



Learning Outcomes for the Biology Pre-med 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 (see Biology major checklist or UG Bulletin for courses)

Biology (20 hrs)

Chemistry (16 hrs)

Physics (8 hrs)

Mathematics (7 hrs)

Upper Division Courses

Upper division elective learning outcomes

- Learn foundational course content needed to apply to allopathic and osteopathic medical 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.

Recommended upper division courses

All upper division biology electives have Genetics (BIOL 2490) as a pre-requisite. The pre-requisite course is 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) by the UCA Pre-Med Advisory Committee. *It is important to have some diversity in the course offerings you select.*

_____ BIOL 3310 Neuroethology: The Neural Basis of Natural Behaviors

_____ **BIOL 3420 General Microbiology**

_____ BIOL 4320 Neurodevelopment and Pathology

_____ **BIOL 4340 Immunology (BIOL 3402)**

_____ BIOL 4405 Developmental Biology (BIOL 3402)



- _____ BIOL 4414 Molecular Mechanisms of Aging (BIOL 3402) [UD UCA Core: Z]
- _____ **BIOL 4421 Pathogenic Microbiology (BIOL 3402) [UD UCA Core: Z]**
- _____ BIOL 4425 Experimental Neurobiology (CHEM 1450/PHYS 1420) [UD Core: Z]
- _____ BIOL 4475 Advanced Cell Biology (BIOL 3402) [UD UCA Core: Z]
- _____ **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 4404 Plant Taxonomy
- _____ BIOL 4406 Mammalogy (BIOL 3402, recommended BIOL 3410 or 4415)
- _____ BIOL 4418 Biology of the Reptilia (BIOL 3403)
- _____ BIOL 4461 Parasitology
- _____ BIOL 4415 Evolution
- _____ BIOL 4435 Animal Behavior (CHEM 1451, MATH 2311) [UD UCA Core: Z]
- _____ **CHEM 4320/4121 Biochemistry I & Lab (CHEM 3411)**
- _____ BIOL 4445 Biometry (MATH 2311)
- _____ BIOL 3V50/4V55 Independent Study
- _____ BIOL 3V45 Internship
- _____ BIOL 4V85 Undergraduate Research [UD UCA Core: Z]
- _____ BIOL 4V90 Special Topics in Biology: TBD

Non-academic Competencies

The following traits are desired of allopathic and osteopathic medical school applicants. A detailed list can be found at <https://students-residents.aamc.org/applying-medical-school/article/core-competencies/>.

- Altruism
- Compassion & empathy
- Responsibility
- Excellence
- Socio, economic, and cultural competence
- Humility
- Respect differences
- Integrity

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 Spanish may be helpful.