UNIVERSITY OF MINNESOTA
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Twin Cities Campus

Biology B.S.

College of Biological Sciences - Adm

College of Biological Sciences

- Program Type: Baccalaureate
- Requirements for this program are current for Spring 2018
- Required credits to graduate with this degree: 120
- Required credits within the major: 69 to 78
- Degree: Bachelor of Science

Students majoring in biology gain a broad understanding of the fundamental nature and characteristics of living things and the ways in which they interact. Their studies cover the full range of life sciences, from cancer genes to acid rain, and from lichens to marine mammals.

The biology BS program prepares students for study in a broad spectrum of biological sciences, professional training programs in the health sciences, careers in teaching, and entry-level scientist positions in industry, government agencies, and universities.

Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

Admission Requirements

Freshmen students are usually admitted to pre-major status before admission to this major

A GPA above 2.0 is preferred for the following:

- 2.50 transferring from another University of Minnesota college
- 2.50 transferring from outside the University

Students completing another major in the College of Biological Sciences are not eligible for the BS in biology. In addition, students completing a degree in biology are not eligible for the following CBS minors, due to overlap: biochemistry, microbiology, plant biology, and behavioral biology.

For information about University of Minnesota admission requirements, visit the Office of Admissions website.

General Requirements

All students are required to complete general University and college requirements including writing and liberal education courses. For more information about University-wide requirements, see the liberal education requirements.Required courses for the major or minor in which a student receives a D grade (with or without plus or minus) do not count toward the major or minor (including transfer courses).

Program Requirements

Foundational Courses

Nature of Life/Nature of Science and Research

BIOL 1805 - Nature of Life: Introducing New Students to the Biological Sciences (0.5 cr)
BIOL 1806 - Nature of Life, Part Two (0.5 cr)
BIOL 2905 - Nature of Life, Part III (0.5 cr)
BIOL 2906 - Nature of Life, Part IV (0.5 cr)
or This track (BIOL 3001) is for transfer students only.
BIOL 3001 - Nature of Science and Research (1.0 cr)

Foundations of Biology

BIOL 1951 - Foundations of Biology Lecture I for Biological Sciences Majors [BIOL] (4.0 cr)
BIOL 1961 - Foundations of Biology Lab I for Biological Sciences Majors [BIOL] (2.0 cr)
or BIOL 1951H - Foundations of Biology Lecture I for Biological Sciences Majors [BIOL] (4.0 cr)
BIOL 1961H *{Inactive}*[BIOL] (2.0 cr)
BIOL 2003 - Foundations of Biology for Biological Sciences Majors, Part II (3.0 cr)
BIOL 3004 - Foundations of Biology for Biological Sciences Majors, Part II Laboratory (3.0 cr)
or BIOL 2003H - Foundations of Biology for Biological Sciences Majors, Part II (3.0 cr)
BIOL 3004H *{Inactive}*(3.0 cr)

Quantitative Requirements

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MATH 1241 - Calculus and Dynamical Systems in Biology [MATH] (4.0 cr)
or MATH 1271 - Calculus I [MATH] (4.0 cr)
or MATH 1571H - Honors Calculus I [MATH] (4.0 cr)
Take 1 or more course(s) from the following:
- CSCI 1133 - Introduction to Computing and Programming Concepts (4.0 cr)
- CSCI 1133H - Honors Introduction to Computing and Programming Concepts (4.0 cr)
- CSCI 3003 - Introduction to Computing in Biology (3.0 cr)
- MATH 1272 - Calculus II (4.0 cr)
- MATH 1572H - Honors Calculus II (4.0 cr)
- MATH 2241 - Mathematical Modeling of Biological Systems (3.0 cr)
- STAT 3011 - Introduction to Statistical Analysis [MATH] (4.0 cr)
- BIOL 3272 - Applied Biostatistics (4.0 cr)
  or BIOL 3272H - Applied Biostatistics (4.0 cr)
  or BIOL 5272 - Applied Biostatistics (4.0 cr)

Chemistry

Track 1: Preferred CBS Chemistry Sequence

CHEM 1081 - Chemistry for the Life Sciences I [PHYS] (3.0 cr)
CHEM 1065 - Chemical Principles I Laboratory [PHYS] (1.0 cr)
CHEM 1082 - Chemistry for the Life Sciences II (3.0 cr)
CHEM 1086 - Chemistry for the Life Sciences II Laboratory (1.0 cr)
CHEM 2081 - Chemistry for the Life Sciences III (3.0 cr)
CHEM 2085 - Chemistry for the Life Sciences III Laboratory (2.0 cr)

or **Track 2**

This track is allowable for students entering CBS with previous chemistry credit or for whom space is not available in the preferred track. Students should speak with a CBS academic advisor to determine eligibility for this track.

CHEM 1061 - Chemical Principles I [PHYS] (3.0 cr)
CHEM 1065 - Chemical Principles I Laboratory [PHYS] (1.0 cr)
CHEM 1062 - Chemical Principles II [PHYS] (3.0 cr)
CHEM 1066 - Chemical Principles II Laboratory [PHYS] (1.0 cr)
CHEM 2301 - Organic Chemistry I (3.0 cr)

or **Track 2 (Honors Option)**

This track is allowable for CBS honors students.

CHEM 1071H - Honors Chemistry I [PHYS] (3.0 cr)
CHEM 1075H - Honors Chemistry I Laboratory [PHYS] (1.0 cr)
CHEM 1072H - Honors Chemistry II [PHYS] (3.0 cr)
CHEM 1076H - Honors Chemistry II Laboratory [PHYS] (1.0 cr)
CHEM 2331H - Honors Elementary Organic Chemistry I (3.0 cr)

Physics

PHYS 1201W *{Inactive}*[PHYS, WI] (5.0 cr)
or PHYS 1301W - Introductory Physics for Science and Engineering I [PHYS, WI] (4.0 cr)
or PHYS 1401V - Honors Physics I [PHYS, WI] (4.0 cr)
or PHYS 1501V *{Inactive}*[PHYS, WI] (4.0 cr)
PHYS 1202W *{Inactive}*[PHYS, WI] (5.0 cr)
or PHYS 1302W - Introductory Physics for Science and Engineering II [PHYS, WI] (4.0 cr)
or PHYS 1402V - Honors Physics II [PHYS, WI] (4.0 cr)
or PHYS 1502V *{Inactive}*[PHYS, WI] (4.0 cr)

Molecular and Cellular Biology

BIOL 3025 - Molecular Biology and Society [TS] (3.0 cr)
BIOC 3022 - Biochemistry for Life Scientists (3.0 cr)
or BIOC 4331 - Biochemistry I: Structure, Catalysis, and Metabolism in Biological Systems (4.0 cr)
BIOL 4003 - Genetics (3.0 cr)
BIOL 4004 - Cell Biology (3.0 cr)

Ecology, Evolution, and Biodiversity

Courses cannot fulfill both the ecology, evolution, and biodiversity requirements and a major elective requirement.
Take 2 or more course(s) from the following:

Organismal Biology

Take 1 or more course(s) from the following:
- PMB 3007W - Plant, Algal, and Fungal Diversity and Adaptation [WI] (4.0 cr)
- MICB 3301 - Biology of Microorganisms (5.0 cr)
- PMB 3002 - Plant Biology: Function (2.0 cr)
  PMB 3005W - Plant Function Laboratory [WI] (2.0 cr)
- BIOL 3211 - Physiology of Humans and Other Animals (3.0 cr)
  BIOL 2005 - Animal Diversity Laboratory (2.0 cr)
- BIOL 3211 - Physiology of Humans and Other Animals (3.0 cr)

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BIOL 2007 - Marine Animal Diversity Laboratory (1.0 cr)

•Ecology, Evolution, and Behavior

Take 1 or more course(s) from the following:

•EEB 3807 - Ecology (4.0 cr)
•EEB 3811W - Animal Behavior in the Field [WI] (4.0 cr)
•EEB 3407 - Ecology (3.0 cr)
•EEB 3408W - Ecology [WI] (4.0 cr)
•EEB 3411 - Introduction to Animal Behavior (3.0 cr)
•EEB 3412W - Introduction to Animal Behavior, Writing Intensive [WI] (4.0 cr)
•EEB 3409 - Evolution (3.0 cr)
or EEB 5409 - Evolution (3.0 cr)

Biology Major-Specific Coursework

BIOL 2005/2007 must be paired with 3211 to count for elective credit.

Take 11 or more credit(s) from the following:

Laboratory and Field Courses

Electives must include 2 lab/field courses from the approved list. To count as a lab/field course, directed research must be a minimum of 3 credits; credits can be split over multiple terms using 4994, 4794W, or a combination. Students may use a maximum of 7 credits of directed research toward a CBS degree. Directed research can only be used for one lab/field course. In order to count toward the lab/field course, Itasca courses (48xx) must be 2 credits or greater.

Take 2 or more course(s) from the following:

•BIOC 4025W - Laboratory in Biochemistry [WI] (2.0 cr)
•BIOC 4125 - Laboratory in Molecular Biology and Biotechnology (3.0 cr)
•BIOC 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
•BIOC 4994 - Directed Research (1.0 - 7.0 cr)
•PMB 3005W - Plant Function Laboratory [WI] (2.0 cr)
•PMB 3007W - Plant, Algal, and Fungal Diversity and Adaptation [WI] (4.0 cr)
•EEB 3807 - Ecology (4.0 cr)
•EEB 3811W - Animal Behavior in the Field [WI] (4.0 cr)
•BIOL 4596 *{Inactive}*(2.0 cr)
•BIOL 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
•BIOL 4994 - Directed Research (1.0 - 7.0 cr)
•CFAN 3502 - Bahamas--Tropical Marine Biology and Shark Ecology (2.0 cr)
•CFAN 3529 - From Rainforest to Reef: Wildlife Medicine and Conservation in Belize [GP, ENV] (3.0 cr)
•EEB 3407 - Ecology (3.0 cr)
•EEB 3408W - Ecology [WI] (4.0 cr)
•EEB 3411 - Introduction to Animal Behavior (3.0 cr)
•EEB 3412W - Introduction to Animal Behavior, Writing Intensive [WI] (4.0 cr)
•EEB 4129 - Mammalogy (4.0 cr)
•EEB 4134 - Introduction to Ornithology (4.0 cr)
•EEB 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
•EEB 4839 - Field Studies in Mammalogy (4.0 cr)
•EEB 4844 - Field Ornithology (3.0 cr)
•EEB 4994 - Directed Research (1.0 - 6.0 cr)
•EEB 5605 *{Inactive}*(2.0 cr)
•ENT 4361 - Aquatic Insects (3.0 cr)
•FW 4136 - Ichthyology (4.0 cr)
•GCD 3485 - Bioinformatic Analysis: Introduction to the Computational Characterization of Genes and Proteins (4.0 cr)
•GCD 4025 - Cell Biology, Development & Regeneration Laboratory (3.0 cr)
•GCD 4111 - Histology: Cell and Tissue Organization (4.0 cr)
•GCD 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
•GCD 4994 - Directed Research (1.0 - 7.0 cr)
•GCD 5005 - Computer Programming for Biology (3.0 cr)
•MICB 3301 - Biology of Microorganisms (5.0 cr)
•MICB 4215 - Advanced Laboratory: Microbial Physiology and Diversity (3.0 cr)
•MICB 4225W - Advanced Laboratory: Microbial Genetics [WI] (3.0 cr)
•MICB 4235 - Advanced Laboratory: Virology, Immunology, and Microbial Genetics (3.0 cr)
•MICB 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
•MICB 4994 - Directed Research (1.0 - 7.0 cr)
•NSCI 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
•NSCI 4994 - Directed Research (1.0 - 6.0 cr)
•PMB 4321 - Minnesota Flora (3.0 cr)
•PMB 4511 - Flowering Plant Diversity (3.0 cr)
•PMB 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
•PMB 4994 - Directed Research (1.0 - 7.0 cr)
•BIOL 3211 - Physiology of Humans and Other Animals (3.0 cr)

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BIOL 2005 - Animal Diversity Laboratory (2.0 cr)
•BIOL 3211 - Physiology of Humans and Other Animals (3.0 cr)
BIOL 2007 - Marine Animal Diversity Laboratory (1.0 cr)
•EEB 3409 - Evolution (3.0 cr)
or EEB 5409 - Evolution (3.0 cr)

•Additional Electives

Take 0 - 8 credit(s) from the following:
•BIOC 3960 *{Inactive}*(1.0 cr)
•BIOC 4025W - Laboratory in Biochemistry [WI] (2.0 cr)
•BIOC 4125 - Laboratory in Molecular Biology and Biotechnology (3.0 cr)
•BIOC 4185 *{Inactive}*(3.0 cr)
•BIOC 4225 - Laboratory in NMR Techniques (1.0 cr)
•BIOC 4325 - Laboratory in Mass Spectrometry (1.0 cr)
•BIOC 4331 - Biochemistry I: Structure, Catalysis, and Metabolism in Biological Systems (4.0 cr)
•BIOC 4332 - Biochemistry II: Molecular Mechanisms of Signal Transduction and Gene Expression (4.0 cr)
•BIOC 4351 - Protein Engineering (3.0 cr)
•BIOC 4521 - Introduction to Physical Biochemistry (3.0 cr)
•BIOC 4793W - Directed Studies: Writing Intensive [WI] (1.0 - 7.0 cr)
•BIOC 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
•BIOC 4960 - Special Topics in Biochemistry (3.0 cr)
•BIOC 4993 - Directed Studies (1.0 - 7.0 cr)
•BIOC 4994 - Directed Research (1.0 - 7.0 cr)
•BIOC 5213 *{Inactive}*(3.0 cr)
•BIOC 5309 - Biocatalysis and Biodegradation (3.0 cr)
•BIOC 5352 - Biotechnology and Bioengineering for Biochemists (3.0 cr)
•BIOC 5361 - Microbial Genomics and Bioinformatics (3.0 cr)
•BIOC 5527 *{Inactive}*(4.0 cr)
•BIOC 5528 - Spectroscopy and Kinetics (4.0 cr)
•BIOC 5960 - Biophysical Spectroscopy (2.0 cr)
•PMB 3002 - Plant Biology: Function (2.0 cr)
•PMB 3005W - Plant Function Laboratory [WI] (2.0 cr)
•PMB 3007W - Plant, Algal, and Fungal Diversity and Adaptation [WI] (4.0 cr)
•BIOL 3209 - Understanding the Evolution-Creationism Controversy [CIV] (3.0 cr)
•BIOL 3211 - Physiology of Humans and Other Animals (3.0 cr)
•BIOL 3272 - Applied Biostatistics (4.0 cr)
•BIOL 3503 - Biology of Aging (2.0 cr)
•BIOL 3600 - Directed Instruction (1.0 - 2.0 cr)
•BIOL 3696 - Internship: Professional Experience in Biological Sciences (1.0 - 3.0 cr)
•BIOL 3700 - Special Topics in Biology (1.0 - 3.0 cr)
•EEB 3807 - Ecology (4.0 cr)
•EEB 3811W - Animal Behavior in the Field [WI] (4.0 cr)
•PMB 4121 - Microbial Ecology and Applied Microbiology (3.0 cr)
•BIOL 4201 - Teaching in the Biology Laboratory (1.0 cr)
•BIOL 4590 - Coral Reef Ecology (2.0 cr)
•BIOL 4793W - Directed Studies: Writing Intensive [WI] (1.0 - 7.0 cr)
•BIOL 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
•BIOL 4850 *{Inactive}*(1.0 - 5.0 cr)
•BIOL 4950 - Special Topics in Biology (1.0 - 4.0 cr)
•BIOL 4993 - Directed Studies (1.0 - 7.0 cr)
•BIOL 4994 - Directed Research (1.0 - 7.0 cr)
•BIOL 5309 - Molecular Ecology And Ecological Genomics (3.0 cr)
•BIOL 5407 *{Inactive}*(3.0 cr)
•BIOL 5409 *{Inactive}*(3.0 cr)
•BIOL 5950 - Special Topics (1.0 - 4.0 cr)
•BMEN 2501 - Cellular and Molecular Biology for Biomedical Engineers [BIOL] (4.0 cr)
•CHEM 2302 - Organic Chemistry II (3.0 cr)
•CHEM 2311 - Organic Lab (4.0 cr)
•CHEM 4001 - Chemistry of Biomass and Biomass Conversion to Fuels and Products [ENV] (4.0 cr)
•CHEM 4412 - Chemical Biology of Enzymes (3.0 cr)
•CHEM 4413 *{Inactive}*(3.0 cr)
•CSCI 3081W - Program Design and Development [WI] (4.0 cr)
•CSCI 3921W - Social, Legal, and Ethical Issues in Computing [CIV, WI] (3.0 cr)
•EEB 3407 - Ecology (3.0 cr)
•EEB 3408W - Ecology [WI] (4.0 cr)
•EEB 3409 - Evolution (3.0 cr)
•EEB 3411 - Introduction to Animal Behavior (3.0 cr)

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- EEB 3412W - Introduction to Animal Behavior, Writing Intensive [WI] (4.0 cr)
- EEB 3603 - Science, Protection, and Management of Aquatic Environments (3.0 cr)
- EEB 4068 - Plant Physiological Ecology (3.0 cr)
- EEB 4129 - Mammalogy (4.0 cr)
- EEB 4134 - Introduction to Ornithology (4.0 cr)
- EEB 4329 - Primate Ecology and Social Behavior (3.0 cr)
- EEB 4330W - Animal Communication [WI] (3.0 cr)
- EEB 4609W - Ecosystem Ecology [ENV, WI] (3.0 cr)
- EEB 4611 - Biogeochemical Processes (3.0 cr)
- EEB 4793W - Directed Studies: Writing Intensive [WI] (1.0 - 7.0 cr)
- EEB 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
- EEB 4839 - Field Studies in Mammalogy (4.0 cr)
- EEB 4844 - Field Ornithology (3.0 cr)
- EEB 4993 - Directed Studies (1.0 - 7.0 cr)
- EEB 4994 - Directed Research (1.0 - 6.0 cr)
- EEB 5042 - Quantitative Genetics (3.0 cr)
- EEB 5053 - Ecology: Theory and Concepts (4.0 cr)
- EEB 5068 - Plant Physiological Ecology (3.0 cr)
- EEB 5221 *{Inactive}*(3.0 cr)
- EEB 5322 *{Inactive}*(3.0 cr)
- EEB 5605 *{Inactive}*(2.0 cr)
- EEB 5609 - Ecosystem Ecology (3.0 cr)
- ESCI 4102W - Vertebrate Paleontology: Evolutionary History and Fossil Records of Vertebrates [WI] (3.0 cr)
- ESCI 4103W - Fossil Record of Mammals [WI] (3.0 cr)
- GCD 3485 - Bioinformatic Analysis: Introduction to the Computational Characterization of Genes and Proteins (4.0 cr)
- GCD 4025 - Cell Biology, Development & Regeneration Laboratory (3.0 cr)
- GCD 4034 - Molecular Genetics and Genomics (3.0 cr)
- GCD 4111 - Histology: Cell and Tissue Organization (4.0 cr)
- GCD 4134 *{Inactive}*(3.0 cr)
- GCD 4143 - Human Genetics and Genomics (3.0 cr)
- GCD 4151 - Molecular Biology of Cancer (3.0 cr)
- GCD 4161 - Developmental Biology (3.0 cr)
- GCD 4171 - Stem Cells in Biology and Medicine (3.0 cr)
- GCD 4793W - Directed Studies: Writing Intensive [WI] (1.0 - 7.0 cr)
- GCD 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
- GCD 4993 - Directed Studies (1.0 - 7.0 cr)
- GCD 4994 - Directed Research (1.0 - 7.0 cr)
- GCD 5036 - Molecular Cell Biology (3.0 cr)
- MATH 3283W - Sequences, Series, and Foundations: Writing Intensive [WI] (4.0 cr)
- MATH 5445 - Mathematical Analysis of Biological Networks (4.0 cr)
- MATH 5447 - Theoretical Neuroscience (4.0 cr)
- PMB 4111 - Microbial Physiology and Diversity (3.0 cr)
- MICB 4131 - Immunology (3.0 cr)
- MICB 4151 - Molecular and Genetic Bases for Microbial Diseases (3.0 cr)
- MICB 4161W - Eukaryotic Microbiology [WI] (3.0 cr)
- MICB 4171 - Biology, Genetics, and Pathogenesis of Viruses (3.0 cr)
- MICB 4215 - Advanced Laboratory: Microbial Physiology and Diversity (3.0 cr)
- MICB 4225W - Advanced Laboratory: Microbial Genetics [WI] (3.0 cr)
- MICB 4235 - Advanced Laboratory: Virology, Immunology, and Microbial Genetics (3.0 cr)
- MICB 4793W - Directed Studies: Writing Intensive [WI] (1.0 - 7.0 cr)
- MICB 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
- MICB 4993 - Directed Studies (1.0 - 7.0 cr)
- MICB 4994 - Directed Research (1.0 - 7.0 cr)
- NSC 5031W - Perception [WI] (3.0 cr)
- NSC 5040 - Brain Networks: From Connectivity to Dynamics (4.0 cr)
- NSC 5202 - Theoretical Neuroscience: Systems and Information Processing (3.0 cr)
- NSC 5203 - Basic and Clinical Vision Science (3.0 cr)
- NSC 5461 - Cellular and Molecular Neuroscience (3.0 cr)
- NSC 5462 - Neuroscience Principles of Drug Abuse (2.0 cr)
- NSC 5540 - Survey of Biomedical Neuroscience (2.0 cr)
- NSC 5551 - Itasca Cell and Molecular Neurobiology Laboratory (4.0 cr)
- NSC 5561 - Systems Neuroscience (4.0 cr)
- NSC 5661 - Behavioral Neuroscience (2.0 cr)
- NSC 5667 *{Inactive}*(2.0 - 3.0 cr)
- NSCI 3001W - Neuroscience and Society [CIV, WI] (4.0 cr)
- NSCI 3101 - Neurobiology I: Molecules, Cells, and Systems (3.0 cr)

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- NSCI 3102W - Neurobiology II: Perception and Behavior [WI] (3.0 cr)
- NSCI 4101 - Development of the Nervous System: Cellular and Molecular Mechanisms (3.0 cr)
- NSCI 4105 - Neurobiology Laboratory I (3.0 cr)
- NSCI 4150 - Advanced Topics in Neuroscience (3.0 cr)
- NSCI 4167 *{Inactive}*(1.0 - 3.0 cr)
- NSCI 4793W - Directed Studies: Writing Intensive [WI] (1.0 - 6.0 cr)
- NSCI 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
- NSCI 4993 - Directed Studies (1.0 - 7.0 cr)
- NSCI 4994 - Directed Research (1.0 - 6.0 cr)
- NSCI 5300 *{Inactive}*(3.0 cr)
- PMB 4321 - Minnesota Flora (3.0 cr)
- PMB 4511 - Flowering Plant Diversity (3.0 cr)
- PMB 4516W - Plant Cell Biology: Writing Intensive [WI] (3.0 cr)
- PMB 4601 - Topics in Plant Biochemistry (3.0 cr)
- PMB 4793W - Directed Studies: Writing Intensive [WI] (1.0 - 7.0 cr)
- PMB 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
- PMB 4993 - Directed Studies (1.0 - 7.0 cr)
- PMB 4994 - Directed Research (1.0 - 7.0 cr)
- PMB 5109 *{Inactive}*(2.0 cr)
- PMB 5412 - Plant Physiology and Development (3.0 cr)
- PMB 5516 *{Inactive}*(3.0 cr)
- PMB 5601 - Topics in Plant Biochemistry (3.0 cr)
- PMB 5960 *{Inactive}*(1.0 - 3.0 cr)
- PHCL 4001 - Mechanisms of Drug Action (2.0 cr)
- PHYS 3022 - Introduction to Cosmology (3.0 cr)
- STAT 3011 - Introduction to Statistical Analysis [MATH] (4.0 cr)
- STAT 3021 - Introduction to Probability and Statistics (3.0 cr)
- STAT 3022 - Data Analysis (4.0 cr)
- STAT 4101 - Theory of Statistics I (4.0 cr)
- STAT 4102 - Theory of Statistics II (4.0 cr)
- VPM 4131 - Immunology (3.0 cr)
- MICB 3301 - Biology of Microorganisms (5.0 cr)
  or MICB 3303 - Biology of Microorganisms (without laboratory) (3.0 cr)
- EEB 3002 - Sex, Evolution, and Behavior: Examining Human Evolutionary Biology (4.0 cr)
  or ANTH 3002 - Sex, Evolution, and Behavior: Examining Human Evolutionary Biology (4.0 cr)
- BIOC 5444 - Muscle (3.0 cr)
  or PHSL 5444 - Muscle (3.0 cr)
- Take 0 - 1 course(s) from the following:
  - GCC 3xxx
  - GCC 5xxx

Upper Division Writing Intensive within the Major

Students are required to take one upper division writing intensive course within the major. If that requirement has not been satisfied within the core major requirements, students must choose one course from the following list. Some of these courses may also fulfill other major requirements.

Take 0 - 1 course(s) from the following:

- BIOC 4025W - Laboratory in Biochemistry [WI] (2.0 cr)
- BIOC 4793W - Directed Studies: Writing Intensive [WI] (1.0 - 7.0 cr)
- BIOC 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
- PMB 3005W - Plant Function Laboratory [WI] (2.0 cr)
- PMB 3007W - Plant, Algal, and Fungal Diversity and Adaptation [WI] (4.0 cr)
- BIOL 4321W - Deconstructing Research: Writing about Biological Research for Non-scientists [WI] (2.0 cr)
- BIOL 4793W - Directed Studies: Writing Intensive [WI] (1.0 - 7.0 cr)
- BIOL 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
- EEB 3408W - Ecology [WI] (4.0 cr)
- EEB 3412W - Introduction to Animal Behavior, Writing Intensive [WI] (4.0 cr)
- EEB 4330W - Animal Communication [WI] (3.0 cr)
- EEB 4609W - Ecosystem Ecology [ENV, WI] (3.0 cr)
- EEB 4793W - Directed Studies: Writing Intensive [WI] (1.0 - 7.0 cr)
- EEB 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
- GCD 4005W - Cell Biology-Writing Intensive [WI] (4.0 cr)
- GCD 4793W - Directed Studies: Writing Intensive [WI] (1.0 - 7.0 cr)
- GCD 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
- MICB 4161W - Eukaryotic Microbiology [WI] (3.0 cr)
- MICB 4225W - Advanced Laboratory: Microbial Genetics [WI] (3.0 cr)
- MICB 4793W - Directed Studies: Writing Intensive [WI] (1.0 - 7.0 cr)

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- MICB 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
- NSCI 3001W - Neuroscience and Society [CIV, WI] (4.0 cr)
- NSCI 3102W - Neurobiology II: Perception and Behavior [WI] (3.0 cr)
- NSCI 4793W - Directed Studies: Writing Intensive [WI] (1.0 - 6.0 cr)
- NSCI 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
- PMB 4516W - Plant Cell Biology: Writing Intensive [WI] (3.0 cr)
- PMB 4793W - Directed Studies: Writing Intensive [WI] (1.0 - 7.0 cr)
- PMB 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)

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