

BIOLOGY

The field of Biology represents a number of different approaches to the study of life, from the molecular to organismal to ecological levels.

ABOUT THE PROGRAM

The Department of Biology offers all Hope College students an opportunity to participate in biology, either in courses listed here or in some of the GEMS and Environmental Science courses. Several members of the Department of Biology faculty have been recognized as outstanding educators at the state and national levels. Biology majors leave Hope College well prepared to pursue a number of different careers. Many of our majors go on to earn advanced degrees in graduate, medical, dental or other professional schools. Our success at placing students in graduate and professional schools is outstanding. Other students go on to careers in the allied health professions, industrial research and laboratory positions, conservation and natural resources management, secondary education and environmental/outdoor education.

We give students the chance to learn biology in well-taught courses in a diverse curriculum. Courses emphasize active participation by the students in lecture, discussion and laboratory settings. A hallmark of the department's approach is the belief that students best learn biology by doing biology. Thus, almost all of our courses include investigative laboratories. In addition, we provide students with the opportunity to be biologists by participating in research projects with our faculty. Student/faculty research occurs both in the summer, when stipends are available to give selected students the experience of full-time research, and during the academic year. More than 100 research papers co-authored by students have been presented or published in the last five years. The variety of research projects reflects the diversity of interests of the biology faculty:

- Ecologists are studying seed banks and tropical forest regeneration, effects of endophytic fungi on insects, behavioral ecology of birds and the ecology of invasive plants
- Botanists are investigating molecular plant systematics
- Physiologists are studying the role of vasopressin receptors, the regulation of body mass and reproduction in vertebrates and the electrophysiology of the hippocampus
- Geneticists, cell biologists and molecular biologists are studying receptor function and molecular biology of lipid metabolism
- Zoologists are investigating interactions between insects, fungi, and grasses; and competition for nesting sites among bird species

The department has many well-equipped laboratories and a 55-acre nature preserve for both teaching and research and a well-supplied library of books and current journals. More recent additions to our capabilities include a computer laboratory for bioinformatics studies, statistical analyses and simulation studies, an apotome/fluorescence microscope, diode array

spectrophotometers, an automated next generation DNA sequencer, a real-time PCR thermal cycler, scintillation counters, a video image analysis system, a confocal microscope, a portable photosynthesis system, equipment for electrophysiological studies, seven computerized polygraphs for physiological measurements, five walk-in and numerous reach-in environmental chambers, new field equipment, two molecular biology laboratories and facilities for plant and animal tissue culture and gene cloning and amplification.

Qualified students can spend a semester at a university abroad or in an internship while pursuing their other studies at Hope College or during participation in one of the college's domestic off-campus programs.

A Bachelor of Science degree in Biochemistry and Molecular Biology is offered jointly by the departments of Biology and Chemistry and is available for those students who seek a degree at the interface of these two disciplines. You may find complete description of the requirements for this degree [here](#).

MAJORS

A Hope College biology major must be prepared to meet a variety of future challenges. For that reason, the basic requirements are distributed among the diversity of approaches to the study of biology. Students should discuss their individual needs with a member of the Department of Biology as early as possible so that those needs can be met.

Biology

The General Biology classes (BIO 105 and 106) and laboratory (BIO 107 and 108 or 207 and 208) are referred to as the "core courses in biology" throughout the catalog.

Basic major requirements:

The B.A. in biology requires completion of at least 28 credits of biology, including the required core biology courses. In addition, students will take

- 1 semester of a 4-credit mathematics course
- 1 year of chemistry (major level courses are strongly recommended).

The B.S. in biology requires 36 credits in biology, including the required biology core courses. Note that CHEM 314 and 315 may be counted as biology credits for the B.S. degree. In addition, students will take:

- CHEM 125, 127, 128, 126 (or 131, 132), 221, 231 and 255
- 2 semesters of 4-credit courses in mathematics, or one semester of a 4- credit mathematics course and CSCI 160 - Scientific Computer Programming
- 8 additional credits from courses in the natural science departments other than biology and chemistry

Students must have a minimum GPA of 2.0 in biology to graduate with a major.

Required courses:

Biology majors desiring either a B.A. or B.S. must take the entry-level core courses in biology. The four General Biology courses provide a comprehensive overview of the basic principles of biology. They stress the central ideas in the biological sciences, such as ecology and evolution, adaptation, structure-function relationships and the global diversity and unity of life with an emphasis on the process of scientific discovery and investigation.

To ensure students are exposed to advanced study in the major areas of biology, at least one course in each of the following areas must be taken:

- BIOL 301*, 332*, 340, 370, 374*, 422*, 432*, 442 – Organismal Biology
- BIOL 295, 335, 341, 356/357, 348/349, 355, 366, 395 (Bioinformatics) – Cell/Molecular Biology
- BIOL 315, 343*, 380*, 421, 330* – Ecology & Evolutionary Biology
- BIOL 318, 490, 490R, 495 – Professional Development (Mathematical Biology, Research in Biology, Capstone, Journal Club)

*To ensure students are informed about the important topic of biological diversity, at least one of the courses above with an asterisk is required.

Important Considerations:

1. Core courses in biology (105, 106 and either 107 and 108 or 207 and 208) and CHEM 125, 127, 128 and 126 (or 131 and 132) should be taken in the first year of college, if possible.
2. Students planning to attend graduate, medical or dental schools or pursue other biology careers that require rigorous training, should take mathematics; one year of physics; and CHEM 125, 127, 128 and 126 (or 131 and 132), 221, 231, 255 and biochemistry, statistics and computer programming are desirable for many biological careers.
3. Research in Biology (490R) can count for up to 4 credits towards the Biology major.

Biology Education

In partnership with the Hope College Department of Education, the Department of Biology offers a teaching major and minor for certification through the State of Michigan (see the [Department of Education](#) website.)

Majors desiring a B.A. must take a minimum of 30 credits in biology, beginning with the four-course core.

Biology secondary teacher candidates must choose an additional 22 credits.

In addition to biology course work, teacher candidates must take one semester of a 4-credit mathematics course and a year of chemistry.

MINORS

Biology

The minimum requirement for a biology minor is 20 credits of biology, including core courses in biology, plus 12 more credits selected from other courses in the department. Students must have a minimum GPA of 2.0 in biology to graduate with the minor.

If earning a minor for secondary teacher certification, students must have at least a 2.5 GPA.

Biology Education

In partnership with the Hope College Department of Education, the Department of Biology offers a teaching major and minor for certification through the State of Michigan (see the [Department of Education](#) website.)

Minors for secondary teacher certification must take a minimum of 20 credits in biology, beginning with BIOL 105, 106, 107 and 108. An additional 12 credits may be chosen from the same biology department electives as the secondary teacher certification major.

Because of the expectations for high school teaching, BIOL 221, Human Physiology, is strongly recommended for teacher education candidates.

Courses designed for students preparing for careers in the allied health fields. These courses do not count toward a biology major or minor.

COURSES

BIOLOGY

BIOL 103 - Introduction to Cell Biology

A study of the fundamentals of cell biology and genetics. Three lectures and one 3-hour laboratory period per week. Not open to students who have taken Biol 240 or Biol 105 and 106.

Credits Awarded: 4

Terms Offered: Fall

Attribute: Natural Science I with lab (NSL)

BIOL 104 - Organisms and Environments

This is the second of a two-semester sequence of courses. The combined courses ("Matter and Energy" and "Organisms and Environments") will satisfy the natural science laboratory general education requirements only for elementary education teacher candidates. The courses will also cover the content that is important for future educators in an integrated inquiry-based format. The content in this recommended course sequence will flow from the physical science to earth/space science to life science topics that students will find themselves teaching in the future. This course will primarily include content from the life and earth/space science, though due to the interdisciplinary nature of many of the topics, physical science topics will also be addressed where appropriate.

Credits Awarded: 4

Terms Offered: Fall, Spring

Attribute: Natural Science I with lab (NSL)

BIOL 105 - General Biology I

This course includes an overview of ecology emphasizing the ways organisms interact with their physical and biological environment, and the study of animal and plant diversity, anatomy and physiology with an emphasis on structure-function relationships and homeostasis. Three lectures per week.

Credits Awarded: 3

Terms Offered: Fall

Corequisites: Biol 107

Attribute: Natural Science I with lab (NSL)

BIOL 106 - General Biology II

This course includes the study of cell biology, including cellular structure and function, metabolism, enzyme activity, and energetics, Mendelian and molecular genetics, including discussion and use of modern techniques as a means to answer biological questions, and evolutionary biology, including the relationships between the major taxa, and how the interaction of organisms with their environment drives the evolutionary process. Three lectures per week.

Credits Awarded: 3

Terms Offered: Spring

Prerequisites: Biol 105

Corequisites: Biol 108

Attribute: Natural Science I with lab (NSL)

BIOL 107 - General Biology Laboratory I

Laboratory experiences designed to complement lecture material in Biol 105. The labs are organized into research experience modules. In this semester, students investigate questions in ecology, animal and plant biology.

Credit Awarded: 1

Terms Offered: Fall

Corequisites: Biol 105

Attribute: Natural Science I with lab (NSL)

BIOL 108 - General Biology Laboratory II

Laboratory experiences designed to complement lecture material in Biol 106. The labs are organized into research experience modules. In this semester, students investigate questions in cell biology, molecular genetics and evolution.

Credit Awarded: 1

Terms Offered: Spring

Prerequisites: Biol 105

Corequisites: Biol 106

Attribute: Natural Science I with lab (NSL)

BIOL 195 - Studies in Biology

A course offered in response to student and instructor interest. Topics are not generally covered in the regular course listings. Course may be taken multiple times if topics are different.

Credits Awarded: 0-4

Terms Offered: As Needed

Prerequisites: Permission of instructor

BIOL 207 - Honors Laboratory in Cells and Genetics

This research based laboratory course is the first part of a two-semester introductory biology laboratory sequence. The full-year course covers basic techniques in microbiology, molecular biology, genetics, evolutionary biology and computer based bioinformatics analysis of viral genomes through the exploration of Mycobacteriophage diversity. In this first semester, students will focus on various wet laboratory skills in microbiology, molecular biology and genetics. Enrollment is by invited application only. One 3-hour laboratory session and one 2-hour laboratory session per week.

Credits Awarded: 2

Terms Offered: Fall

Prerequisites: Permission of instructor

Corequisites: Biol 105

Attribute: Natural Science I with lab (NSL)

BIOL 208 - Honors Laboratory in Cells and Genetics

This research based laboratory course is the second part of a two-semester introductory biology laboratory sequence. The full-year course covers basic techniques in microbiology, molecular biology, genetics, evolutionary biology and computer based bioinformatics analysis of viral genomes through the exploration of Mycobacteriophage diversity. In this second semester, students will focus on various topics in bioinformatics, comparative genomics, and evolutionary biology. Two 2-hour computer laboratory session per week.

Credits Awarded: 2

Terms Offered: Spring

Prerequisites: Biol 207, Permission of instructor

Corequisites: Biol 106

Attribute: Natural Science I with lab (NSL)

BIOL 221 - Human Physiology

A study of the function and interactions of the various organ systems of the human body. Three lectures and one 3-hour laboratory period per week. Prior completion of Biol 103 or Biol 106 and 108 or the equivalent is highly recommended prior to this course.

Credits Awarded: 4

Terms Offered: Fall

Attribute: Natural Science I with lab (NSL)

BIOL 222 - Human Anatomy

A course where the human body is studied from histological and gross anatomical perspectives. Laboratories require dissections, microscope work, and use of computer programs. Three lectures and one 3-hour laboratory period per week. Cross-listed with Kin 200.

Credits Awarded: 4

Terms Offered: Fall, Spring

Attribute: Natural Science I with lab (NSL)

BIOL 231 - Microbiology for the Allied Health Professions

A study of selected bacteria, viruses and parasites with an emphasis on host-microbe interactions and microorganisms implicated in human disease. Three 1-hour lectures and two 2-hour laboratories per week. Not open to students who have had an advanced microbiology course. Students may take Chem 103 either prior to enrollment in or concurrently with the class.

Credits Awarded: 4
Terms Offered: Spring
Prerequisites: Biol 103, Chem 103
Corequisites: Chem 103

BIOL 295 - Studies in Biology

A course offered in response to student and instructor interest. Topics are not generally covered in the regular course listings. Course may be taken multiple times if topics are different.

Credits Awarded: 0-4
Terms Offered: As Needed

BIOL 301 - General Microbiology

An introduction to the field of microbiology covering physiological and molecular characteristics of microorganisms (bacteria, archaea, viruses and microbial eukaryotes) in the context of evolution and diversity. Special emphasis will be given to pathogenicity and interactions of microbes with the human immune system. Three lectures and two 2-hour laboratories per week. Additional out-of-class hours are required.

Credits Awarded: 4
Terms Offered: Fall
Prerequisites: Biol 105 and Biol 106, Biol 107 or equivalent, Biol 108 or equivalent
Attribute: Natural Science I with lab (NSL)

BIOL 315 - Advanced Topics in Ecology

A course that deals with the interactions between organisms and their physical and biological environments at an advanced level, emphasizing recent developments and specialized problems. Areas of emphasis (e.g., principles of ecology, conservation biology, plant-animal interactions, community ecology, and physiological ecology) as well as course format (lecture-lab, lab only) and credits (1-4) will vary.

Credits Awarded: 1-4
Terms Offered: Fall, Spring
Prerequisites: Biol 105 and Biol 106, Biol 107 or equivalent, Biol 108 or equivalent

BIOL 318 - Mathematical Biology

An exploration of the ways in which mathematics is used to understand and model biological systems. Using examples from ecology, neuroscience, epidemiology, and molecular evolution, we will focus on continuous and discrete models and their analytical and computational solutions. Systems of differential equations, linear algebra, and statistical methods will figure prominently among the mathematical topics. Students will become familiar with the statistical, graphical & modeling capabilities of the R computer language. Cross-listed with Math 318.

Credits Awarded: 4
Terms Offered: Spring, Odd Years
Prerequisites: Biol 105 and Biol 106, Biol 107 or equivalent, Biol 208 or equivalent, Or, Math 231

BIOL 330 - Marine Biology and Biophysics

An interdisciplinary course focusing on the biology of marine organisms and the physicochemical and geological factors that govern their distribution, abundance, and characteristics. The course covers much of the subject matter of a traditional marine biology course, including a survey of important groups of marine organisms and ecosystems, but it also delves frequently into the ways in which physics informs a deeper understanding of the special challenges of life in the sea and adaptations of organisms to deal with those challenges. Three lectures and one 3-hour laboratory per week. Instruction in SCUBA and a field trip to Caribbean coral reef habitats during spring break will be available to students as an option, at extra cost. Cross-listed with Phys 330.

Credits Awarded: 4

Terms Offered: Spring, Odd Years

Prerequisites: Biol 105 and Biol 106, Biol 107 or equivalent, Biol 108 or equivalent

BIOL 332 - Comparative Anatomy of Vertebrates

A course that extensively studies the evolutionary adaptations of anatomy across several taxa of animals. The course is solely laboratory dissections of many aquatic and terrestrial vertebrates. An excellent preparatory for students interested in any career within the Health Professions or Life Sciences.

Credits Awarded: 4

Terms Offered: Spring, Even Years

Prerequisites: Biol 105 and Biol 106, Biol 107 or equivalent, Biol 108 or equivalent

Attribute: Natural Science I with lab (NSL)

BIOL 335 - Neurochemistry and Disease

In this course, students will explore how the biochemistry of the brain influences nervous system function, specifically in relationship to motor and cognitive processes. Students will initially be introduced to fundamental aspects of neuroscience and biochemistry in a traditional lecture format. After this introduction, students will explore the relationship between altered neurochemical activity and disease states using a case study approach. In the lab, students will be introduced to several neurochemistry techniques and will then be asked to use these tools to complete a novel neurochemistry research project. Neurochemistry and Disease meets three times a week for one hour. In addition, students are required to complete one, 3-hour laboratory each week. Cross-listed with Chem 335 and Nsci 335.

Credits Awarded: 4

Terms Offered: Spring, Odd Years

Prerequisites: Biol 105 and Biol 106, Biol 107 or equivalent, Biol 108 or equivalent, Or, Chem 311 or NSCI 211

Attribute: Natural Science I with lab (NSL)

BIOL 340 - Advanced Topics in Plant Biology

An in-depth study of specialized topics in botany such as plant anatomy, plant breeding systems, plant molecular systematics, and ecophysiology of plants. Three ethnobiology lectures and one 3-hour laboratory per week.

Credits Awarded: 4

Terms Offered: Fall, Even Years

Prerequisites: Biol 105 and Biol 106, Biol 107 or equivalent, Biol 108 or equivalent

BIOL 341 - Virology

This course introduces the principles of virology including the molecular biology of viral replication, virus-host cell interactions, immune response to infection, pathogenesis, control strategies (i.e., vaccines), virus-based medical therapies, epidemiology of emerging viruses, and the history of pandemics. The laboratory uses a model virus system and course-based research to explore virus-host interactions, and in the process, teach modern molecular virology laboratory techniques.

Credits Awarded: 4

Terms Offered: Fall

Prerequisites: Biol 105 and Biol 106, Biol 107 or equivalent, Biol 108 or equivalent

Attribute: Natural Science I with lab (NSL)

BIOL 343 - Vascular Plant Systematics

A study of the biology, evolutionary relationships and identification of selected families of vascular plants, and the principles of plant classification. The laboratory will involve field work and concentrate on the local flora. Two 3-hour lecture and laboratory session per week. Additional out-of-class hours are required.

Credits Awarded: 4

Terms Offered: Fall, Odd Years

Prerequisites: Biol 105 and Biol 106, Biol 107 or equivalent, Biol 108 or equivalent

BIOL 348 - Advanced Cell Biology

An advanced study of cell structure, function and regulation of eukaryotic cells. The goal of this course is for students to learn and understand cellular/molecular mechanisms that are essential in the maintenance of cellular homeostasis. The specific topics include cell membrane, cell organelles, cytoskeleton, extracellular matrix and cell cycle. The gene structure and function is also explored. Three lectures per week.

Credits Awarded: 3

Terms Offered: Spring

Prerequisites: Biol 105 and Biol 106, Biol 107 or equivalent, Biol 108 or equivalent

BIOL 349 - Advanced Cell Biology Laboratory

The laboratory course employs an investigative project approach and introduces students to the scientific literature, “research proposal” writing, and latest technologies used to investigate cellular function. The experiments focus on the cancer cell as a model and employ such techniques as cell culture, assays measuring cell proliferation and apoptosis, RNA isolation and microarray analysis, immunocytochemistry, and finally, protein analysis through gel electrophoresis and Western blotting. One 3-hour laboratory per week. Students may take Biol 348 either prior to enrollment in or concurrently with the class.

Credit Awarded: 1

Terms Offered: Spring

Prerequisites: Biol 348

Corequisites: Biol 348

BIOL 355 - Developmental Biology

A study of the processes involved in the development of animal embryos, including regeneration and metamorphosis. The course integrates the descriptive, comparative and molecular approaches to the study of development. Three lectures and one 3-hour laboratory per week.

Credits Awarded: 4

Terms Offered: Fall

Prerequisites: Biol 105 and Biol 106, Biol 107 or equivalent, Biol 108 or equivalent

BIOL 356 - Genetics

A comprehensive overview of genetics from its classical beginnings, including Mendelian genetics, linkage, chromosomal aberrations and extranuclear inheritance to modern molecular genetics. After a thorough grounding, topical subjects are covered in the last part of the semester, and have included cancer genetics, genetics of behavior, and population genetics. Three lectures a week. The laboratory (1 credit) is optional, and may be taken concurrently with the course.

Credits Awarded: 3

Terms Offered: Fall, Spring

Prerequisites: Biol 105 and Biol 106, Biol 107 or equivalent, Biol 108 or equivalent

BIOL 357 - Genetics Laboratory

Designed to introduce the student to the experimental basis of lecture topics. Investigations include the purification and analysis of DNA, generation and sequencing of recombinant DNA molecules, and *Drosophila* and bacterial genetics. Students may take Biol 356 either prior to enrollment in or concurrently with the class.

Credit Awarded: 1

Terms Offered: Fall, Spring

Prerequisites: Biol 356

Corequisites: Biol 356

BIOL 366 - Molecular Biology

An advanced course which examines the role of gene structure, function, and regulation at the molecular level to explain biological processes. Topics include basic processes such as DNA replication, recombination, and regulation of gene expression, as well as an emphasis on experimental design and techniques. The laboratory component of the course uses a project approach to introduce experimental design and molecular biological methods as students clone and characterize a gene. Three lectures and one 3-hour laboratory per week. Biol 356 is highly recommended prior to this course.

Credits Awarded: 4

Terms Offered: Spring

Prerequisites: Biol 105 and Biol 106, Biol 107 or equivalent, Biol 108 or equivalent, Chem 231

BIOL 370 - Animal Behavior

An investigation-based study of vertebrate and invertebrate behavior from an evolutionary perspective. Topics include proximate behavioral mechanisms (genetic, developmental and neurological) and ultimate consequences (evolution, ecology and sociology). Two 3-hour laboratories per week plus additional required out-of-class hours. Statistics is highly recommended prior to this course.

Credits Awarded: 4

Terms Offered: Fall

Prerequisites: Biol 105 and Biol 106, Biol 107 or equivalent, Biol 108 or equivalent

BIOL 374 - Biology of Insects

The course is an introduction to the identification, structure, life cycle, ecology and behavior of insects. Field aspects will be stressed. Two 3-hour lecture/laboratory periods per week, plus additional required out-of-class hours.

Credits Awarded: 4

Terms Offered: Fall

Prerequisites: Biol 105 and Biol 106, Biol 107 or equivalent, Biol 108 or equivalent

BIOL 380 - Field Studies in Biology

A concentrated study of a variety of organisms in their natural habitats. Normally requires field studies or camping trips as long as two to three weeks in duration. In addition study projects and/or papers will be expected. May be repeated for a maximum of 8 credits.

Credits Awarded: 1-4

Terms Offered: Summer

Prerequisites: Biol 105 and Biol 106, Biol 107 or equivalent, Biol 108 or equivalent

BIOL 390 - Independent Study of Biology

A special course to allow students to study an area of biology not included in the regular curriculum or an in-depth study of a selected biological topic.

Credits Awarded: 1-3

Terms Offered: Fall, Spring

Prerequisites: Biol 105 and Biol 106, Biol 107 or equivalent, Biol 108 or equivalent, Permission of instructor

BIOL 395 - Studies in Biology

This course may be a lecture or laboratory on a topic in biology related to special interests of the faculty or to significant current developments in the field.

Credits Awarded: 1-4

Terms Offered: As Needed

Prerequisites: Biol 105 and Biol 106, Biol 107 or equivalent, Biol 108 or equivalent

BIOL 421 - Evolutionary Biology

A study of special topics concerning the process of evolution and its mechanisms involving both micro and macro evolution. Each year a different special topic is explored. Past examples include evolutionary molecular biology and speciation. Three lectures and one laboratory/discussion per week.

Credits Awarded: 4

Terms Offered: Spring

Prerequisites: Biol 105 and 106, Biol 107 or equivalent, Biol 108 or equivalent

BIOL 422 - Invertebrate Zoology

The biology of selected invertebrate animals will be studied with emphasis on their functional morphology, ecology and behavior. Laboratory includes field studies with a weekend trip. Two 3-hour laboratory/lecture sessions per week, plus additional out-of-class hours.

Credits Awarded: 4

Terms Offered: Fall, Even Years

Prerequisites: Biol 105 and 106, Biol 107 or equivalent, Biol 108 or equivalent

BIOL 432 - Vertebrate Zoology

Vertebrate examples are used to investigate a broad range of biological topics including evolution, speciation, historical and modern zoogeography, energetics, behavior, ecology and conservation. Laboratory includes both laboratory exercises and field trips that focus on the taxonomy, external morphology, natural history and field identification of local vertebrates. Three lectures and one 3-hour laboratory per week. Additional out-of-class hours are required.

Credits Awarded: 4

Terms Offered: Spring

Prerequisites: Biol 105 and 106, Biol 107 or equivalent, Biol 108 or equivalent

BIOL 442 - Advanced Topics in Animal Physiology

An in-depth examination of comparative aspects of animal physiology such as cardiovascular systems, renal physiology, endocrinology, immunology, or environmental physiology. Three lectures and one 3-hour laboratory per week, or two lectures and two 2-hour laboratories per week. Additional out-of-class hours are required. Biol 221 is highly recommended prior to this course.

Credits Awarded: 4

Terms Offered: Spring, Odd Years

Prerequisites: Biol 105 and 106, Biol 107 or equivalent, Biol 108 or equivalent

BIOL 490 - Research in Biology

This course is designed to give students majoring in biology a chance to do research in an area in which they have a special interest. Students are expected to attend weekly seminars. Requires formal application and permission of the instructor with whom the student will work.

Credits Awarded: 0-2

Terms Offered: Fall, Spring

Prerequisites: Biol 105 and Biol 106, Biol 107 or equivalent, Biol 108 or equivalent, Permission of instructor

BIOL 493 - Independent Study in Biology

Course provides opportunity for a junior or senior biology major to engage in an independent study project in an area in which the student has special interest.

Credits Awarded: 1-4

Terms Offered: As Needed

Prerequisites: Permission of Instructor

BIOL 495 - Advanced Topics in Biology

A special course, sometimes taught as a seminar, which deals with a specific area of biology at an advanced level. Past topics have included environmental genetic theory, the biology of sex, the heart and kidney, cancer biology, ecology of plant-animal interactions, and cholesterol biology.

Credits Awarded: 1-4

Terms Offered: Fall, Spring

Prerequisites: Biol 105 and Biol 106, Biol 107 or equivalent, Biol 108 or equivalent

BIOL 499 - Internship

An opportunity to gain practical experience in the work place. Requires formal application and permission of the department chairperson.

Credits Awarded: 1-6

Terms Offered: Fall, Spring, Summer

Prerequisites: Biol 105 and 106, Biol 107 or equivalent, Biol 108 or equivalent

FACULTY & STAFF**Best, Dr. Aaron**

Harrison C. and Mary L. Visscher Professor of Genetics, Biology Department Chair (2004)

Ph.D., Univ Illinois Urbana-Champaign, 2001

M.S., Univ Illinois Urbana-Champaign, 1999

B.A., William Jewell College, 1996

Bultman, Dr. Tom

Professor of Biology (2001)

Ph.D., Arizona State University, 1985

M.S., University of Cincinnati, 1981

B.A., Hope College, 1978

Bultman, Judy

Lecturer (2002)

B.A., Hope College,

Burnatowska-Hledin, Dr. Maria

The Frederick Garrett & Helen Floor Dekker Professor of Biomedicine & Chemistry (1992)

Ph.D., Charette Charter School, 1980

M.S., Charette Charter School, 1977

B.S., Charette Charter School, 1975

Calvo-Ochoa, Erika

Assistant Professor of Biology and Neuroscience (2020)

Ph.D., National University Of Mexico, 2015

B.S., National University Of Mexico, 2008

Chase, Dr. Leah

Professor of Biology & Chemistry (2000)

Ph.D., Univ of Minnesota Twin Cities, 1999

B.S., University of Michigan-Flint, 1993

Isola, Dr. Vicki

Assistant Professor of Biology Instruction (1988)

Ph.D., University of Pennsylvania, 1988

B.S., Michigan Tech University, 1981

Kopek, Dr. Benjamin

Associate Professor of Biology (2014)

Ph.D., University of Wisconsin, 2008

B.A., Spring Arbor University, 2002

Li, Dr. Jianhua

Professor of Biology (2009)

Ph.D., Univ New Hampshire Durham, 1997

M.S., Huazhong Normal University, 1987

B.S., Henan University, 1984

Madison, Dr. Farrah

Post Doctoral Fellow Biology (2007)

M.S., University of Nebraska Lincoln,

B.S., University of Nebraska Lincoln,

Ph.D., Univ Arkansas Fayetteville, 2007

McCrum, Shana

Assistant Professor of Biology Instruction/ExploreHope Curriculum Coordinator (2013)

M.Ed., Grand Valley State University, 2010

B.S., Grand Valley State University, 1999

B.S., Grand Valley State University, 1990

McDonough-Stukey, Dr. Virginia

Professor of Biology (1995)

Ph.D., Rutgers Univ New Brunswick, 1992

B.S., Rutgers Univ New Brunswick, 1983

Muilenburg, Dr. Vanessa

Assistant Professor of Biology Instruction (2013)

Ph.D., Ohio State University, 2010

M.S., Univ Arkansas Fayetteville, 2006

B.S., Iowa State University, 2003

Murray, Dr. K. Greg

T. Elliot Weier Professor of Plant Science (1986)

Ph.D., University of Florida, 1986

M.S., Calif State Univ Northridge, 1980

B.A., Calif State Univ Northridge, 1977

Olson, Vickie

(2020)

Rivera, Dr. Phillip

Assistant Professor of Biology (2018)

M.S., New Mexico State University,

Ph.D., Univ Texas Southwstrn Med Cntr, 2015

Ronald, Dr. Kelly

Assistant Professor of Biology (2019)

Ph.D., Purdue University, 2016

B.A., Transylvania University, 2009

Scogin, Dr. Stephen

Associate Professor of Biology and Education (2014)

Ph.D., Texas A&M Univ College Sta*, 2014

M.S., Stephen F Austin State Univ, 1995

B.S., Stephen F Austin State Univ, 1993

Stukey, Dr. Joseph

Assistant Professor of Biology Instruction (2000)

Ph.D., Rutgers Univ New Brunswick, 1990

B.A., Rutgers Univ New Brunswick, 1981

Welsch, Aaron

Visiting Assistant Professor of Neuroscience (2008)

B.S., Hope College,

Winnett-Murray, Dr. Kathy

Professor of Biology (1986)

Ph.D., University of Florida, 1986

M.S., Calif State Univ Northridge, 1979

B.S., University of Calif Irvine, 1976