

INTEGRATIVE PHYSIOLOGY - BACHELOR OF ARTS (BA)

The integrative physiology program leads to a Bachelor of Arts (BA) degree. The program allows the student to learn the accumulated scientific knowledge about the human body and its responses to physical activity. Integrative physiology students spend a significant portion of their freshman and sophomore years taking prerequisite coursework in biology, chemistry, human anatomy and human physiology, physics and statistics.

In their junior and senior years, students take at least 15 core course credits: biomechanics, cell physiology, endocrinology, immunology, exercise physiology, neurophysiology, and sleep physiology. In addition, a number of elective courses are offered to complete the degree including independent study, internships and honors work with individual faculty members.

Because of its emphasis on the natural sciences, many students select the integrative physiology major as preparation for a premedical program, since it provides the type of coursework required for advanced training in areas such as health, wellness and medicine.

The program provides students with the knowledge, skills and expertise required for advanced training in fields like physical therapy, medicine, osteopathic medicine, dentistry, exercise management, nursing and physiological sciences. A degree in integrative physiology also qualifies graduates for other career possibilities in cardiac rehabilitation, chiropractic, geriatrics, physical fitness programming (industrial and corporate), science education, and further scientific training in graduate school.

Requirements

Students must complete the general requirements of the College of Arts and Sciences and the required courses below. Students must complete a minimum of 38 credit hours, 30 credit hours in courses with the IPHY subject code, including a minimum of 28 upper-division credit hours, and 8 credit hours in a biology sequence including requisite labs.

All required major courses and all required ancillary courses must be passed with a C- or better and cannot be taken pass/fail. Students must have a grade point average of at least 2.000 in the major in order to graduate.

Required Courses and Credits

Code	Title	Credit Hours
Required Biology Sequence		
Select one of the following biology sequences of lectures and lab(s):		
<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 IPHY 1181	Biological Probiotic/Drug Discovery Through Hands-on Screens	
or MCDB 1171	Drug Discovery Through Hands-on Screens I	
or MCDB 2161	From DNA to Genes, Phage Genomics Laboratory II	
or MCDB 2171	Drug Discovery Through Hands-On Screens 2	

Required IPHY Coursework

IPHY 3280	Intro to Data Science and Biostatistics	4
IPHY 3410	Human Anatomy	3
IPHY 3430	Human Physiology	4
IPHY 3435	Physiology Lab	2

Advanced IPHY Coursework

Select at least 15 credits (three courses must be taken at CU Boulder):

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 Electives¹ 2

Total Credit Hours 38-40

¹The number of IPHY major elective credit hours needed to reach the requirement for 30 credit hours in IPHY coursework and 38 total major credit hours will vary based on what major courses are taken and could be unnecessary.

Code	Title	Credit Hours
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IPHY Recommended Coursework

Coursework recommended for allied health careers. May be used to reach IPHY 30-credit total.		
IPHY 3415	Human Anatomy Laboratory	2
Total Credit Hours		2

Code	Title	Credit Hours
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Required Ancillary Coursework

CHEM 1113 & CHEM 1114	General Chemistry 1 and Laboratory in General Chemistry 1	5
CHEM 1133 & CHEM 1134	General Chemistry 2 and Laboratory in General Chemistry 2	5
PHYS 2010	General Physics 1	5
Total Credit Hours		15

Students cannot apply more than 45 major credit hours toward the degree. Contact department for current elective choices.

Graduating in Four Years

Consult the Four-Year Guarantee Requirements for information on eligibility. The concept of "adequate progress" as it is used here only

refers to maintaining eligibility for the four-year guarantee; it is not a requirement for the major. To maintain adequate progress in integrative physiology, students should meet the following requirements:

- By the first semester, declare the major.
- Before the beginning of the fifth semester, complete the biology and chemistry requirements.
- By the end of the sixth semester, complete the anatomy and physiology requirements.

Students must consult with a major advisor to determine adequate progress toward completion of major requirements.

Recommended Four-Year Plan of Study

Through the required coursework for the major, students will fulfill all 12 credits of the Natural Sciences area of the Gen Ed Distribution Requirement, including the lab component, and the QRMS area of the Gen Ed Skills Requirement.

Course	Title	Credit Hours
Year One		
Fall Semester		
EBIO 1210 & EBIO 1230	General Biology 1 and General Biology Laboratory 1	4
	Gen. Ed. Skills course (example: Lower-division Written Communication)	3
	Elective/MAPS	3
	Elective/MAPS	3
	Elective	3
	Credit Hours	16
Spring Semester		
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
	Gen. Ed. Distribution (example: Arts & Humanities)	3
	Elective/MAPS	3
	Credit Hours	15
Year Two		
Fall Semester		
CHEM 1133 & CHEM 1134	General Chemistry 2 and Laboratory in General Chemistry 2	5
IPHY 3280	Intro to Data Science and Biostatistics	4
IPHY 3410	Human Anatomy	3
	Gen. Ed. Distribution course (example: Social Sciences)	3
	Credit Hours	15
Spring Semester		
PHYS 2010	General Physics 1	5
	Gen. Ed. Distribution/Diversity course (example: Social Sciences/Global Perspective)	3
IPHY 3430	Human Physiology	4
	Gen. Ed. Distribution (example: Arts & Humanities)	3
	Credit Hours	15

Year Three

Fall Semester

IPHY 3435	Physiology Lab	2
	Elective	3
	IPHY Major Core Course #1	3-5
	Gen. Ed. Distribution course (example: Social Sciences)	3
	Upper-division Elective	3
	Credit Hours	14-16

Spring Semester

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

Year Four

Fall Semester

IPHY 3415	Human Anatomy Laboratory	2
	IPHY Major Core Course #3	4-5
	Gen. Ed. Distribution/Diversity course (example: Arts & Humanities/US Perspective)	3
	Gen. Ed. Distribution course (example: Social Sciences)	3
	Upper-division Elective	3
	Credit Hours	15-16

Spring Semester

	IPHY Major Core Course #4	3-5
	IPHY Major Core Course If Needed	3-5
	Gen. Ed. Distribution course (example: Arts & Humanities)	3
	Upper-division Elective	3
	Upper-division Elective	3
	Credit Hours	15-19
	Total Credit Hours	120-129

Learning Outcomes

Students completing a degree in integrative physiology are expected to:

- Demonstrate a mastery of the core concepts defined by the *2011 Vision and Change in Undergraduate Biology Education: A Call to Action*, including structure and function; information flow, exchange, and storage; pathways and transformations of energy and matter; and systems.
- 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 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.

Bachelor's–Accelerated Master's Degree Program(s)

The Bachelor's–Accelerated Master's (BAM) degree program options offer currently enrolled CU Boulder undergraduate students the opportunity to receive a bachelor's and master's degree in a shorter period of time. Students receive the bachelor's degree first, but begin taking graduate coursework as undergraduates (typically in their senior year). Because some courses are allowed to double count for both the bachelor's and the master's degrees, students receive a master's degree in less time and at a lower cost than if they were to enroll in a stand-alone master's degree program after completion of their baccalaureate degree. In addition, staying at CU Boulder to pursue a bachelor's–accelerated master's program enables students to continue working with their established faculty mentors.

BA and MS in Integrative Physiology

The Department of Integrative Physiology has developed a curriculum that allows both degrees to be completed in 5 years. The program has been designed to provide qualified undergraduate students with an opportunity to enhance their knowledge base in the discipline, engage in research, increase their opportunities for employment and make their applications to medical/allied health professional schools more competitive.

Admissions Requirements

In order to gain admission to the BAM program named above, a student must meet the following criteria:

- Have a cumulative GPA of 3.3 or higher
- Have completed a minimum of 24 credit hours of coursework
- Transfer students must have completed a minimum of 24 credit hours at CU Boulder
- Students must have completed one year of general biology and one year of general chemistry prerequisite courses with grades of C-

Candidates for the program are recruited from the undergraduate population of declared integrative physiology majors during the beginning of their junior year. All interested candidates must apply by the second semester of their junior year. To apply, students must also provide one letter of recommendation and have a faculty mentor. Approximately 3–5 of the applicants will be selected on a competitive basis to begin the program.

Program Requirements

Students may take up to and including 12 hours of graduate credits while in the undergraduate program which can later be used toward the master's degree. In addition, 6 graduate credits may be double counted toward the bachelor's degree and 6 undergraduate credits may be double

counted toward the master's degree. Students must apply to graduate with the bachelor's degree, and apply to continue with the master's degree, early in the semester in which the undergraduate requirements will be completed.

Once accepted into the program, a student must maintain a GPA of 3.00 in all coursework undertaken. After transitioning to the MS degree, students must register for at least 5 graduate course credit hours per semester. Students deciding to discontinue the program may do so at any time during their course of study. All credit hours completed toward the concurrent degree program will be counted toward the completion of the requirements for a BA degree in integrative physiology.

If you are interested in the BAM degree program, please contact the Integrative Physiology graduate program for more information.

For more information, visit the Integrative Physiology - Master of Science (MS) (catalog.colorado.edu/graduate/colleges-schools/arts-sciences/programs-study/integrative-physiology/integrative-physiology-master-science-ms/) webpage.