize patient health and business success by mobilizing enterprise-wide quality effectiveness through innovative systems and critical thinking grounded in science, data, stakeholder awareness and regulatory intelligence.

## **SCI 275 Product Development, Risk, and Failure Analysis 4 credits**

In this course, students will be exposed to the major design processes that are critical to life science product, process and specification development. Topics to be covered include cradle to grave product and process development, prototype builds, scalability, design of experiments, variability, control, specification development and validation methodology. Instructors will explore how rigorous human factor engineering studies and clinical trials provide essential inputs into the product development process. The students will be introduced to concepts such as gap analysis, risk assessment, master plan, process characterization, installation qualification, operational qualification, measurement system analysis, repeatability and reproducibility (data collection / analysis), performance qualification/ validation. In a world of innovative technology, it is critical that the students gain an understanding of computer system and software validation to ensure the quality of data generation, data storage, and digital processes used in manufacturing and products with digital components using technical and practical aspects expected in the regulated life science industries. This course will also dive into the nuances of the life science industries related to the specific regulations that apply to consumer health products. Importantly, it is desired that students take this course while on internship at a life science company such that they can experience a failure while learning all that is required for acceptable resolution. Through the use of historical risk analysis techniques, such as FMEA, Fault Tree, and 5 Why’s, students will be able to analyze a holistic set of data (in production, across product lines, across equipment, human variability, on-market, on-stability, validation studies, change control, etc.) that will lead to scientifically justified investigations supported by evidence, and the identification of effective corrective and preventative actions (CAPA). (Prerequisite: SCI 250).

## **SCI 310 Life, Earth, Space, and Physical Science for Educators 4 credits**

In this course, students actively explore concepts and skills taught in the K-6 classroom including life, earth, space, and physical science. The planned explorations will be structured to simultaneously expose students to activities and approaches that are appropriate for the elementary classroom while also understanding the process of scientific inquiry and knowledge acquisition.

## **SCI 435 Research and Techniques 4 credits**

This course provides the students with an opportunity to master a number of research techniques through participation in a collaborative research project. Significant time will be spent reading and analyzing scientific literature related to the research project. Emphasis may be given to molecular biology, cell and bacterial culture, or HP-LC mass spectrometry. This course is intended for students with little to no research experience. Students will meet during regularly scheduled class time to learn techniques and design experiments. Time will be required outside of class to carry out and maintain experiments. (Prerequisites: BIO 130 and CHE 115)

## **SCI 436 Advanced Research & Techniques 4 credits**

This course provides the students with an opportunity to master a number of research techniques through participation in a collaborative research project. Significant time will be spent reading and analyzing scientific literature related to the research project. This course is intended for students that have taken SCI 435 and are interested in further pursuing advanced research opportunities. Time will be required outside of class to carry out and maintain experiments. (Pre-requisite: SCI 435)

**SCI 450 Literature Review of Special Topics 2 credits**

The topic for this course will vary each semester from a wide range of current scientific research. Students will read background material, participate in discussions and complete writing assignments.  
(Prerequisite: Minimum grade of C- in BIO 120 and CHE 115)

**SCI 453 Science Senior Capstone 2 credits**

This course is a required course for all majors within the Science department and should be taken within two semesters of graduation. This course will focus on key skills required of science graduates: communication, scientific writing, analysis of primary literature, and an ability to describe the research skills gained during laboratory experiences. Part of this course will also emphasize career preparation, focusing on the transition from college to a graduate program or job.  
(Prerequisite: Minimum grade of C- in BIO 120 and CHE 115).

**SCI 455 Research in Science 4 credits**

This course offers students the opportunity to do original research in science under the direction of university faculty. When applicable, the research will result in a presentation at a research symposium.  
(Prerequisite: Minimum grade of C- in BIO 120 and instructor approval)

**SCI 456 Advanced Research in Science 1-4 credits**

This course offers students the opportunity to do original research in science under the direction of university faculty. When applicable, the research will result in a presentation at a research symposium. This advanced course is intended for students with prior research experience.  
(Prerequisite: Minimum grade of C- in SCI 455 and instructor approval)

**SCI 497 Study Abroad 1-4 credits**

International travel course that supports students' program learning with first-hand experience.

**SCI 499 Senior Outcomes 0 credits**