



Twin Cities Campus

Human Physiology B.A.

Integrative Biology and Physiology

College of Liberal Arts

- Program Type: Baccalaureate
- Requirements for this program are current for Spring 2020
- Required credits to graduate with this degree: 120
- Required credits within the major: 60 to 69
- Degree: Bachelor of Arts

The human physiology major concentrates on understanding the functions of the human body from individual cells to organ systems. The program is based upon principles from chemistry, physics, mathematics, and biological sciences.

This major is particularly appropriate for students who intend to enter medical school or graduate study in any of a variety of biological, health, or biomedical sciences. The required courses form a strong core in biomedical science. Many of the required courses are identical to those required for admission to medical school. Students may tailor the overall degree program to specific needs and may choose additional science courses in preparation for medical school, other health sciences professional schools, or graduate school. Students may also take advantage of the freedom to pursue a more diverse undergraduate experience in CLA. Others may benefit from an opportunity to pursue a double major.

For the latest information, visit the human physiology major website: <https://www.physiology.umn.edu/degrees-and-programs/undergraduate-program>.

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

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

Students are required to take 4 semester(s) of any second language.

All CLA BA degrees require 18 upper division (3xxx-level or higher) credits outside the major designator. These credits must be taken in designators different from the major designator and cannot include courses that are cross-listed with the major designator. The major designator for the human physiology BA is PHSL.

A given course may only count towards one major requirement.

At least 11 upper division credits in the major must be taken at the University of Minnesota - Twin Cities campus.

All incoming CLA freshmen must complete the First-Year Experience course sequence.

Preparatory Courses

Quantitative Sequence

Take exactly 1 course(s) totaling exactly 4 credit(s) from the following:

- [MATH 1271](#) - Calculus I [MATH] (4.0 cr)
- or [MATH 1571H](#) - Honors Calculus I [MATH] (4.0 cr)

Take exactly 1 course(s) totaling 3 - 4 credit(s) from the following:

- [MATH 1272](#) - Calculus II (4.0 cr)
- or [MATH 1572H](#) - Honors Calculus II (4.0 cr)
- or [ANSC 3011](#) - Statistics for Animal Science (4.0 cr)



- or BIOL 3270 *(Inactive)*(3.0 cr)
- or BIOL 3272 - Applied Biostatistics (4.0 cr)
- or BIOL 5272 - Applied Biostatistics (4.0 cr)
- or CSCI 1113 - Introduction to C/C++ Programming for Scientists and Engineers (4.0 cr)
- or CSCI 1133 - Introduction to Computing and Programming Concepts (4.0 cr)
- or CSCI 3003 - Introduction to Computing in Biology (3.0 cr)
- or EPSY 3264 - Basic and Applied Statistics [MATH] (3.0 cr)
- or PSY 3801 - Introduction to Psychological Measurement and Data Analysis [MATH] (4.0 cr)
- or SOC 3811 - Social Statistics [MATH] (4.0 cr)
- or STAT 3011 - Introduction to Statistical Analysis [MATH] (4.0 cr)

Chemistry Sequence

Take exactly 4 course(s) totaling exactly 8 credit(s) from the following:

Chemistry I

- CHEM 1061 - Chemical Principles I [PHYS] (3.0 cr)
with CHEM 1065 - Chemical Principles I Laboratory [PHYS] (1.0 cr)
- or CHEM 1071H - Honors Chemistry I [PHYS] (3.0 cr)
with CHEM 1075H - Honors Chemistry I Laboratory [PHYS] (1.0 cr)

Chemistry II

- CHEM 1062 - Chemical Principles II [PHYS] (3.0 cr)
with CHEM 1066 - Chemical Principles II Laboratory [PHYS] (1.0 cr)
- or CHEM 1072H - Honors Chemistry II [PHYS] (3.0 cr)
with CHEM 1076H - Honors Chemistry II Laboratory [PHYS] (1.0 cr)

Physics Sequence

Physics I

Take exactly 1 course(s) totaling 4 - 5 credit(s) from the following:

Physics I

- 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)

Physics II

Take exactly 1 course(s) totaling 4 - 5 credit(s) from the following:

- 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)

General Biology

Take exactly 1 course(s) totaling exactly 4 credit(s) from the following:

- BIOL 1009 - General Biology [BIOL] (4.0 cr)
- or BIOL 1009H - Honors: General Biology [BIOL] (4.0 cr)

Core Courses

Organic Chemistry

Organic Chemistry I

Take exactly 2 course(s) totaling exactly 7 credit(s) from the following:

- CHEM 2301 - Organic Chemistry I (3.0 cr)
- CHEM 2311 - Organic Lab (4.0 cr)
- or CHEM 2331H - Honors Elementary Organic Chemistry I (3.0 cr)
- CHEM 2312H - Honors Organic Lab (5.0 cr)

Organic Chemistry II

Take exactly 1 course(s) totaling exactly 3 credit(s) from the following:

- CHEM 2302 - Organic Chemistry II (3.0 cr)
- or CHEM 2332H - Honors Elementary Organic Chemistry II (3.0 cr)

Physiology

Take exactly 2 course(s) totaling exactly 6 credit(s) from the following:

- PHSL 3061 - Principles of Physiology (4.0 cr)
- PHSL 3701 - Physiology Laboratory (2.0 cr)

Advanced Physiology Elective(s)

Take exactly 1 course(s) totaling 1 - 6 credit(s) from the following:

- BIOC 5444 - Muscle (3.0 cr)
- or PHSL 3095 - Problems in Physiology (1.0 - 5.0 cr)
- or PHSL 4xxx



or PHSL 5xxx

Biochemistry

Take exactly 1 course(s) totaling 3 - 4 credit(s) from the following:

- BIOC 3021 - Biochemistry (3.0 cr)
- or BIOC 4331 - Biochemistry I: Structure, Catalysis, and Metabolism in Biological Systems (4.0 cr)

Genetics

Take exactly 1 course(s) totaling exactly 3 credit(s) from the following:

- GCD 3022 - Genetics (3.0 cr)
- or BIOL 4003 - Genetics (3.0 cr)

Cell Biology

Take exactly 1 course(s) totaling exactly 3 credit(s) from the following:

- GCD 3033 - Principles of Cell Biology (3.0 cr)
- or BIOL 4004 - Cell Biology (3.0 cr)
- or PHSL 4702 - Cell Physiology (3.0 cr)

Electives

Take exactly 3 course(s) totaling 6 or more credit(s) from the following:

- ANAT 3601 - Principles of Human Anatomy (3.0 cr)
- ANAT 3602 - Principles of Human Anatomy Laboratory (2.0 cr)
- ANAT 3608H - Principles of Human Anatomy Laboratory for Honors Students (3.0 cr)
- ANAT 3611 - Principles of Human Anatomy (3.0 cr)
- ANAT 3612 - Principles of Human Anatomy Laboratory (2.0 cr)
- ANAT 4900 - Directed Studies in Anatomy (1.0 - 6.0 cr)
- ANAT 5525 - Anatomy and Physiology of the Pelvis and Urinary System (1.0 - 2.0 cr)
- BIOC 4xxx
- BIOC 5444 - Muscle (3.0 cr)
- BIOL 4993 - Directed Studies (1.0 - 7.0 cr)
- BIOL 4994 - Directed Research (1.0 - 7.0 cr)
- CHEM 4xxx
- CSCI 3xxx
- CSCI 4xxx
- GCC 3016 - Science and Society: Working Together to Avoid the Antibiotic Resistance Apocalypse [TS] (3.0 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 4161 - Developmental Biology (3.0 cr)
- GCD 5036 - Molecular Cell Biology (3.0 cr)
- MATH 2xxx
- MICB 3301 - Biology of Microorganisms (5.0 cr)
- MICB 4131 - Immunology (3.0 cr)
- PHSL 3095 - Problems in Physiology (1.0 - 5.0 cr)
- PHSL 4xxx
- PHSL 5xxx
- PSY 3011 - Introduction to Learning and Behavior (3.0 cr)
- PSY 3031 - Introduction to Sensation and Perception (3.0 cr)
- PSY 3061 - Introduction to Biological Psychology (3.0 cr)
- PSY 3604 - Introduction to Psychopathology (3.0 cr)
- PSY 5031W - Perception [WI] (3.0 cr)
- PSY 5036W - Computational Vision [WI] (3.0 cr)
- PSY 5037 - Psychology of Hearing (3.0 cr)
- PSY 5038W - Introduction to Neural Networks [WI] (3.0 cr)
- PSY 5137 - Introduction to Behavioral Genetics (3.0 cr)
- STAT 3011 - Introduction to Statistical Analysis [MATH] (4.0 cr)
- STAT 3022 - Data Analysis (4.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)
- GCC 3007 - Toward Conquest of Disease [ENV] (3.0 cr)
- or GCC 5007 - Toward Conquest of Disease [ENV] (3.0 cr)
- GCC 3014 - The Future of Work and Life in the 21st Century [TS] (3.0 cr)
- or GCC 5014 - The Future of Work and Life in the 21st Century [TS] (3.0 cr)

Intercultural Competency Electives

These classes provide a cultural perspective on healthcare and/or society and can be taken to fulfill the electives requirement for the major. No more than one 1xxx-level course may count as an elective.

Take 0 or more course(s) from the following:



- ANTH 3003 - Cultural Anthropology (3.0 cr)
- ANTH 3306W - Medical Anthropology [GP, WI] (3.0 cr)
- ANTH 4071 *{Inactive}*(3.0 cr)
- ANTH 4075 - Cultural Histories of Healing [SOCS, GP] (3.0 cr)
- CSCL 3351W - The Body and the Politics of Representation [HIS, WI] (3.0 cr)
- ECON 3101 - Intermediate Microeconomics (4.0 cr)
- ECON 5890 *{Inactive}*(3.0 cr)
- GEOG 3411W - Geography of Health and Health Care [WI] (3.0 cr)
- GLOS 3143 - Place, Community, Culture [CIV] (3.0 cr)
- GLOS 3305 - Science for Sale: Environment, Capital, and Medicine (3.0 cr)
- GLOS 3602 - Other Worlds: Globalization and Culture (3.0 cr)
- GWSS 3003 - Gender and Global Politics [SOCS, GP] (3.0 cr)
- GWSS 3203W - Blood, Bodies and Science [TS, SOCS, WI] (3.0 cr)
- POL 3464 - The Politics of Economic Inequality [DSJ] (3.0 cr)
- PSY 3301 - Introduction to Cultural Psychology (3.0 cr)
- SOC 4246 - Sociology of Health and Illness (3.0 cr)
- AMES 3676 *{Inactive}*[GP, SOCS] (3.0 cr)
or ANTH 3023 *{Inactive}*[GP, SOCS] (3.0 cr)
or GLOS 3961 *{Inactive}*[GP, SOCS] (3.0 cr)
- AAS 3211W - Race & Racism in the U.S. [DSJ, WI] (3.0 cr)
or SOC 3211W - Race and Racism in the US [DSJ, WI] (3.0 cr)
- AAS 3251W - Sociological Perspectives on Race, Class, and Gender [SOCS, DSJ, WI] (3.0 cr)
or SOC 3251W - Sociological Perspectives on Race, Class, and Gender [SOCS, DSJ, WI] (3.0 cr)
- CSCL 3350W - Sexuality and Culture [DSJ, WI] (3.0 cr)
or GLBT 3456W - Sexuality and Culture [DSJ, WI] (3.0 cr)
- GEOG 3381W - Population in an Interacting World [SOCS, GP, WI] (3.0 cr)
or GLOS 3701W *{Inactive}*[SOCS, GP, WI] (3.0 cr)
- GEOG 3331 - Geography of the World Economy [SOCS, GP] (3.0 cr)
or GLOS 3231 - Geography of the World Economy [SOCS, GP] (3.0 cr)
- GLOS 3613W - Stuffed and Starved: The Politics of Eating [SOCS, GP, WI] (3.0 cr)
or GLOS 3613V *{Inactive}*[SOCS, GP, WI] (3.0 cr)
or SOC 3613W - Stuffed and Starved: The Politics of Eating [SOCS, GP, WI] (3.0 cr)
or SOC 3613V *{Inactive}*[SOCS, GP, WI] (3.0 cr)
- GLOS 3681 - Gender and the Family in the Islamic World (3.0 cr)
or GWSS 3681 - Gender and the Family in the Islamic World (3.0 cr)
or RELS 3716 - Gender and the Family in the Islamic World (3.0 cr)
or SOC 3681 - Gender and the Family in the Islamic World (3.0 cr)
- GLOS 4221 - Globalize This! Understanding Globalization Through Sociology [GP] (3.0 cr)
or SOC 4321 - Globalize This! Understanding Globalization through Sociology [GP] (3.0 cr)
- AAS 4231 - Color of Public Policy: African Americans, American Indians, Asian Americans & Chicanos in the U.S. (3.0 cr)
or AFRO 4231 - Color of Public Policy: African Americans, American Indians, Asian Americans & Chicanos in the U.S. (3.0 cr)
or AMIN 4231 - Color of Public Policy: African Americans, American Indians, Asian Americans, & Chicanos in the U.S. (3.0 cr)
or CHIC 4231 - Color of Public Policy: African Americans, American Indians, Asian Americans & Chicanos in the U.S. (3.0 cr)
- 1xxx-level
Take no more than 1 course(s) totaling at most 4 credit(s) from the following:
 - GEOG 1301W - Our Globalizing World [SOCS, GP, WI] (3.0 cr)
 - AMIN 1002 - Indigenous Peoples in Global Perspective [GP] (3.0 cr)
or POL 1019 - Indigenous Peoples in Global Perspective [GP] (3.0 cr)
 - ANTH 1003W - Understanding Cultures [SOCS, GP, WI] (4.0 cr)
or ANTH 1003V - Understanding Cultures: Honors [SOCS, GP, WI] (4.0 cr)
 - GLOS 1015W - Globalization: Issues and Challenges [GP, WI] (4.0 cr)
or HIST 1015W - Globalization: Issues and Challenges [GP, WI] (4.0 cr)

Capstone

Students who double major within CLA and choose to complete the capstone requirement in their other major are still required to take the human physiology BA capstone.

Honors students also take PHSL 3062W to fulfill the capstone requirement, and their PHSL 4095H credits will count as either an elective or an advanced physiology elective. Cum Laude and Magna Cum Laude candidates must register for a minimum of 3 credits of PHSL 4095H. Summa Cum Laude candidates must register for a minimum of 4 credits of PHSL 4095H.

PHSL 3062W

In 3062W, students write a research review on a physiological topic. Students select an area of focus within the discipline of physiology, and complete a literature review of basic science papers published in the past 10 years in their topic area. All students will work with a faculty advisor, who will assist the student in selecting their topic area, refining the focus of their literature review and provide guidance on writing a scientific review article.

Take exactly 1 course(s) totaling exactly 1 credit(s) from the following:

- PHSL 3062W - Research Paper for Physiology Majors [WI] (1.0 cr)



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:

- [PHSL 3062W](#) - Research Paper for Physiology Majors [WI] (1.0 cr)