

INTEGRATIVE PHYSIOLOGY - BACHELOR OF SCIENCE (BS)

The Department of Integrative Physiology (IPHY), housed within the College of Arts and Sciences, offers a Bachelor of Science (BS) degree. Our undergraduate courses integrate knowledge from various life-science disciplines, enabling students to explore organisms as dynamic systems composed of molecules, cells, tissues and organs. The curriculum places specific emphasis on understanding whole-body function and its relevance to human health and disease.

We actively encourage students to engage in a variety of enriching experiences, including research, internships, independent study, teaching opportunities, honors programs and extracurricular activities. By participating in these diverse activities, students can broaden their perspectives and enhance their overall learning experience.

Upon successful completion of the IPHY BS degree, students will possess the knowledge, skills and expertise necessary for advanced training and diverse career paths. Our graduates are well-prepared for pursuits in clinical practice, research, health education, sports medicine, rehabilitation and industry.

Requirements

To graduate, students are required to fulfill both the general requirements of the College of Arts and Sciences and the required courses below. Students must complete a minimum of 40 credit hours, with at least 32 credit hours in courses designated with the IPHY subject code, including a minimum of 21 credit hours at the upper-division level. Additionally, students must complete 8 credit hours in a biology sequence including requisite labs.

All required courses within the major and all ancillary courses must be passed with a grade of C- or better; pass/fail grading is not permitted for these courses. Furthermore, students must maintain a minimum grade point average of 2.000 in their major to be eligible for graduation.

Required Courses and Credits

Code	Title	Credit Hours
Required Biology Sequence		
Select one of the following biology sequences of lecture and lab:		
<i>Lecture</i>		6
EBIO 1210 & EBIO 1220	General Biology 1 and General Biology 2	
MCDB 1150 & MCDB 2150	Introduction to Cellular and Molecular Biology and Principles of Genetics	
<i>Lab</i>		2
EBIO 1230 & EBIO 1240	General Biology Laboratory 1 and General Biology Laboratory 2	
MCDB 1161	From Dirt to DNA: Phage Genomics Laboratory I	
or IPHY 1111	Analysis of Human Movement with Smart-Phone Technology	
or MCDB 1171	Antibiotics Discovery Through Hands-on Screens I	
or MCDB 2161	From DNA to Genes, Phage Genomics Laboratory II	

or MCDB 2171	Chemotherapeutic Discovery Through Hands-On Screens	
Required IPHY Coursework		
IPHY 2400	Introduction to Medical Terminology for Future Health Professionals	2
or IPHY 3415	Human Anatomy Laboratory	
IPHY 3410	Human Anatomy	3
IPHY 3430	Human Physiology	4
IPHY 3435	Physiology Lab	2
or IPHY 3437	Virtual Human Physiology Laboratory	
Advanced IPHY Coursework		
Select at least 15 credits (three courses must be taken at CU Boulder, including Main Campus, Continuing Education, or Education Abroad)		15-17
IPHY 4060	Cell Physiology	
IPHY 4440	Endocrinology	
IPHY 4540	Biomechanics	
IPHY 4580	Sleep Physiology	
IPHY 4600	Immunology	
IPHY 4650	Exercise Physiology	
IPHY 4720	Neurophysiology	
IPHY Major Electives ¹		4-6
Total Credit Hours		40

¹ To meet the requirement of 32 credit hours in IPHY coursework and 40 total major credit hours, the number of elective credit hours in IPHY may vary depending on the specific major courses taken and could be unnecessary. A maximum of 45 major credit hours can be applied towards the degree.

Code	Title	Credit Hours
Required Ancillary Coursework		
One of the following Statistics courses		3-4
IPHY 3280	Intro to Data Science and Biostatistics (preferred) ²	
or EBIO 1010	Introduction to Statistics and Quantitative Thinking for Biologists	
or MATH 2510	Introduction to Statistics	
or PSYC 2111	Psychological Science I: Statistics	
or SOCY 2061	Introduction to Social Statistics	
CHEM 1113 & CHEM 1114	General Chemistry 1 and Laboratory in General Chemistry 1	5
CHEM 1133 & CHEM 1114	General Chemistry 2 and Laboratory in General Chemistry 1	5
PHYS 2010	General Physics 1	5
Total Credit Hours		18-19

² If IPHY 3280 is chosen as the statistics requirement, it will also fulfill IPHY upper-division elective credit.

Graduating in Four Years

Consult the Four-Year Guarantee Requirements for eligibility details. The term 'adequate progress' here pertains solely to maintaining eligibility for

the four-year guarantee, not to requirements for the major itself. To stay on track in integrative physiology, students must meet these criteria:

- Declare the major by the first semester.
- Complete general biology and chemistry sequences by the third semester.
- Finish anatomy and physiology sequences by the fifth semester.

Students should meet with their major advisor to track progress toward completing major requirements.

Recommended Four-Year Plan of Study

By completing the required coursework for the major, students will satisfy all 12 credits of the Natural Sciences portion of the Gen. Ed. Distribution requirement, which includes the lab component, as well as the QRMS area of the Gen. Ed. Skills requirement.

Year One

Fall Semester		Credit Hours
EBIO 1210 & EBIO 1230	General Biology 1 and General Biology Laboratory 1	4
Elective		3
Elective		3
Elective - IPHY 1020		1
Gen. Ed. Skills course (example: Lower-division Written Communication)		3
Credit Hours		14

Spring Semester		Credit Hours
EBIO 1220 & EBIO 1240	General Biology 2 and General Biology Laboratory 2	4
CHEM 1113 & CHEM 1114	General Chemistry 1 and Laboratory in General Chemistry 1	5
IPHY 2400	Introduction to Medical Terminology for Future Health Professionals	2
Gen. Ed. Distribution course (example: Arts & Humanities)		3
Credit Hours		14

Year Two

Fall Semester		Credit Hours
CHEM 1133 & CHEM 1134	General Chemistry 2 and Laboratory in General Chemistry 2	5
IPHY 3280 or MATH 2510 or PSYC 2111 or EBIO 1010 or SOCY 2061	Intro to Data Science and Biostatistics or Introduction to Statistics or Psychological Science I: Statistics or Introduction to Statistics and Quantitative Thinking for Biologists or Introduction to Social Statistics	3-4
IPHY 3410	Human Anatomy	3
Gen. Ed. Distribution course (example: Social Sciences)		3
Credit Hours		14-15

Spring Semester		Credit Hours
PHYS 2010	General Physics 1	5
IPHY 3430	Human Physiology	4
Gen. Ed. Distribution/Diversity course (example: Social Sciences/Global Perspective)		3
Gen. Ed. Distribution course (example: Arts & Humanities)		3
Credit Hours		15

Year Three

Fall Semester		Credit Hours
IPHY 3435 or IPHY 3437	Physiology Lab or Virtual Human Physiology Laboratory	2
IPHY Major Course #1		5-3
Elective		3
Upper-Division Elective		3
Gen Ed. Distribution course (example: Social Sciences)		3
Credit Hours		16-14

Spring Semester		Credit Hours
IPHY Major Core Course #2		5-3
Elective		3
Upper-division Elective		3
Upper-division Elective		3
Gen. Ed. Skills course (example: Upper-division Written Communication)		3
Credit Hours		17-15

Year Four

Fall Semester		Credit Hours
IPHY Major Core Course #3		3-5
Upper-division Elective - IPHY 3415		2
Upper-division Elective		3
Gen. Ed. Distribution course (example: Arts & Humanities/US Perspective)		3
Gen. Ed. Distribution course (example: Social Sciences)		3
Credit Hours		14-16

Spring Semester		Credit Hours
IPHY Major Core Course #4		5-3
IPHY Major Core Course (if needed)		3-5
Upper-division Elective		3
Upper-division Elective		3
Gen. Ed. Distribution course (example: Arts & Humanities)		3
Credit Hours		17
Total Credit Hours		121-120

Learning Outcomes

By the completion of the program, students will be able to:

- Apply foundational biological concepts, including structure and function, information flow, energy and matter transformations, and systems, to analyze and explain physiological processes.
- Apply knowledge of the human body to new and real-world contexts.
- Extract meaning from visual representations of data (e.g., graphs, tables, images), and discern relevant information from irrelevant information in various contexts.
- Synthesize ideas and concepts from multiple sources to create a more comprehensive understanding of integrative physiology.
- Apply the scientific method to research questions related to integrative physiology, including designing experiments, collecting and analyzing experimental data, forming evidence-based conclusions and placing results in the larger scientific context.

- Search, critically evaluate and analyze the scientific literature related to integrative physiology, and apply this knowledge to critique claims in the popular media.
- Possess effective collaborative, teamwork, and oral and written communication skills, including the ability to work with others towards shared goals and successfully communicate an understanding of integrative physiology to a wide audience.
- Recognize the limit of one's knowledge or ability and determine how to expand that knowledge or extend the ability.
- Gain experience in disciplinary settings (e.g., research, teaching, internships, leadership, outreach, volunteering) and awareness of careers suitable for those with expertise in integrative physiology.