

University of Indianapolis - Shaheen College of Arts & Sciences

2025-2026 Curriculum Guide for Biology Majors (BIOL)

Bachelor of Arts or Science

Biology Core Courses (these must be completed for all concentration areas):

Freshman Year - Semester I

- **BIOL 159** Introduction to Ecology and Evolution (4)
- **CHEM 150** General Chemistry I (3) and **CHEM 151** General Chemistry Lab I (1)

Freshman Year - Semester II

- **BIOL 165** Introduction to Cell Biology (4)
- **CHEM 160** General Chemistry II (3) and **CHEM 161** General Chemistry Lab II (1)

Sophomore Year

- **BIOL 225** Introduction to Genetics (4)
- **BIOL 290** Biology Seminar (1)
- **MATH ELEC** MATH 180 or greater (MATH 190 *recommended*) (4)
- **MATH ELEC** (MATH 191, 220, or 245 *recommended*) (4)

Junior and Senior Years

- **PHYS 150** General Physics I (4) or **PHYS 153** General Physics I, Calculus Based (4)
- **PHYS 160** General Physics II (4) or **PHYS 163** General Physics II, Calculus Based (4)
- **BIOL 495** Capstone: Integrative Biology (3) **or**
- **BIOL 496** Capstone: Research Experience (1) **and**
- **BIOL 490** Independent Research Project (2 hours minimum)

Other courses required in addition to the Biology Core:

You must choose a concentration from the following seven (7) choices:

General Biology

Ideal for jobs such as lab analyst, PT/OT, state health department, hospital administration.

Take TWO (2) of these courses:

- **BIOL 260** Biodiversity (4)
- **BIOL 265** Ecology (4)
- **BIOL 280** Evolutionary Biology (4)

Take:

- **CHEM 250** Organic Chemistry I (3) and **CHEM 251** Organic Chemistry I Lab (2)
- **NAT SCI ELEC** **CHEM 210** or greater, **ESCI**, **PHYS**, **SCI**, or **ANTH** course (min 3 hours)

(A) Organismal Core Area (select 3 hours minimum, BIOL 260, 265, or 280 can only be counted if 2 of these have already been taken):

- **BIOL 210** Human Biological Variation (3)
- **BIOL 326** Animal Development (4)
- **BIOL 240** Vertebrate Anatomy (4)
- **BIOL 245** Ornithology (4)
- **BIOL 250** Conservation Biology (3)
- **BIOL 260** Biodiversity (4)
- **BIOL 265** Ecology (4)

- **BIOL 377** Entomology (4)
- **BIOL 280** Evolutionary Biology (4)
- **BIOL 305** Human Functional Anatomy (4)
- **BIOL 345** Human Evolution (3)
- **BIOL 350** Plant Biology (4)
- **BIOL 425** Dental Science (3)
- **BIOL 450** Human Osteology (3)
- Approved course at 210-level or above (1-4)

(B) Cell/Molecular Core Area (select 6 hours minimum):

- **BIOL 220** General Microbiology (4)
- **BIOL 326** Animal Development (4)
- **BIOL 266** Applied Bio Instrumentation (2)
- **BIOL 310** Vertebrate Histology (4)
- **BIOL 320** Biochemistry (3)
- **BIOL 325** Advanced Genetics (4)
- **BIOL 330** Biomedical Physiology (4)
- **BIOL 331** Animal Physiology (4)
- **BIOL 335** Cell Biology (4)
- **BIOL 355** Biochemistry Lab (1)
- **BIOL 370** Immunology (3)
- **BIOL 390** Molecular Biology (4)
- **BIOL 395** Biochemistry II (3)
- **BIOL 435** Forensic and Historic DNA Analysis (3)
- **BIOL 440** Cancer Biology (3)
- **BIOL 441** Cancer Biology Lab (2)
- Approved course at 210-level or above (1-4)

NOTES:

- Minimum grade of C (2.0 on a 4.0 scale) required for courses applying to the Biology major and as a prerequisite for any higher level biology course.
- The biology capstone requirement may be fulfilled by taking:
 - **BIOL 495 OR**
 - **BIOL 490/HONS 490: Independent Research and BIOL 496 OR**
 - another approved research course
- No more than 6 credit hours of BIOL 490 may count toward the major.
- No single course can count for both (A) Organismal Core Area and (B) Cell/Molecular Core Area
- The Biology major requires a minimum of 65 hrs. The above courses allow the student to have a major in Biology.

Organismal Biology Concentration [BIOB]

Ideal for jobs such as zoological scientist, animal behaviorist, wildlife scientist, and park ranger

Take the following courses:

- **BIOL 260** Biodiversity (4)
- **BIOL 265** Ecology (4)
- **BIOL 280** Evolutionary Biology (4)
- **NAT SCI ELEC** Take TWO (2) of CHEM 210 or greater, ESCI, PHYS, SCI, or ANTH courses (*min 7 hours*)

(A) Organismal Core Area (select 10 hours minimum):

- **BIOL 326** Animal Development (4)
- **BIOL 240** Vertebrate Anatomy (4)
- **BIOL 245** Ornithology (4)

- **BIOL 250** Conservation Biology (3)
- **BIOL 377** Entomology (4)
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- **BIOL 331** Animal Physiology (4)
- **BIOL 350** Plant Biology (4)

(B) Cell/Molecular Core Area (select 4 hours minimum):

- **BIOL 220** General Microbiology (4)
- **BIOL 326** Animal Development (4)
- **BIOL 266** Applied Bio Instrumentation (2)
- **BIOL 310** Vertebrate Histology (4)
- **BIOL 325** Advanced Genetics (4)
- **BIOL 335** Cell Biology (4)
- **BIOL 370** Immunology (3)
- **BIOL 390** Molecular Biology (4)
- **BIOL 435** Forensic and Historic DNA Analysis (3)
- **BIOL 440** Cancer Biology (3)
- **BIOL 441** Cancer Biology Lab (2)

NOTES:

- Completion of the Biology Major (Organismal Biology Concentration) requires a minimum of 73 hours.
- No single course can count for both (A) Organismal Core Area and (B) Cell/Molecular Core Area

Cell and Molecular Biology Concentration [CMB]

Ideal for jobs such as cell culture tech., microbiologist, clinical lab scientist, and OSHA specialist

Take the following courses:

- **BIOL 280** Evolutionary Biology (4)
- **BIOL 335** Cell Biology (4)
- **BIOL 390** Molecular Biology (4)
- **CHEM 250** Organic Chemistry I (3) and **CHEM 251** Organic Chemistry I Lab (2)
- **CHEM 260** Organic Chemistry II (3) and **CHEM 261** Organic Chemistry I Lab (2)
- **CHEM ELEC** Take **one** course that is CHEM 210 or greater (minimum 3 hours) (*recommended: CHEM 320: Biochemistry*)

(A) Cell/Molecular Core Area (select 8 hours minimum):

- **BIOL 220** General Microbiology (4)
- **BIOL 326** Animal Development (4)
- **BIOL 325** Advanced Genetics (4)
- **BIOL 330** Biomedical Physiology (4)
- **BIOL 370** Immunology (3)
- **BIOL 440** Cancer Biology (3)
- **BIOL 441** Cancer Biology Lab (2)

NOTES:

- Completion of the Biology Major (Cell and Molecular Biology Concentration) requires a minimum of 73 hours.
- The above courses allow the student to earn a Bachelor of Science in Biology. This concentration can be used to build a second major in Chemistry with limited additional work. Consult the curriculum guide for Chemistry majors for details.

Roche Concentration [ROCH]

Ideal for jobs such as laboratory technician, R&D scientist, instrument specialist, and biotech assistant.

Take the following courses:

- **BIOL 220** General Microbiology (4) *Recommended sophomore year*
- **BIOL 266** Applied Bio Instrumentation (2) **OR**
- **CHEM 400** Advanced Laboratory Techniques (4)
- **CHEM 250** Organic Chemistry I (3) and **CHEM 251** Organic Chemistry I Lab (2)
- **CHEM 310** Analytical Chemistry (5)
- **PHYS 230** Laboratory Instrumentation I (3)

(A) Roche Core Area (select 14 hours minimum):

- **BIOL 310** Vertebrate Histology (4)
- **BIOL 330** Biomedical Physiology (4) **OR**
- **BIOL 331** Animal Physiology (4)
- **BIOL 335** Cell Biology (4)
- **BIOL 370** Immunology (3)
- **BIOL 390** Molecular Biology (4)

NOTES:

- Completion of the Biology Major (Roche Concentration) requires a minimum of 73 hours.
- Students may not take both BIOL 330 and 331 to count toward the Roche Core Area minimum hours.

Pre-Dental Concentration [DENT]

Ideal for dental school preparation.

Take the following course:

- **BIOL 220** General Microbiology (4) *Recommended sophomore year*

Take TWO (2) of the following courses:

- **BIOL 260** Biodiversity (4)
- **BIOL 265** Ecology (4)
- **BIOL 280** Evolutionary Biology (4)

Take the following courses:

- **CHEM 250** Organic Chemistry I (3) and **CHEM 251** Organic Chemistry I Lab (2)
- **CHEM 260** Organic Chemistry II (3) and **CHEM 261** Organic Chemistry I Lab (2)
- **CHEM 320** Biochemistry (3)

Pre-Dental Core Area (select 9 hours minimum):

- **ANTH 425** Dental Science (3)
- **BIOL 210** Human Biological Variation (3)
- **BIOL 305** Human Functional Anatomy (4)
- **BIOL 310** Vertebrate Histology (4)
- **BIOL 325** Advanced Genetics (4)
- **BIOL 330** Biomedical Physiology (4) **OR**
- **BIOL 331** Animal Physiology (4)
- **BIOL 335** Cell Biology (4)
- **BIOL 370** Immunology (3)
- **BIOL 395** Biochemistry II (3)

NOTES:

- Completion of the Biology Major (Pre-Dental Concentration) requires a minimum of 74 hours.
- Students may not take both BIOL 330 and 331 to count toward the Pre-Dental Core Area minimum hours.

Pre-Medical Concentration [MED]*Ideal for medical school preparation.***Take the following courses:**

- **BIOL ELEC** Take ONE (1) course in BIOL 210 or greater excluding BIOL 225 (minimum 3 hours)
- **PSY ELEC** Take ONE (1) course in PSY 210 or greater (minimum 3 hours) *Recommended: PSY 230:*
Brain & Behavior

Take TWO (2) of the following courses:

- **BIOL 260** Biodiversity (4)
- **BIOL 265** Ecology (4)
- **BIOL 280** Evolutionary Biology (4)

Take the following courses:

- **CHEM 250** Organic Chemistry I (3) and **CHEM 251** Organic Chemistry I Lab (2)
- **CHEM 260** Organic Chemistry II (3) and **CHEM 261** Organic Chemistry I Lab (2)
- **CHEM 320** Biochemistry (3)

Pre-Medical Core Area (select 6 hours minimum):

- **BIOL 210** Human Biological Variation (3)
- **BIOL 220** General Microbiology (4)
- **BIOL 305** Human Functional Anatomy (4)
- **BIOL 310** Vertebrate Histology (4)
- **BIOL 325** Advanced Genetics (4)
- **BIOL 330** Biomedical Physiology (4) **OR**
- **BIOL 331** Animal Physiology (4)
- **BIOL 335** Cell Biology (4)
- **BIOL 370** Immunology (3)
- **BIOL 395** Biochemistry II (3)

NOTES:

- Completion of the Biology Major (Pre-Medical Concentration) requires a minimum of 73 hours.
- Students may not take both BIOL 330 and 331 to count toward the Pre-Medical Core Area minimum hours.

Pre-Veterinary Concentration [VET]*Ideal for medical school preparation.***Take TWO (2) of the following courses:**

- **BIOL 260** Biodiversity (4)
- **BIOL 265** Ecology (4)
- **BIOL 280** Evolutionary Biology (4)

Take the following courses:

- **BIOL ELEC** Take ONE (1) course in BIOL 210 or greater excluding BIOL 225 (minimum 3 hours)
- **CHEM ELEC** Take ONE (1) course in CHEM 210 or greater (minimum 3 hours)
- **CHEM 250** Organic Chemistry I (3) and **CHEM 251** Organic Chemistry I Lab (2)
- **CHEM 260** Organic Chemistry II (3) and **CHEM 261** Organic Chemistry I Lab (2)
- **PSY ELEC** Take ONE (1) course in PSY 210 or greater (minimum 3 hours) *Recommended: PSY 230:*
Brain & Behavior

Pre-Veterinary Core Area (select 6 hours minimum):

- **BIOL 210** Human Biological Variation (3)
- **BIOL 220** General Microbiology (4)
- **BIOL 240** Comparative Vertebrate Anatomy (4)
- **BIOL 310** Vertebrate Histology (4)
- **BIOL 325** Advanced Genetics (4)
- **BIOL 330** Biomedical Physiology (4) **OR**

- **BIOL 331** Animal Physiology (recommended) (4)
- **BIOL 335** Cell Biology (4)
- **BIOL 370** Immunology (3)

NOTES:

- Completion of the Biology Major (Pre-Veterinary Concentration) requires a minimum of 73 hours.
 - Students may not take both BIOL 330 and 331 to count toward the Pre-Medical Core Area minimum hours.
 - Many veterinary professional programs require an animal nutrition course, a course not yet offered at UIndy. Be sure to check the requirements of your preferred veterinary program prior to selecting courses.
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ADDITIONAL NOTES:

- The Bachelor's Degree requires a minimum of 120 hrs. See the General Education Core Guide for additional requirements.
- Many biology elective courses are offered every other year.
- **Early admission to professional programs:** Biology majors planning to apply to a professional program (e.g., medical, dental, optometry, veterinary, physical therapy, or occupational therapy) may be eligible for admission to such a program after their junior year if (1) all general education core requirements are met, and (2) a minimum of 90 undergraduate semester hours are completed, and (3) all major courses except the chemistry elective and 5 hours of biology electives have been satisfied.
- A student may complete more than one major as long as each major has at least 24 discrete hours. Please see the Academic Catalog for additional details.
- Below are recommended electives for pre-professional program students:
 - **Pre-Physical Therapy/Pre-Occupational Therapy**
 - **BIOL 305** Human Functional Anatomy (4) **OR**
 - **BIOL 240** Vertebrate Anatomy (4)
 - **BIOL 330** Biomedical Physiology (4)

REMEMBER: If you have any questions about the Biology Major and its requirements contact the Department Chair, Dr. Sandra Davis (317-788-2400) or the academic advisor for the Biology department.