Biological Sciences (BSC)

210 Julian Hall, (309) 438-3669
BIO.IllinoisState.edu
Chairperson: Rachel Bowden

Programs Offered
M.S. in Biological Sciences with sequences in: Behavior, Ecology, Evolution, and Systematics; Bioenergy Sciences; Biomathematics; Biotechnology; Conservation Biology; Neuroscience and Physiology; and a Ph.D. degree in Biological Sciences with sequences in: Behavior, Ecology, Evolution, and Systematics; Molecular and Cellular Biology; and Neurosciences.

Master’s in Biological Sciences Program requirements
All master’s degree students are required to complete a research thesis and at least 30 semester hours, which must include at least 2 semester hours of BSC 420 Seminar. The School will determine additional coursework specific to each individual’s plan of study. All master’s degree programs require a minimum of 50 percent of the non-thesis credit hours applied to the degree to be 400-level courses or above.

Behavior, Ecology, Evolution, and Systematics (BEES) Sequence:
Students may elect to pursue a sequence in Behavior, Ecology, Evolution, and Systematics, a course of study that provides students with a strong conceptual background in whole-organism biology. The sequence is designed to enhance students’ understanding of the underlying concepts that unite research in the areas of behavior, ecology, evolution, and systematics while providing the opportunity for training in specific taxa and in subjects ranging from molecular and cellular biology to neurobiology, physiology, and advanced research techniques. This 30-hour sequence requires:
- 2 hours of BSC 420
- 4 hours of thesis (BSC 499)
- 7 hours of sequence core courses: BSC 420A27, 470, and 490
- 9-12 hours: chosen from BSC 325, 330, 335/336, 375/376, 404, 405, 406, 486, 488
- 5-8 hours of elective courses are selected through consultation among the major professor, the student’s committee, and the student

Bioenergy Sciences Sequence:
This course of study provides students with a strong conceptual background in biological and environmental aspects of using and engineering plants and microbes for the production of bio-based fuels. Students successfully completing this sequence should be competitive for admission into Ph.D. programs and/or for acquiring bioenergy-related jobs in industry, non-profits, government agencies, or academia. Students can choose between a biotechnology-based track and an ecology/conservation biology-based track. This 30-hour sequence requires:

For the Biotechnology-based track:
- 20 hours: BSC 353, 354, 365, 415, 419, 420A38, 420Axx (student’s choice), 450A45
- 4 hours of thesis (BSC 499)
- 6 hours of electives

For the Ecology/Conservation Biology-based track:
- 19 hours: BSC 365, 404 or 405, 406, 420A27, 420A38, 470, 490
- 4 hours of thesis (BSC 499)
- 7 hours of electives

Biomathematics Sequence:
This cross-disciplinary sequence provides students with a unique and strong cross-disciplinary training in biology and mathematics. The sequence is designed first to give students a solid foundation in mathematics (core courses), then training in one of two biological areas that use specific types of mathematical applications to address biological questions (emphases). Before entering the sequence, students should have two semesters of calculus and one semester of linear algebra.
This 32-hour sequence requires:
- 2 hours of BSC 420 A36
- 4 hours of thesis BSC 499
- 14 hours of sequence core courses: MAT 340, 350, 351, and 442
Transfer credit can be offered for the core math classes provided that students take at least two courses from the Mathematics Department while at Illinois State University.
- 12 hours of electives from two areas of emphasis. A minimum of 12 non-thesis hours must be from the School of Biological Sciences. A minimum of 14 hours (not including 499) outside of the core courses and BSC 420A36 must be at the 400 level.
- Biological Statistics and Modeling area of emphasis: with a choice of courses from BSC 343, 404, 405, 406, 450A37, 450A51, 470, 486, MAT 353, 356, 362, 378, 450, 453, 455, 456, 458
- Computation and Bioinformatics area of emphasis: with a choice of courses from BSC 350, 353, 355, 415, 419, 450A53, 470; MAT 356, 361, 363, 461

**Biotechnology Sequence:**
This sequence provides training in Biotechnology, a discipline linking biochemistry, molecular biology, genomics, bioinformatics, cell biology, genetics, and their biomedical and agricultural applications. It is designed to enhance students’ competency in fundamental principles, strategies, and techniques applied widely across biotechnology and medical research. This 30-hour sequence requires:

- 2 hours of BSC 420
- 4 hours of thesis BSC 499
- 15 hours of sequence core courses: BSC 353, 354, 415, 419 and 450A45
- 9 hours of electives, to include at least one course in the area of genomics or bioinformatics (BSC 355, 370A03, 450A53, or advisor-approved topics course in that area).

**Conservation Biology Sequence:**
This sequence is a discipline linking ecology, genetics, evolution, and systematics to applied problems in biodiversity preservation and ecosystem function and maintenance. This 30-hour degree requirements include:

- 8 hours of sequence core courses (BSC 406, 420A29, 490/420A27)
- 4 hours of thesis BSC 499
- 1 hour of another BSC 420

**Neuroscience and Physiology Sequence:**
This sequence provides students with a strong conceptual background in these two fields of biological sciences and is designed to enhance students' understanding of the canonical concepts that underlie neuroscience and physiology, including biostatistics, while providing the opportunity for training in related fields such as cell and molecular biology, chemistry, behavior and psychology. This 30-hour sequence requires:

- 2 hours of BSC 420
- 4-6 hours of thesis BSC 499
- 10 hours of sequence core courses (BSC 430, 435, 490, and 420A27)
- 14 hours of sequence elective courses chosen from BSC 411, 415, 418, 419, 425, 450A37, 450A40, 450A47, 450A49, 450A50, 450A51, 450A52, 486, 470 and 472. To complete these 14 hours of sequence elective courses, no more than two of the following may also be taken: BSC 301, 325, 327, 345, 346, 353, 354, 355, 367, and 396; CHE 442, 444, and 464; PSY 418, 421, and 468.

- Additional elective courses are selected through consultation among the major professor, the student’s committee, and the student. For further information, see the Department’s website at BIO.IllinoisState.edu.

**Ph.D. in Biological Sciences Program Requirements**
Doctoral students may design an individual plan of study in consultation with advisors, or they may elect to pursue a sequence within the Ph.D. program in (1) Behavior, Ecology, Evolution, and Systematics (BEES), (2) Molecular and Cellular Biology, or (3) Neuroscience and Physiology, each of which includes specific requirements (see below).

Degree requirements include:

- 4 hours BSC 420
- Most Ph.D. students take 30-40 semester hours of coursework
- Take and pass the Ph.D. qualifying exam
- 15+ hours: BSC 599
- A sequence (requirements follow) or an individual plan of study
- Other university requirements for Ph.D. degrees are listed elsewhere in this catalog.

**Behavior, Ecology, Evolution, and Systematics (BEES) Sequence:**
The sequence is designed to enhance students' understanding of the underlying concepts that unite research in the areas of behavior, ecology, evolution, and systematics while providing the opportunity for training in specific taxa and in subjects ranging from molecular and cellular biology to neurobiology, physiology, and advanced research techniques. Degree requirements include:

- 7 hours of sequence core courses (BSC 420A27, 470, and 490) and 3 additional sequence courses (9-12 hours) chosen from BSC 325, 330, 335/336, 375/376, 404, 405, 406, 486, 488
- Elective courses (unspecified hours) are selected through consultation among the major professor, the student’s committee, and the student.
Molecular and Cellular Biology Sequence:
The sequence is designed to enhance the student's competency in molecular and cellular biology principles, techniques, and their application for becoming leaders in solving tomorrow's problems in molecular cell biology. Degree requirements include
- 8 hours of core courses (BSC 415, 419, 420A37)
- at least three graduate elective courses (9-12 hours). Elective courses will be selected from the area of the student's specialization and will be decided by the student in consultation with his/her advisor and/or student dissertation committee. Elective courses may be selected from among, but not limited to, the following representative courses: BSC 325, 329, 330, 343, 345, 350, 353, 354, 355, 361, 367, 411, 418, CHE 342, 343, 344, 440, 442, 444

Neuroscience and Physiology Sequence:
The sequence is designed to enhance students' understanding of the canonical concepts that underlie neuroscience and physiology, including biostatistics, while providing the opportunity for training in related fields such as cell and molecular biology, chemistry, behavior and psychology. Degree requirements include:
- 10 hours of sequence core courses (BSC 430, 435, 490, and 420A27)
- 12 hours of sequence elective courses chosen from BSC 411, 415, 418, 419, 425, 450A37, 450A40, 450A47, 486, and 470. To complete these 12 hours of sequence elective courses, no more than two of the following may also be taken: BSC 301, 325, 327, 345, 346, 353, 354, 355, 367, and 396; CHE 442, 444, and 464; PSY 418, 421, and 468
- Additional elective courses are selected through consultation among the major professor, the student's committee, and the student. For further information, see the Department's website at BIO.IllinoisState.edu

Biology Geographic Information Systems (GIS) Graduate Certificate
Graduate students in the School of Biological Sciences may elect to pursue a Biology Geographic Information Systems (GIS) Graduate Certificate. To earn the certificate, students must take GEO 303, 304, and 305.

Biological Sciences Courses:
coursefinder.illinoisstate.edu/directory/bsc/
All Courses:
coursefinder.illinoisstate.edu/directory/