

BIOLOGY CORE CURRICULUM (BIOCORE)

BIOCORE 181 – BECOMING A SCIENTIST: DOING BIOLOGY RESEARCH

2 credits.

Orientation to biology research on campus, work in a research team to investigate a novel research question, and do biology research on a choice of topics: from ecology and physiology to cell biology. Emphasis is on critical thinking required in designing and conducting experiments, analyzing and interpreting data, and communicating findings orally and in writing.

Requisites: None

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Elementary

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Honors - Honors Only Courses (H)

Repeatable for Credit: No

Last Taught: Fall 2024

Learning Outcomes: 1. Apply approaches for being a successful college student

Audience: Undergraduate

2. Communicate what biology research looks like, sounds like, and feels like at UW Madison

Audience: Undergraduate

3. Do biology research and engage as a member of a biology research community

Audience: Undergraduate

BIOCORE 381 – EVOLUTION, ECOLOGY, AND GENETICS

3 credits.

Basic principles of ecology and interrelations between individuals, populations, communities, ecosystems and their environment; transmission genetics and introduction to population genetics; origin of life, evolutionary mechanisms, ancestral relationships among species, and the diversity of life.

Requisites: Declared in Biology Core Curriculum Honors Certificate

Course Designation: Gen Ed - Communication Part B

Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Honors - Honors Only Courses (H)

Repeatable for Credit: No

Last Taught: Fall 2024

Learning Outcomes: 1. Understand what we know, how we know, and what we don't know in ecology, transmission genetics and evolution at the intermediate level

Audience: Undergraduate

2. Apply scientific theory, concepts, reasoning, and quantitative and qualitative approaches to understand and solve problems

Audience: Undergraduate

3. Use terminology accurately and effectively within appropriate conventions of the discipline

Audience: Undergraduate

4. Find, evaluate and relate relevant information found in primary scientific literature using core library resources

Audience: Undergraduate

5. Build a logical argument in writing based on critical reading, and use of evidence and scientific reasoning

Audience: Undergraduate

6. Analyze a problem using a systems approach, recognizing levels of biological scale and organization

Audience: Undergraduate

7. Work as a member of a productive, collaborative group

Audience: Undergraduate

8. Demonstrate scientific communication skills and the ability to translate scientific concepts to a broader community using appropriate style and disciplinary conventions

Audience: Undergraduate

BIOCORE 382 – EVOLUTION, ECOLOGY, AND GENETICS LABORATORY

2 credits.

Writing-intensive with opportunities to make observations and generate and test questions. Includes ecology field trips and research projects that focus on genetics and evolution.

Requisites: BIOCORE 381 or concurrent enrollment

Course Designation: Gen Ed - Communication Part B

Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Honors - Honors Only Courses (H)

Repeatable for Credit: No

Last Taught: Fall 2024

BIOCORE 383 – CELLULAR BIOLOGY

3 credits.

Cellular and molecular basis of life. The main themes are the structure and function of cells and organelles, the flow of energy in cells, and the storage, expression, and regulation of genetic information.

Requisites: BIOCORE 381

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Honors - Honors Only Courses (H)

Repeatable for Credit: No

Last Taught: Spring 2025

BIOCORE 384 – CELLULAR BIOLOGY LABORATORY

2 credits.

Writing-intensive with opportunities to generate and test questions utilizing concepts and procedures of cell biology. Includes research projects in subcellular fractionation, protein structure and enzyme catalysis, molecular genetics of *C.elegans* worms, and signal transduction in yeast.

Requisites: BIOCORE 383 or concurrent enrollment

Course Designation: Gen Ed - Communication Part B

Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Honors - Honors Only Courses (H)

Repeatable for Credit: No

Last Taught: Spring 2025

BIOCORE 401 – PEER MENTORING

1 credit.

Develops mentoring, group facilitation, leadership, and interpersonal skills used in peer learning and leading mentored study groups. Focuses on the pedagogy, skills, and effective techniques used to facilitate learning in small groups. Discuss lower order to higher order cognitive levels using Blooms Taxonomy, and reciprocal mentor observations.

Requisites: BIOCORE 381, 383, and (BIOCORE 382 or 384)

Course Designation: Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Fall 2024

BIOCORE 485 – PRINCIPLES OF PHYSIOLOGY

3 credits.

Study the physiology of and consider how plants and animals interact with their environments to survive, obtain nutrients, exchange gases, and reproduce, also how the complex systems of neural and endocrine regulation in animals and hormonal and environmental regulation in plants allow cells and organs to communicate.

Requisites: BIOCORE 383

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Honors - Honors Only Courses (H)

Repeatable for Credit: No

Last Taught: Fall 2024

Learning Outcomes: 1. Frame biological questions about physiological systems, formulate testable hypotheses to guide in answering the questions, design experiments to test hypotheses (including appropriate controls), and predict/recognize/graph data that support these hypotheses.

Audience: Undergraduate

2. Build logical arguments about the operation of physiological systems based on evidence.

Audience: Undergraduate

3. Use and manipulate basic mathematical equations that model physiological systems.

Audience: Undergraduate

4. Integrate past experience, accumulated knowledge, and creativity to solve complex physiological problems.

Audience: Undergraduate

5. Recognize diversity in organismal design and response to environmental challenges

Audience: Undergraduate

6. Define the components of regulatory systems, propose models to explain observed physiological phenomena, and explain the fundamental role of regulation in physiological processes.

Audience: Undergraduate

7. Explain and give specific examples to demonstrate how structure - function relationships underlie/determine physiological phenomena.

Audience: Undergraduate

8. Evaluate the reliability and validity of scientific information.

Audience: Undergraduate

9. Use scientific terminology precisely and appropriately.

Audience: Undergraduate

10. Demonstrate effective scientific discourse as a member of a group.

Audience: Undergraduate

BIOCORE 486 – PRINCIPLES OF PHYSIOLOGY LABORATORY

2 credits.

Experience the process of science by collaborating on independent experiments to investigate your questions about animal and plant physiology. Emphasis is on critical thinking required in designing and conducting experiments, analyzing and interpreting data, and communicating findings orally and in writing.

Requisites: BIOCORE 485 or concurrent enrollment

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Honors - Honors Only Courses (H)

Repeatable for Credit: No

Last Taught: Fall 2024

Learning Outcomes: 1. Appropriately utilize Biocore 485 lecture concepts in an applied setting.

Audience: Undergraduate

2. Engage in the process of science, including the problem-solving involved in designing and executing experiments, and the critical thinking required to carefully analyze and interpret results.

Audience: Undergraduate

3. Work with tools & procedures to investigate biology.

Audience: Undergraduate

4. Concisely, clearly, and precisely communicate your plans and findings to others using written and oral communication

Audience: Undergraduate

5. Utilize quantitative reasoning skills (statistical analysis skills).

Audience: Undergraduate

6. Work as a member of a productive, collaborative research team

Audience: Undergraduate

7. Build on, apply, and integrate concepts & skills that you learn in other Biocore courses.

Audience: Undergraduate

8. Contribute to a safe, sustainable, socially and ethically responsible learning environment

Audience: Undergraduate

BIOCORE 587 – BIOLOGICAL INTERACTIONS

3 credits.

A capstone course to build on and integrate the knowledge and skills gained in previous Biocore coursework through readings and analysis of primary scientific literature. Work in small groups to analyze current and emerging topics through the lens of scientific research. Topics include signaling pathways, systems biology, genetic disease, and cancer.

Requisites: BIOCORE 485

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Honors - Honors Only Courses (H)

Repeatable for Credit: No

Last Taught: Spring 2025

BIOCORE 699 – DIRECTED STUDY

1-3 credits.

Independent mentored study as arranged with a faculty member

Requisites: Consent of instructor

Course Designation: Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Spring 2025