

# Table of Contents

|   |    |
|---|----|
| LaGrange College.....                                       | 2  |
| Course Catalog - Biology.....                               | 2  |
| B.A. in Biology and M.A.T. - B.A. in Biology and M.A.T..... | 2  |
| B.A. in Biology - B.A. in Biology.....                      | 2  |
| Minor in Biology - Minor in Biology.....                    | 3  |
| B.S. in Biology - B.S. in Biology.....                      | 3  |
| BIOL 1101 - General Biology I.....                          | 4  |
| BIOL 1102 - General Biology II.....                         | 5  |
| BIOL 1102 L - General Biology II Laboratory.....            | 5  |
| BIOL 1107 - Principles of Biology I.....                    | 5  |
| BIOL 1107 L - Principles of Biology I Laboratory.....       | 6  |
| BIOL 1108 - Principles of Biology II.....                   | 6  |
| BIOL 1108L - Principles of Biology II Laboratory.....       | 7  |
| BIOL 2100 - Research Techniques.....                        | 7  |
| BIOL 2148 - Human Anatomy and Physiology I.....             | 8  |
| BIOL 2148L - Human Anatomy and Physiology I Lab.....        | 8  |
| BIOL 2149 - Human Anatomy and Physiology II.....            | 8  |
| BIOL 2149L - Human Anatomy and Physiology II Lab.....       | 8  |
| BIOL 2200 - Biological Research and Analysis.....           | 9  |
| BIOL 2270 - Sophomore Seminar.....                          | 9  |
| BIOL 2550 - Internship in Biology.....                      | 10 |
| BIOL 3320 - Medical Microbiology.....                       | 10 |
| BIOL 3321 - Microbiology.....                               | 10 |
| BIOL 3322 - Immunology.....                                 | 11 |
| BIOL 3334 - General Ecology.....                            | 11 |
| BIOL 3335 - General Zoology.....                            | 12 |
| BIOL 3336 - General Botany.....                             | 12 |
| BIOL 3340 - Conservation Biology.....                       | 13 |
| BIOL 3351 - Vertebrate Embryology.....                      | 13 |
| BIOL 3353 - Fundamentals of Evolutionary Theory.....        | 14 |
| BIOL 3360 - Histology.....                                  | 14 |
| BIOL 3370 - Toxicology.....                                 | 15 |
| BIOL 3372 - Molecular Biology.....                          | 15 |
| BIOL 3373 - Genetics.....                                   | 16 |
| BIOL 3374 - Cell Physiology.....                            | 17 |
| BIOL 3376 - Virology.....                                   | 17 |
| BIOL 3384 - Neurobiology.....                               | 18 |
| BIOL 4470 - Senior Seminar.....                             | 18 |
| BIOL 4491 - Directed Research.....                          | 19 |
| BIOL 4495 - Independent Study.....                          | 19 |
| BIOL 4550 - Internship.....                                 | 20 |

# LaGrange College

## Course Catalog - Biology

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### B.A. in Biology and M.A.T. - B.A. in Biology and M.A.T.

**Type:**Major

Biology majors interested in teaching are eligible to apply to the M.A.T. program for initial certification. Information can be found in the Graduate Bulletin for the M.A.T. program in the Education Department.

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### B.A. in Biology - B.A. in Biology

**Type:**Major

In addition to completing the general education curriculum requirements, students pursuing a major in Biology must complete program requirements. The program offers a **Bachelor of Arts in Biology** with the following criteria:

- Ethos Curriculum (including [BIOL 1107](#), [1107 L](#), [1108](#), and [1108 L](#); A C- or better is required in these courses to declare the biology major or minor and to enroll in upper level biology courses). These courses fulfill PG2, Laboratory Science and the Natural World, of the Ethos Curriculum.
- [CHEM 1101](#) and [1102](#) ([MATH 1101](#) is the prerequisite.)
- A total of two (2) MATH courses for Ethos curriculum; choose from **Ethos PG1** MATH [1101](#), MATH [1221](#), or MATH [2221](#) and choose from MATH [1114](#), MATH [1115](#), or MATH [1120](#) (**MATH 1114 preferred**) for the biology major requirements
- BIOL [2100](#), BIOL [2200](#), BIOL [2270](#) (sophomore year)
- Choice of one (1) cellular-level biology course ([BIOL 3321](#), [3322](#), [3360](#), [3370](#), [3372](#), [3373](#), [3374](#), [3376](#)); Minimum grade: C-
- Choice of one (1) organismal-level biology course ([BIOL 3334](#), [3335](#), [3336](#), [3340](#), [3351](#), [3353](#), [3384](#)); Minimum grade: C-
- Choose (3) additional upper level BIOL courses **with a lab**: BIOL [3321](#), [3334](#), [3335](#), [3336](#), [3351](#), [3360](#), [3370](#), [3372](#), [3374](#), [3376](#), [3384](#), [4491](#); Minimum grade: C-
- Choose (3) additional upper level courses **with or without a lab**: BIOL [3321](#), [3322](#), [3334](#), [3335](#), [3336](#), [3340](#), [3351](#), [3353](#), [3360](#), [3370](#), [3372](#), [3373](#), [3374](#), [3376](#), [3384](#), [4491](#), [CHEM 4421](#) **OR** [CHEM 4422](#) Minimum grade: C-
- [BIOL 4470](#)—Senior Seminar; Minimum grade: C-

This represents 43-48 semester hours of coursework in addition to the general education requirements.

See **Biology Policies** section on the main Biology page for other general information and policies for all biology degrees and minor.

## Recommended Progression

Students who are interested in the B.A. in Biology can review a four-year course plan.

[Starting in MATH 0100](#)

[Starting in MATH 1101](#)

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## Minor in Biology - Minor in Biology

**Type:**Minor

In addition to completing the general education curriculum requirements, students pursuing a minor in Biology must complete the following program requirements:

- Complete the Principles of Biology series ([BIOL 1107](#), [1107 L](#), [1108](#), and [1108 L](#)) **OR** the Anatomy and Physiology series ([BIOL 2148](#) and [2149](#)). A C- or better is required in these courses to declare the biology major or minor and to enroll in upper level biology courses. These courses fulfill PG2, Laboratory Science and the Natural World, of the Ethos Curriculum.
- Complete three (3) additional upper-level biology courses (If [BIOL 1107](#), [1107L](#), [1108](#), and [1108L](#) are used as the PG2 requirement in the Ethos Curriculum, either [BIOL 2148](#) or [2149](#) may satisfy one of the required courses in this section.) [BIOL 4470](#) and [BIOL 4496](#) do not satisfy this requirement.
- At least 2 of the 3 upper-level biology courses must have a lab.
- All courses must be completed with a C- or better.

This represents 11-12 semester hours of coursework in addition to the PG2 general education requirements in bullet point 1.

See **Biology Policies** section on the main Biology page for other general information and policies for all biology degrees and the minor.

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## B.S. in Biology - B.S. in Biology

**Type:**Major

In addition to completing the general education curriculum requirements, students pursuing a major in Biology must complete program requirements. The program offers a **Bachelor of Science in Biology** with the following criteria:

- Ethos Curriculum including [BIOL 1107](#), [1107 L](#), [1108](#), and [1108 L](#); A C- or better is required in these courses to declare the biology major or minor and to enroll in upper level biology courses. These courses fulfill PG2, Laboratory Science and the Natural World, of the Ethos Curriculum.
- [CHEM 1101](#) and [1102](#) ([MATH 1101](#) is prerequisite)
- A total of two (2) MATH courses for Ethos curriculum; choose from **Ethos PG1** MATH [1101](#), MATH [1221](#), or MATH [2221](#) (**minimum MATH 1221; pre-requisite**

for **PHYS 1101**) and choose from MATH [1114](#), MATH [1115](#), or MATH [1120](#) (**MATH 1114 preferred**) for the biology major requirements

- BIOL [2100](#), BIOL [2200](#), BIOL [2270](#) (sophomore year)
- Organic Chemistry I ([CHEM 3201](#)) and Organic Chemistry II ([CHEM 3202](#))
- Introductory Physics I ([PHYS 1101](#)) and Introductory Physics II ([PHYS 1102](#)) ([MATH 1221](#) is the prerequisite)
- Choice of one (1) cellular-level biology course ([BIOL 3321](#), [3322](#), [3360](#), [3370](#), [3372](#), [3373](#), [3374](#), [3376](#)); Minimum grade: C-
- Choice of one (1) organismal-level biology course ([BIOL 3334](#), [3335](#), [3336](#), [3340](#), [3351](#), [3353](#), [3384](#)); Minimum grade: C-
- Choose three (3) additional upper level BIOL courses **with a lab**: BIOL [3321](#), [3334](#), [3335](#), [3336](#), [3351](#), [3360](#), [3370](#), [3372](#), [3374](#), [3376](#), [3384](#), [4491](#); Minimum grade: C-
- Choose two (2) additional upper level courses **with or without a lab**: BIOL [3321](#), [3322](#), [3334](#), [3335](#), [3336](#), [3340](#), [3351](#), [3353](#), [3360](#), [3370](#), [3372](#), [3373](#), [3374](#), [3376](#), [3384](#), [4491](#), [CHEM 4421](#) **OR** [CHEM 4422](#) Minimum grade: C-
- [BIOL 4470](#)—Senior Seminar; Minimum grade: C-

This represents 56-60 semester hours of coursework in addition to the general education requirements.

See **Biology Policies** section on the main Biology page for other general information and policies for all biology degrees and minor.

### Recommended Progression

Students who are interested in the B.S. in Biology can review a four-year course plan.

[Starting in MATH 0100](#)

[Starting in MATH 1101](#)

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## BIOL 1101 - General Biology I

This is the beginning biology course for non-majors. General Biology deals with the phenomenon of life as is manifested in all types of living organisms. The origin of life, chemistry of life, cellular and tissue organization, metabolism, cell division, genetics, and gene action are among topics covered. This course fulfills 3 hours of the laboratory science portion of the Ethos (PG2) Curriculum requirements.

**Grade Basis:** AL

**Credit hours:** 3.0

**Lecture hours:** 3.0

**Restrictions:**

- Offered in Fall terms

## **BIOL 1102 - General Biology II**

This course is a continuation of General Biology I. General Biology deals with the phenomenon of life as is manifested in all types of living organisms. Evolution, diversity of life, ecology and the functioning of the organ systems are among topics covered. This course fulfills 3 hours of the laboratory science portion of the Ethos (PG2) Curriculum requirements.

**Grade Basis:** AL

**Credit hours:** 3.0

**Lecture hours:** 3.0

**Prerequisites:**

- [BIOL 1101](#) - General Biology I

**Restrictions:**

- Offered in Spring terms
  - Co-requisite: BIOL 1102 L
- 

## **BIOL 1102 L - General Biology II Laboratory**

This laboratory course is designed to complement and provide experiential learning for General Biology II. This course fulfills 1 hour of the laboratory science portion of the Ethos (PG2) general education requirements. This lab meets 1.5 hours per week.

**Grade Basis:** AL

**Credit hours:** 1.0

**Lab hours:** 2.0

**Prerequisites:**

- [BIOL 1101](#) - General Biology I

**Restrictions:**

- Corequisite: BIOL 1102
  - Offered in Spring terms
- 

## **BIOL 1107 - Principles of Biology I**

An introductory biology course for science majors that includes scientific method and its application, biological chemistry, cell structure and function, energy transfer, cell cycle, and mitosis. This course fulfills 3 hours of the laboratory science portion of the Ethos (PG2) Curriculum requirements.

**Grade Basis:** AL

**Credit hours:** 3.0

**Lecture hours:** 3.0

**Restrictions:**

- Must place in MATH 1101 or higher on math placement exam
  - Corequisite: BIOL 1107L
  - Offered in Fall terms
- 

## **BIOL 1107 L - Principles of Biology I Laboratory**

Laboratory experience for science majors to accompany topics from BIOL 1107. This course focuses on the scientific method, data acquisition, manipulation and analysis, and presentation of results. This course fulfills 1 hour of the laboratory science portion of the Ethos (PG2) Curriculum requirements. Lab meets 3 hours per week.

**Grade Basis:** AL

**Credit hours:** 1.0

**Lab hours:** 3.0

**Restrictions:**

- Must place in MATH 1101 or higher on math placement exam
  - Corequisite: BIOL 1107
  - Offered in Fall terms
- 

## **BIOL 1108 - Principles of Biology II**

A continuation of introductory biology for science majors. Topics include genetics and meiosis, evolution, biodiversity, physiology, and ecology. This course fulfills 3 hours of the laboratory science portion of the Ethos (PG2) Curriculum requirements.

**Grade Basis:** AL

**Credit hours:** 3.0

**Lecture hours:** 3.0

**Prerequisites:**

- [BIOL 1107](#) - Principles of Biology I
- [BIOL 1107 L](#) - Principles of Biology I Laboratory

**Restrictions:**

- Corequisite: BIOL 1108L
  - Offered in Spring terms
-

## **BIOL 1108L - Principles of Biology II Laboratory**

Laboratory experience for science majors to accompany topics from BIOL 1108. This course focuses on the scientific method, data acquisition, manipulation and analysis, and presentation of results. This course fulfills 1 hour of the laboratory science portion of the Ethos (PG2) Curriculum requirements.

**Grade Basis:** AL

**Credit hours:** 1.0

**Lab hours:** 3.0

**Prerequisites:**

- [BIOL 1107](#) - Principles of Biology I
- [BIOL 1107 L](#) - Principles of Biology I Laboratory

**Restrictions:**

- Corequisite: BIOL 1108
  - Offered in Spring terms
- 

## **BIOL 2100 - Research Techniques**

This sophomore-level course will introduce student to many common laboratory skills needed in the cellular/molecular and organismal biology fields. Topics covered will include various techniques, such as how to make basic laboratory solutions, DNA extraction and purification, serial dilutions, PCR, gel electrophoresis, DNA sequencing, as well as all calculations and methods used to interpret the output of these various techniques. Students will also learn how to properly keep a laboratory notebook and maintain their lab space and equipment.

**Grade Basis:** L

**Credit hours:** 3.0

**Lecture hours:** 3.0

**Prerequisites:**

- [BIOL 1107](#) - Principles of Biology I
- [BIOL 1107 L](#) - Principles of Biology I Laboratory
- [BIOL 1108](#) - Principles of Biology II
- [BIOL 1108L](#) - Principles of Biology II Laboratory

**Restrictions:**

- Offered every fall semester.
-

## **BIOL 2148 - Human Anatomy and Physiology I**

A study of the structure and function of the human body. Designed for pre-nursing majors. This course consists of 3 hours of lecture and 1.5 hours of lab per week. This course fulfills 4 credit hours of the laboratory science portion of the Ethos (PG2) Curriculum requirements.

**Grade Basis:** AL

**Credit hours:** 4.0

**Lecture hours:** 3.0

**Restrictions:**

- Offered in Fall terms
- 

## **BIOL 2148L - Human Anatomy and Physiology I Lab**

Lab for BIOL 2148 - Human Anatomy and Physiology I.

**Grade Basis:** L

**Lab hours:** 3.0

**Restrictions:**

- Offered in fall semesters.
- 

## **BIOL 2149 - Human Anatomy and Physiology II**

A continuation of Human Anatomy and Physiology I. This course consists of 3 hours of lecture and 1.5 hours of lab per week. This course fulfills 4 credit hours of the laboratory science portion of the Ethos (PG2) Curriculum requirements.

**Grade Basis:** AL

**Credit hours:** 4.0

**Lecture hours:** 3.0

**Prerequisites:**

- [BIOL 2148](#) - Human Anatomy and Physiology I

**Restrictions:**

- Offered in Spring terms
- 

## **BIOL 2149L - Human Anatomy and Physiology II Lab**

Lab for BIOL 2149 - Human Anatomy and Physiology II.

**Grade Basis:** L

**Lab hours:** 3.0

**Restrictions:**

- Offered in fall semesters.
- 

## **BIOL 2200 - Biological Research and Analysis**

This course will continue your exploration into how scientific research is conducted and will provide an introduction to study design, data analysis, and interpretation. We will discuss the process of developing a hypothesis and designing an experiment to refute or support (fail to disprove) this hypothesis. During the course of the semester, you will conduct an experiment, analyze data gathered, and develop an appropriate inference based on your results.

**Grade Basis:** L

**Credit hours:** 3.0

**Lecture hours:** 3.0

**Prerequisites:**

- [BIOL 1107](#) - Principles of Biology I
- [BIOL 1107 L](#) - Principles of Biology I Laboratory
- [BIOL 1108](#) - Principles of Biology II
- [BIOL 1108L](#) - Principles of Biology II Laboratory

**Restrictions:**

- Offered every spring
- 

## **BIOL 2270 - Sophomore Seminar**

This course, designed for sophomore Biology majors, will provide opportunities for students to explore career options and the requirements to enter a career field, to form a community with advanced Biology majors, and to learn about undergraduate research.

**Grade Basis:** L

**Credit hours:** 1.0

**Lecture hours:** 1.0

**Prerequisites:**

- [BIOL 1108](#) - Principles of Biology II
- [BIOL 1108L](#) - Principles of Biology II Laboratory

**Restrictions:**

- Offered every fall

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## **BIOL 2550 - Internship in Biology**

(1-6 Hours) An opportunity for students to gain added early applied experience and insight in approved off-campus settings. Internships consist of at least 40 working hours per credit hour in areas related to the discipline. Assignments may include selected readings, public presentation, and a final portfolio containing essays, weekly journal, and supporting material. Advisors, program coordinators, department chairs, and the internship coordinator (or designee) must approve the internship before a student begins their work. Internships will be taken as pass/no credit.

**Grade Basis:** P

**Credit hours:** 3.0

**Lecture hours:** 3.0

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## **BIOL 3320 - Medical Microbiology**

A study of human disease caused by pathogenic microbes and helminths. Designed for pre-health professions majors. Laboratory activities focus on bacteria as model organisms. This course consists of 3 hours of lecture and 1.5 hours of lab per week.

**Grade Basis:** AL

**Credit hours:** 4.0

**Lecture hours:** 3.0

**Prerequisites:**

- [BIOL 2148](#) - Human Anatomy and Physiology I
- [BIOL 2149](#) - Human Anatomy and Physiology II

**Restrictions:**

- Offered in Spring terms
- 

## **BIOL 3321 - Microbiology**

A study of the morphology, physiology, classification, ecology, and economics of microbial forms, especially bacteria and fungi. This course consists of 3 hours of lecture and 3 hours of lab per week.

**Grade Basis:** AL

**Credit hours:** 4.0

**Lecture hours:** 3.0

**Lab hours:** 3.0

**Prerequisites:**

- [BIOL 1107](#) - Principles of Biology I
- [BIOL 1107 L](#) - Principles of Biology I Laboratory

- [BIOL 1108](#) - Principles of Biology II
- [BIOL 1108L](#) - Principles of Biology II Laboratory

**Restrictions:**

- Offered on Demand
  - Minimum of C- in prerequisite courses is required to enroll in upper level biology courses (3000-4000)
- 

## **BIOL 3322 - Immunology**

A study of the fundamentals of immunology. Topics will include tissues and control of the immune system, including dynamics of B cell and T cell activation and function, inflammation and autoimmune disorders. Laboratory experiences include antigen-antibody interactions in gels, on membranes and in tissues, as well as complement-mediated cell lysis. This course consists of 3 hours of lecture per week.

**Grade Basis:** AL

**Credit hours:** 3.0

**Lecture hours:** 3.0

**Prerequisites:**

- [BIOL 1107](#) - Principles of Biology I
- [BIOL 1107 L](#) - Principles of Biology I Laboratory
- [BIOL 1108](#) - Principles of Biology II
- [BIOL 1108L](#) - Principles of Biology II Laboratory

**Restrictions:**

- Offered regularly.
  - Minimum of C- in prerequisite courses is required to enroll in upper level biology courses (3000-4000)
- 

## **BIOL 3334 - General Ecology**

An introduction to the basic principles and concepts of ecology with emphasis on environmental sampling, analysis and characterization. This course consists of 3 hours of lecture and 3 hours of lab per week.

**Grade Basis:** AL

**Credit hours:** 4.0

**Lecture hours:** 3.0

**Lab hours:** 3.0

**Prerequisites:**

- [BIOL 1107](#) - Principles of Biology I

- [BIOL 1107 L](#) - Principles of Biology I Laboratory
- [BIOL 1108](#) - Principles of Biology II
- [BIOL 1108L](#) - Principles of Biology II Laboratory

**Restrictions:**

- Offered regularly.
  - Minimum of C- in prerequisite courses is required to enroll in upper level biology courses (3000-4000)
- 

## **BIOL 3335 - General Zoology**

A phylogenetic approach to the Animal kingdom following cladistic principles. Emphasis will be placed upon representative animal groups and the position of Animalia within the domains of life. Studies of local faunae will be highlighted. This course consists of 3 hours of lecture and 3 hours of lab per week.

**Grade Basis:** AL

**Credit hours:** 4.0

**Lecture hours:** 3.0

**Lab hours:** 3.0

**Prerequisites:**

- [BIOL 1107](#) - Principles of Biology I
- [BIOL 1107 L](#) - Principles of Biology I Laboratory
- [BIOL 1108](#) - Principles of Biology II
- [BIOL 1108L](#) - Principles of Biology II Laboratory

**Restrictions:**

- Offered regularly.
  - Minimum of C- in prerequisite courses is required to enroll in upper level biology courses (3000-4000)
- 

## **BIOL 3336 - General Botany**

A phylogenetic and ecological survey of the kingdom Plantae. The focus will be on the general anatomy and physiology of plants as well as the natural history and ecology of plants. Lab work will be field based and strongly oriented toward the local flora. This course consists of 3 hours of lecture and 3 hours of lab per week.

**Grade Basis:** AL

**Credit hours:** 4.0

**Lecture hours:** 3.0

**Lab hours:** 3.0

**Prerequisites:**

- [BIOL 1107](#) - Principles of Biology I
- [BIOL 1107 L](#) - Principles of Biology I Laboratory
- [BIOL 1108](#) - Principles of Biology II
- [BIOL 1108L](#) - Principles of Biology II Laboratory

**Restrictions:**

- Offered regularly
  - Minimum of C- in prerequisite courses is required to enroll in upper level biology courses (3000-4000)
- 

## **BIOL 3340 - Conservation Biology**

An introduction to the principles and practices involved in the management of endangered species, communities and ecosystems. We will investigate how species natural history, ecology and population dynamics interact with human activities to impact the loss of species diversity. This course consists of 3 hours of lecture per week.

**Grade Basis:** AL

**Credit hours:** 3.0

**Lecture hours:** 3.0

**Prerequisites:**

- [BIOL 1108](#) - Principles of Biology II
- [BIOL 1108L](#) - Principles of Biology II Laboratory

**Restrictions:**

- Offered regularly
  - Minimum of C- in prerequisite courses is required to enroll in upper level biology courses (3000-4000)
- 

## **BIOL 3351 - Vertebrate Embryology**

A study of the embryological development of representative vertebrates, with laboratory emphasis upon the frog and chick. This course consists of 3 hours of lecture and 3 hours of lab per week.

**Grade Basis:** AL

**Credit hours:** 4.0

**Lecture hours:** 3.0

**Lab hours:** 3.0

**Prerequisites:**

- [BIOL 1107](#) - Principles of Biology I
- [BIOL 1107 L](#) - Principles of Biology I Laboratory

- [BIOL 1108](#) - Principles of Biology II
- [BIOL 1108L](#) - Principles of Biology II Laboratory

**Restrictions:**

- BIOL 2148 and 2149 may replace BIOL 1107/L and 1108/L as pre-requisite
  - Offered regularly.
  - Minimum of C- in prerequisite courses is required to enroll in upper level biology courses (3000-4000)
- 

## **BIOL 3353 - Fundamentals of Evolutionary Theory**

A balanced survey of the present-day concepts of evolution with emphasis on human evolution/paleoanthropology. This course consists of 3 hours of lecture per week.

**Grade Basis:** AL

**Credit hours:** 3.0

**Lecture hours:** 3.0

**Prerequisites:**

- [BIOL 1107](#) - Principles of Biology I
- [BIOL 1107 L](#) - Principles of Biology I Laboratory
- [BIOL 1108](#) - Principles of Biology II
- [BIOL 1108L](#) - Principles of Biology II Laboratory

**Restrictions:**

- BIOL 2148 and 2149 may replace BIOL 1107/L and 1108/L as pre-requisite
  - Offered regularly
  - Minimum of C- in prerequisite courses is required to enroll in upper level biology courses (3000-4000)
- 

## **BIOL 3360 - Histology**

A study of the microscopic features of mammalian cells, tissues, and organs. Lectures correlate cell structure with tissue function. Laboratory experiences include the microscopic identification of tissues and organs at the cellular level. This course consists of 3 hours of lecture and 3 hours of lab per week.

**Grade Basis:** AL

**Credit hours:** 4.0

**Lecture hours:** 3.0

**Lab hours:** 3.0

**Prerequisites:**

- [BIOL 1107](#) - Principles of Biology I

- [BIOL 1107 L](#) - Principles of Biology I Laboratory
- [BIOL 1108](#) - Principles of Biology II
- [BIOL 1108L](#) - Principles of Biology II Laboratory

**Restrictions:**

- BIOL 2148 and 2149 may replace BIOL 1107/L and 1108/L as pre-requisite
  - Offered regularly.
  - Minimum of C- in prerequisite courses is required to enroll in upper level biology courses (3000-4000)
- 

## **BIOL 3370 - Toxicology**

An introduction to the basic principles of toxicology. Topics include the cellular sites of action of toxicants, their physiological absorption, distribution and excretion and their effects on tissues and in an ecosystem. The lab applies these principles by students' implementation and analysis of data of an original research project. This course consists of 3 hours of lecture and 3 hours of lab per week.

**Grade Basis:** AL

**Credit hours:** 4.0

**Lecture hours:** 3.0

**Lab hours:** 3.0

**Prerequisites:**

- [BIOL 1107](#) - Principles of Biology I
- [BIOL 1107 L](#) - Principles of Biology I Laboratory
- [BIOL 1108](#) - Principles of Biology II
- [BIOL 1108L](#) - Principles of Biology II Laboratory

**Restrictions:**

- Offered regularly.
  - Minimum of C- in prerequisite courses is required to enroll in upper level biology courses (3000-4000)
- 

## **BIOL 3372 - Molecular Biology**

A molecular study of genes, their expression, the control of their expression, and the gene products that result. The lab uses molecular techniques to study questions involving genes and their gene products. This course consists of 3 hours of lecture and 3 hours of lab per week.

**Grade Basis:** AL

**Credit hours:** 4.0

**Lecture hours:** 3.0

**Lab hours:** 3.0

**Prerequisites:**

- [BIOL 1107](#) - Principles of Biology I
- [BIOL 1107 L](#) - Principles of Biology I Laboratory
- [BIOL 1108](#) - Principles of Biology II
- [BIOL 1108L](#) - Principles of Biology II Laboratory
- [CHEM 1101](#) - General Chemistry I

**Restrictions:**

- Offered regularly.
  - Current enrollment in (or completion of) CHEM 1102
  - Minimum of C- in prerequisite courses is required to enroll in upper level biology courses (3000-4000)
  - Recommended: successful completion of BIOL 3373 or other upper-level cellular/molecular BIOL course
- 

**BIOL 3373 - Genetics**

This course includes topics in both classical and molecular genetics. Topics of study may include but are not limited to Mendelian and non-Mendelian transmission of genes, sex-linked traits, chromosomal genetics and genomes, DNA structure, replication, mutation and repair, gene expression and its regulation, and other molecular genetics topics. The laboratory will evaluate wild-type and mutant model organisms using classical and/or molecular genetic approaches as well as pursue research questions in genetics using model organisms and other systems. This course consists of 3 hours of lecture per week.

**Grade Basis:** AL

**Credit hours:** 3.0

**Lecture hours:** 3.0

**Prerequisites:**

- [BIOL 1107](#) - Principles of Biology I
- [BIOL 1107 L](#) - Principles of Biology I Laboratory
- [BIOL 1108](#) - Principles of Biology II
- [BIOL 1108L](#) - Principles of Biology II Laboratory

**Restrictions:**

- Offered regularly.
  - Minimum of C- in prerequisite courses is required to enroll in upper level biology courses (3000-4000)
-

## **BIOL 3374 - Cell Physiology**

An advanced study of the structure and functions of the eukaryotic cell. Topics include the structure and function of macromolecules, the plasma membrane, intracellular trafficking and cell signaling. The lab uses techniques to microscopically identify organelles and cells, examine the role of enzymes and identify specific proteins involved in cell death. This course consists of 3 hours of lecture per week.

**Grade Basis:** AL

**Credit hours:** 3.0

**Lecture hours:** 3.0

**Prerequisites:**

- [BIOL 1107](#) - Principles of Biology I
- [BIOL 1107 L](#) - Principles of Biology I Laboratory
- [BIOL 1108](#) - Principles of Biology II
- [BIOL 1108L](#) - Principles of Biology II Laboratory

**Restrictions:**

- Offered regularly
  - Minimum of C- in prerequisite courses is required to enroll in upper level biology courses (3000-4000)
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## **BIOL 3376 - Virology**

This introduction to virology will focus on animal viruses that are important for basic science and human and animal diseases. The topics in this course may include viral taxonomy, structure, entry/exit, replication, quantitation, genetics, pathogenesis, and virus-host interaction. The laboratory will study model viral systems. This course consists of 3 hours of lecture and 3 hours of lab per week.

**Grade Basis:** AL

**Credit hours:** 4.0

**Lecture hours:** 3.0

**Lab hours:** 3.0

**Prerequisites:**

- [BIOL 1107](#) - Principles of Biology I
- [BIOL 1107 L](#) - Principles of Biology I Laboratory
- [BIOL 1108](#) - Principles of Biology II
- [BIOL 1108L](#) - Principles of Biology II Laboratory

**Restrictions:**

- Offered regularly.

- Minimum of C- in prerequisite courses is required to enroll in upper level biology courses (3000-4000)
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## **BIOL 3384 - Neurobiology**

An integrated study of the human nervous system correlating neuroanatomy and neurophysiology with fundamentals of clinical neurology. This course consists of 3 hours of lecture and 3 hours of lab per week.

**Grade Basis:** AL

**Credit hours:** 4.0

**Lecture hours:** 3.0

**Lab hours:** 3.0

**Prerequisites:**

- [BIOL 1107](#) - Principles of Biology I
- [BIOL 1107 L](#) - Principles of Biology I Laboratory
- [BIOL 1108](#) - Principles of Biology II
- [BIOL 1108L](#) - Principles of Biology II Laboratory

**Restrictions:**

- BIOL 2148 and 2149 may replace BIOL 1107/L and 1108/L as pre-requisite
  - Offered regularly.
  - Minimum of C- in prerequisite courses is required to enroll in upper level biology courses (3000-4000)
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## **BIOL 4470 - Senior Seminar**

Senior seminar is a thematic capstone course that is a broad, integrative experience in biology. The course promotes independent thinking, develops analytical skills, and provides practice in group discussion and in written and oral presentation. This course is required of all biology majors. Seniors enroll in BIOL 4470 in their last spring semester of enrollment.

**Grade Basis:** AL

**Credit hours:** 1.0

**Lecture hours:** 1.0

**Restrictions:**

- Prerequisite: Senior Standing, Biology Major
  - Offered in Spring terms
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## **BIOL 4491 - Directed Research**

Students will pair with a faculty mentor to carry out a research project in the faculty member's area of expertise. The faculty member will serve as mentor and expert guide for the student. This course will follow the graduate school model for research in the sciences (with faculty mentor in the role of principle investigator) and thus requires that the student demonstrate the ability to: 1. select and read relevant primary literature and explore and understand new content independently; 2. from that work, develop a research question and experimental design; 3. work safely and independently in the lab, and after appropriate training, carry out the project and conduct data analysis. The course is guided by common syllabus requirements (available upon request) that inform a project-specific work agreement between the faculty mentor and student for a mutually agreed upon lab or field research project. These common requirements include: Students will perform a literature review, develop a scientific question and experimental design and work with their mentor to refine them. Students will also work with the mentor to carry out the experiment, apply for undergraduate research funds, analyze data, and present the work as a talk, poster and/or a paper. Course may be repeated once for credit. Only 4 hours may be used to fulfill the biology major requirements. Course may be repeated once for credit. Only 4 hours may be used to fulfill the biology major requirements. Course may be repeated once for credit. Only 4 hours may be used to fulfill the biology major requirements. 3-4 credit hours; Pre-req: CHEM 1102, at least 2 BIOL 3XXX courses, and permission of faculty mentor, course instructor or program coordinator/assistant department chair. Student must have a minimum Science GPA (BIOL CHEM, PHYS courses) of 3.0.

**Grade Basis:** L

**Credit hours:** 3.0

**Lecture hours:** 3.0

**Prerequisites:**

- [CHEM 1102](#) - General Chemistry II

**Restrictions:**

- 3-4 credit hours
- Pre-requisite: In addition to CHEM 1102, student must successfully complete at least 2 BIOL 3XXX courses
- Offered on demand. Permission of faculty mentor, course instructor or program coordinator/assistant department chair
- Student must have a minimum Science GPA (BIOL CHEM, PHYS courses) of 3.0
- Course may be repeated once for credit. Only 4 hours may be used to fulfill the biology major requirements.

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## **BIOL 4495 - Independent Study**

Although not required as part of the biology major, this course provides an opportunity for students, on an individual basis, to pursue in-depth research of a particular biology

topic, question, or problem. Up to 4 hours of BIOL 4495 may be counted toward fulfillment of the major.

**Grade Basis:** AL

**Credit hours:** 4.0

**Lecture hours:** 4.0

**Restrictions:**

- Course Hours: (1-4)
  - Prerequisites: consent of the instructor, the department chair, and the Vice President for Academic Affairs (VPAA)
  - On demand
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## **BIOL 4550 - Internship**

An opportunity for students to gain added experience and insight in approved off-campus settings. The internship cannot be counted as one of the courses required for the major or minor in biology. Prerequisites: consent of the supervising instructor, department chair, and the Career Development Center

**Grade Basis:** AL

**Credit hours:** 3.0

**Lecture hours:** 3.0

**Restrictions:**

- Course Hours: (1-3)
  - On demand
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