

BIOL C299L: RESEARCH SKILLS LABORATORY

Item	Value
Curriculum Committee Approval Date	12/06/2024
Top Code	040100 - Biology, General
Units	1 Total Units
Hours	54 Total Hours (Lab Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Open Entry/Open Exit	No
Grading Policy	Pass/No Pass (B)

Course Description

Research under the supervision of a faculty member intended for students who are eager for laboratory research experience. This laboratory class teaches experimental design and methods applied in biology, biotechnology, chemistry, and ecology, specifically geared toward life sciences. Methods such as those applied in cellular and molecular biology, 3D printing, ecological field studies, and data management will be studied and applied to original research projects. Skills learned include the ability to apply the processes of scientific inquiry to the study of biological concepts, the ability to use the compound microscope, aseptic technique, common techniques used in the biotech laboratory, and the use of laboratory equipment used in biotechnology and ecology. PREREQUISITE: BIOL C299. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Demonstrate the ability to formulate hypotheses, design reports to experiments, analyze data, and form conclusions.

Course Objectives

- 1. Properly maintain a laboratory notebook.
- 2. Understand and interpret basic laboratory safety rules.
- 3. Properly prepare and view specimens for examination using compound light microscopy.
- 4. Properly prepare and view specimens for examination using a dissection microscope.
- 5. Use and maintain basic lab equipment such as autoclaves, water baths, scales, centrifuges and pipettes.
- 6. Prepare solutions, reagents, and media while utilizing good aseptic technique.
- 7. Follow and adhere to basic experimental protocols.
- 8. Design and execute an experiment.

Lab Content

Creation of safe workspaces Proper attire Disposal of hazardous material Aseptic technique Use of a compound microscope How a microscope works Calculation of magnification Sample preparation Proper storage Separation of Biomolecules Electrophoresis Chromatography

Mass Spectrometry Polymerase Chain Reaction (PCR) Components Thermocyclers Calculations of Nucleic Acid Content Variations of PCR DNA extraction/purification Interpreting sequence data 3D Printing Printer use Computer assisted design (CAD) Microbiology Gram stain Bacterial isolation and culturing Use of media Organismal biology Identification of organisms Vertebrate and invertebrate anatomy

Method(s) of Instruction

- Lab (04)

Instructional Techniques

Observation of techniques Laboratory skills hands-on teaching Field observations and sampling

Reading Assignments

Readings pertaining to upcoming laboratory skills and techniques.

Writing Assignments

Documentation in a laboratory journal or equivalent.

Out-of-class Assignments

Options include readings, viewing video recordings, problem-solving activities, practicing skills learned.

Demonstration of Critical Thinking

Decision-making skills and ability to apply the scientific method.

Required Writing, Problem Solving, Skills Demonstration

Laboratory skills in cell and molecular biology, ecology, and chemistry.

Eligible Disciplines

Biological sciences: Master's degree in any biological science OR bachelor's degree in any biological science AND master's degree in biochemistry, biophysics, or marine science OR the equivalent. Master's degree required. Chemistry: Master's degree in chemistry OR bachelor's degree in chemistry or biochemistry AND master's degree in biochemistry, chemical engineering, chemical physics, physics, molecular biology, or geochemistry OR the equivalent. Master's degree required. Ecology: Master's degree in ecology or environmental studies OR the equivalent OR see interdisciplinary studies. Master's degree required.

Other Resources

1. OERs as needed.