

Learning Outcomes for the Biology Pre-Optometry Concentration

Lower Division Courses

Lower division elective learning outcomes

- Learn foundational core scientific concepts in biology, chemistry, and physics to become biologically literate. These core concepts are evolution, structure & function, information flow, exchange and storage, pathways and transformations of energy and matter, and systems (recommended by the American Association for the Advancement of Sciences).
- Learn mathematical concepts utilized in the biological sciences.
- Learn the process of science through problem solving and data interpretation. This involves the ability to develop and conduct experiments or test hypotheses, analyze and interpret data and use scientific judgment to draw conclusions.
- Develop communication skills.
- Understand the interdisciplinary nature of science.
- Understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts.
- Function effectively on teams to solve problems.

Required lower division courses for a Biology major (see Biology major checklist or UG Bulletin for courses)

Biology (20 hrs)

Chemistry (16 hrs)

Physics (8 hrs)

Mathematics (7 hrs)

Additional required lower division courses from the lower division core / general education requirements

2 semesters of English

Many schools require 2 semesters of a Social Science

PSYC 1300 General Psychology

Upper Division Courses

Upper division elective learning outcomes

- Learn foundational course content needed to apply to optometry school.
- Exposure to diverse coursework to broaden students' thought processes so they can approach and deal with different topics and problems.
- An ability to identify, formulate, and solve broadly defined technical or scientific problems by applying knowledge of mathematics and science to areas relevant to the discipline.
- Develop independent inquiry and problem-solving skills.
- Develop communication skills.
- Understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts.

Required upper division courses

Most upper division biology electives have Genetics (BIOL 2490) as a pre-requisite. If an additional pre-requisite course is needed it is indicated in parentheses along with the upper division core designation. These courses are required for entrance into many optometry programs throughout the United States. It is recommended that you confirm pre-requisite courses with the programs you plan to apply to as individual schools update their requirements yearly.



BIOL 3420 General Microbiology (for biology majors) or BIOL 2411 Microbiology for Human Affairs (non-majors course; does not count toward your major)
BIOL 3406 and 3407 Structure Function I and II are required for some programs (these are non-majors courses; does not count toward your major)
CHEM 4320 Biochemistry I (CHEM 3411)

Recommended upper division courses

Most upper division biology electives have Genetics (BIOL 2490) as a pre-requisite. Additional pre-requisite courses are indicated in parentheses along with the upper division core designation, if applicable. These courses are just suggestions, you can still select from **ALL** the upper division biology elective course offerings listed in the UG Bulletin. Courses in **BOLD** are highly suggested (but, not required). *It is important to have some diversity in the course offerings you select.*

____ BIOL 3310 Neuroethology: The Neural Basis of Natural Behaviors
____ **BIOL 4400 Histology (BIOL 3402)**
____ BIOL 4405 Developmental Biology (BIOL 3402)
____ BIOL 4425 Experimental Neurobiology (CHEM 1450/PHYS 1420)
____ BIOL 4360 Endocrinology (BIOL 3402)
____ **BIOL 4430 Comparative Vertebrate Anatomy**
____ **BIOL 4460 Animal Physiology (BIOL 3402)**
____ **BIOL 4400 Histology (BIOL 3402)**
____ BIOL 3410 Vertebrate Zoology
____ BIOL 4415 Evolution
____ **BIOL 3V45 Internship**

Recommended courses outside the Biology Major

These are areas/courses to consider when deciding on additional courses to take or if you desire to earn a minor

Courses in Ethics
Medical Terminology
Business courses
Psychology courses that relate to vision perception
Courses in Critical Thinking

Non-academic Competencies

- Compassion & empathy
- Time management
- Responsibility
- Curiosity
- Socio, economic, and cultural competence
- Humility
- Respect differences
- Integrity
- Professionalism
- Hard worker



Some of these trait competencies are folded into biology courses. However, you will need to find opportunities to discover (and develop) how these traits incorporate you as a unique individual. Courses in other disciplines, such as psychology, communications, sociology, and a foreign language or cultural studies may be helpful.

Shadowing Requirement

All optometry schools also require shadowing experience. Each school has different priorities, some have a specific number of hours, some have a specific number of experiences. In general, shadow at least 3 doctors, that you are not related to, from different practices for a minimum of 15 hrs. Shadow one of those doctors more extensively. Contact each program you plan to apply to for detailed information.