Duluth Campus

Cell and Molecular Biology B.S.

Biology

Swenson College of Science and Engineering

- **Students will no longer be accepted into this program after Spring 2017. Program requirements below are for current students only.**
- **Students interested in Cell and Molecular Biology have the option to pursue a Biology B.S. with a Genetics, Cell, and Development sub-plan.**

- Program Type: Baccalaureate
- Requirements for this program are current for Spring 2022
- Required credits to graduate with this degree: 120
- Required credits within the major: 84 to 91
- Degree: Bachelor of Science

New students are not being accepted into this program. Please visit with a member of the SCSE student advising office for additional information.

Cell and molecular biology are two of the most rapidly growing areas of modern biology. This major prepares students for graduate school and careers in cell biology, genetics, developmental biology, physiology, immunology, biotechnology, molecular biology and microbiology. The major is also appropriate for students considering professional schools of medicine, dentistry, pharmacy, and veterinary medicine.

The program is administered by the Department of Biology and involves faculty in both the Swenson College of Science and Engineering and the Medical School Duluth.

Program Delivery

This program is available:

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

Admission Requirements

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

General Requirements

The Board of Regents, on recommendation of the faculty, grants degrees from the University of Minnesota. Requirements for an undergraduate degree from University of Minnesota Duluth include the following:

1. Students must meet all course and credit requirements of the departments and colleges or schools in which they are enrolled including an advanced writing course. Students seeking two degrees must fulfill the requirements of both degrees. However, two degrees cannot be awarded for the same major.
2. Students must complete all requirements of the Liberal Education Program.
3. Students must complete a minimum of 120 semester credits.
4. At least 30 of the last 60 degree credits earned immediately before graduation must be awarded by UMD.
5. Students must complete at least half of their courses at the 3xxx-level and higher at UMD. Study-abroad credits earned through courses taught by UM faculty and at institutions with which UMD has international exchange programs may be used to fulfill this requirement.
6. If a minor is required, students must take at least three upper division credits in their minor field from UMD.
7. The minimum cumulative UM GPA required for graduation will be 2.00 and will include only University of Minnesota coursework. A minimum UM GPA of 2.00 is required in each UMD undergraduate major and minor. No academic unit may impose higher grade point standards to graduate.
8. Diploma, transcripts, and certification will be withheld until all financial obligations to the University have been met.

Program Requirements

1. A minor or second major from another area of study outside the Department of Biology, with the exception of the natural history minor.

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Information current as of March 29, 2024

Biology Core Courses (31-32 cr)

BIOL 1011 - General Biology I [LE CAT, NAT SCI] (5.0 cr)
BIOL 1012 - General Biology II [SUSTAIN] (5.0 cr)
BIOL 3100 - Cell Biology (3.0 cr)
BIOL 2201 - Genetics (3.0 cr)
BIOL 3401 - Evolution (3.0 cr)
BIOL 3987 - Communication in Biology (2.0 cr)
BIOL 4231 - Molecular Biology (3.0 cr)
BIOL 4232 - Molecular Biology Laboratory (2.0 cr)
BIOL 2102 - Cell Biology Laboratory (2.0 cr)
or BIOL 2202 - Genetics Laboratory (2.0 cr)
BIOL 3703 - Animal Physiology (3.0 cr)
or BIOL 4361 - Developmental Biology (3.0 cr)
or BIOL 3502 - General Microbiology (4.0 cr)
or BIOL 4604 - Plant Physiology (4.0 cr)

Electives (10 cr)

If more than 1 lab elective (2102, 2202) or cell BIOL core 3703, 4361, 4603, (4501 or 4503) are taken the excess may be used for cell BIOL elective cr; BIOL 3990 & 5990 are accepted only by deptartment approval; 2 cr of SSP may be substituted for BIOL 3993 as elective cr. Courses cannot be used to fulfill more than 1 requirement in the major; max of 2 cr of BIOL 3993; max of 4 cr of BIOL 3994 and a max of 1 cr of BIOL 3996 may be applied.

Take 10 or more credit(s) from the following:

Cell Biology Electives

Maximum of one non-BIOL course may be taken.

Take 6 or more credit(s) from the following:

- BIOL 2102 - Cell Biology Laboratory (2.0 cr)
- BIOL 2202 - Genetics Laboratory (2.0 cr)
- BIOL 3512 - Biology of HIV and AIDS (3.0 cr)
- BIOL 3101 - Molecular Biology of Cancer (3.0 cr)
- BIOL 3102 - Cell Biology of Human Disease (3.0 cr)
- BIOL 3301 - Patterning the Embryo (3.0 cr)
- BIOL 3502 - General Microbiology (4.0 cr)
- BIOL 3703 - Animal Physiology (3.0 cr)
- BIOL 4199 - Frontiers in Cell Biology (3.0 cr)
- BIOL 4233 *{Inactive}*(3.0 cr)
- BIOL 4361 - Developmental Biology (3.0 cr)
- BIOL 4511 - Medical Microbiology (3.0 cr)
- BIOL 4604 - Plant Physiology (4.0 cr)
- BIOL 4631 *{Inactive}*(3.0 cr)
- BIOL 5511 *{Inactive}*(3.0 cr)
- BIOL 5515 - Microbial Diversity and Phylogeny (3.0 cr)
- BIOL 5772 - Neural Systems and Behavior (3.0 cr)
- BIOL 5801 - Microbial Ecology (2.0 cr)
- BIOL 5802 *{Inactive}*(2.0 cr)
- BMS 5501 - Neurobiochemistry (2.0 cr)
- BMS 5545 - Immunology (3.0 cr)
- BMS 5555 - Molecular Pathogenesis: Current Concepts (3.0 cr)
- BMS 5601 - Grand Challenges in Physiology (3.0 cr)
- BMS 5602 - Physiology of Organ Systems II (2.0 cr)

•Non-Cell Biology Electives

Take 0 - 1 course(s) totaling 0 or more credit(s) from the following:

- BIOL 3771 - Human Anatomy (4.0 cr)
- BIOL 2801 - General Ecology (3.0 cr)
- BIOL 2802 - Ecology Laboratory (2.0 cr)
- BIOL 3001 *{Inactive}*(3.0 cr)
- BIOL 3601 - Plant Diversity (3.0 cr)
- BIOL 3603 - Plant Taxonomy (3.0 cr)
- BIOL 3701 - Animal Diversity (4.0 cr)
- BIOL 3760 - Marine Biology (3.0 cr)
- BIOL 3761 - Field Studies in Marine Biology (4.0 cr)
- BIOL 3830 *{Inactive}*(3.0 cr)
- BIOL 3835 - Freshwater Ecology (3.0 cr)
- BIOL 3993 - Laboratory Teaching Experience (1.0 - 2.0 cr)
- BIOL 3994 - Undergraduate Research (1.0 - 3.0 cr)
- BIOL 3996 - Internship in Biology (1.0 - 2.0 cr)

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- BIOL 4731 - Entomology (3.0 cr)
- BIOL 4761 - Ichthyology (3.0 cr)
- BIOL 4763 - Ornithology (3.0 cr)
- BIOL 4764 - Mammalogy (3.0 cr)
- BIOL 4818 - Biotic Response to Climate Change (3.0 cr)
- BIOL 4891 - Animal Behavior (3.0 cr)
- BIOL 5240 - Ecological Genetics (3.0 cr)
- BIOL 5777 *{Inactive}*(2.0 cr)
- BIOL 5805 - Fisheries Ecology and Management (3.0 cr)
- BIOL 5807 - Mathematical Ecology (3.0 cr)
- BIOL 5808 *{Inactive}*(3.0 cr)
- BIOL 5833 - Stream Ecology (3.0 cr)
- BIOL 4839 - Coral Reef Field Studies [GLOBAL PER] (3.0 cr)
- BIOL 5861 - Lake Ecology (3.0 cr)
- BIOL 5865 - Conservation Biology (2.0 cr)
- BIOL 5870 - Wetland Ecology (3.0 cr)
- MATH 5233 - Mathematical Foundations of Bioinformatics (3.0 cr)
- BMS 5501 - Neurobiochemistry (2.0 cr)
- BMS 5545 - Immunology (3.0 cr)
- BMS 5555 - Molecular Pathogenesis: Current Concepts (3.0 cr)
- BMS 5601 - Grand Challenges in Physiology (3.0 cr)
- BMS 5602 - Physiology of Organ Systems II (2.0 cr)

Courses From Other Programs (43 - 49 cr)

Biochemistry

CHEM 3322 - Biochemistry (3.0 cr)
CHEM 3324 - Biochemistry Laboratory (1.0 cr)
or CHEM 4351 - Biochemistry I (3.0 cr)
CHEM 4352 - Biochemistry II (3.0 cr)
CHEM 4363 - Biochemistry Laboratory (2.0 cr)

General Chemistry

CHEM 1153 - General Chemistry I [LE CAT, NAT SCI] (4.0 cr)
CHEM 1154 - General Chemistry Lab I [LE CAT, NAT SCI] (1.0 cr)
CHEM 1155 - General Chemistry II (4.0 cr)
CHEM 1156 - General Chemistry Lab II (1.0 cr)

Organic Chemistry

CHEM 2541 - Organic Chemistry I (3.0 cr)
CHEM 2542 - Organic Chemistry II (3.0 cr)
CHEM 2543 - Organic Chemistry I Laboratory (1.0 cr)
CHEM 2544 - Organic Chemistry II Laboratory (1.0 cr)

Mathematics

MATH 1290 - Calculus for the Natural Sciences [LE CAT2, LOGIC & QR] (5.0 cr)
or MATH 1596 *{Inactive}*[LE CAT2, LOGIC & QR] (5.0 cr)
or MATH 1296 - Calculus I [LE CAT, LOGIC & QR] (5.0 cr)
MATH 1297 - Calculus II [LOGIC & QR] (5.0 cr)
or MATH 1597 *{Inactive}*[LOGIC & QR] (5.0 cr)
or STAT 2411 - Statistical Methods [LE CAT, LOGIC & QR] (3.0 cr)
or STAT 3611 - Introduction to Probability and Statistics (4.0 cr)

Physics I

PHYS 1001 - Introduction to Physics I [LE CAT, NAT SCI] (5.0 cr)
PHYS 2013 - General Physics I [LE CAT, NAT SCI] (4.0 cr)
or PHYS 2017 - Honors: General Physics I [NAT SCI] (4.0 cr)
PHYS 2014 - General Physics Lab I [NAT SCI] (1.0 cr)

Physics II

PHYS 1002 - Introduction to Physics II (5.0 cr)
PHYS 2015 - General Physics II (4.0 cr)
or PHYS 2018 - Honors General Physics II (4.0 cr)
PHYS 2016 - General Physics Lab II (1.0 cr)

Advanced Writing

WRIT 3150 - Advanced Writing: Science (3.0 cr)

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