Course Information Form (CIF)

Course Code: SCI 221

Course Title: Scientific Research Methods

Department: Natural Sciences
PCS Code: 1.1 – Baccalaureate/Transfer
CIP Code: 41.0000
Repeatability: 1

Effective Date: Fall 2026

Credit Hours

Catalog Notation: 2-3-3
Credit Hour Distribution:

Lecture: 2	Lab: 3	Clinical: 0	**Total: 3**

General Course Information

Catalog Description

Research methods and scientific inquiry for students desiring to gain research experience including engagement with primary scientific literature, building laboratory skills, pursuit of independent experimental projects, scientific communication, and preparation of a portfolio suitable for applying to research opportunities. Repeatable for a maximum of 6 credit hours.

General Course Objectives

To provide experience and skills for students interested in pursuing research-intensive career paths and experiences; enhancing technical, problem solving, and scientific skills.

Minimum Placement Levels

English	Reading	Math
Placement out of ENG 098	Placement out of CCS 098	Credit in MAT 124 with a grade of C or higher, or placement

Prerequisites

Credit in one course in AST, BIO, CHE, ESC, ENS, PHY, or SCI with a grade of C or higher within the last three years

Methods of Evaluation

- 1-5 Lab Skills Assessments
- 4-10 Progress Reports
- 2-4 Presentations
- 10-15 Lab Write Ups
- 3-7 Projects
- Final Portfolio

Instructional Materials and Additional Supplies

- All reading materials will be provided through the Learning Commons
- Lab notebook
- Chemistry goggles
- Lab coat

Course Content

General Learning Outcomes (GLOs)

- Communication: Students will demonstrate the ability to read, write, listen, and speak effectively.
- Critical Thinking and Information Literacy: Students will demonstrate the ability to evaluate perspectives, evidence, and implications, and to locate, assess, and use information effectively.
- Reasoning and Inquiry: Students will demonstrate the ability to solve problems using deductive reasoning and logic, quantitative reasoning, or the scientific method.

Course Segments and Student Learning Outcomes

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Consuming and Using Scientific Literature	1. Extract, relate, and evaluate relevant information from primary and secondary sources.	10	0	0
Lab Techniques	1. Use scientific instrumentation safely and appropriately. 2. Select the appropriate tool/method for an experiment. 3. Collect and interpret data from lab methods.	0	10	0
Experimental Design	1. Formulate a scientific hypothesis. 2. Design an experiment to test the hypothesis, including appropriate controls. 3. Carry out the experiment with attention to safety, appropriate techniques, and cost efficiency.	0	5	0
Scientific Communication	1. Document quantitative and qualitative data in a laboratory notebook with consideration for future researchers to repeat and build from. 2. Engage in peer review and appraise clarity and quality of written and oral communication including lab notebooks, papers, and posters. 3. Engage in science communication including journal club, oral poster presentations, and written papers.	10	0	0
Analyzing Experimental Data	1. Interpret and analyze experimental data; evaluate data quality. 2. Retool hypotheses and experimental designs in response to results. 3. Form conclusions and plan future directions.	0	20	0
Portfolio	1. Create a portfolio for applying to jobs, internships, and other research opportunities.	10	10	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
30	45	0