INTEGRATIVE PHYSIOLOGY - BACHELOR OF ARTS (BA)

The Department of Integrative Physiology, housed within the College of Arts and Sciences, offers a Bachelor of Arts (BA) 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 BA degree in integrative physiology, students will possess the knowledge, skills and expertise necessary for advanced training and diverse career paths. Our graduates are well-prepared for pursuits in allied health, industry, government, science education and research.

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 18 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

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td></td>
<td>Required Biology Sequence</td>
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<tr>
<td></td>
<td>Select one of the following biology sequences of lectures and lab(s):</td>
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<tr>
<td></td>
<td><strong>Lecture</strong></td>
<td>6</td>
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<tr>
<td>EBI 1210 &amp; EBI 1220</td>
<td>General Biology 1 and General Biology 2</td>
<td></td>
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<tr>
<td>MCDB 1150 &amp; MCDB 2150</td>
<td>Introduction to Cellular and Molecular Biology and Principles of Genetics</td>
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<td></td>
<td><strong>Lab</strong></td>
<td>2</td>
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<tr>
<td>EBI 1230 &amp; EBI 1240</td>
<td>General Biology Laboratory 1 and General Biology Laboratory 2</td>
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<tr>
<td>MCDB 1161</td>
<td>From Dirt to DNA: Phage Genomics Laboratory I</td>
<td></td>
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<tr>
<td>or IPHY 1111</td>
<td>Analysis of Human Movement with Smart-Phone Technology</td>
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<tr>
<td>or IPHY 1181</td>
<td>Biological Probiotic/Drug Discovery Through Hands-on Screens</td>
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<tr>
<td>or MCDB 1171</td>
<td>Antibiotics Discovery Through Hands-on Screens I</td>
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<tr>
<td>or MCDB 2161</td>
<td>From DNA to Genes, Phage Genomics Laboratory II</td>
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<td></td>
<td>Required IPHY Coursework</td>
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<tr>
<td>IPHY 3410</td>
<td>Human Anatomy</td>
<td>3</td>
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<tr>
<td>IPHY 3430</td>
<td>Human Physiology</td>
<td>3</td>
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<tr>
<td>or IPHY 3435</td>
<td>Physiology Lab</td>
<td>2</td>
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<tr>
<td>or IPHY 3437</td>
<td>Virtual Human Physiology Laboratory</td>
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<td></td>
<td>Advanced IPHY Coursework</td>
<td>15-17</td>
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<tr>
<td>IPHY 4060</td>
<td>Cell Physiology</td>
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<td>IPHY 4440</td>
<td>Endocrinology</td>
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<tr>
<td>IPHY 4540</td>
<td>Biomechanics</td>
<td></td>
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<td>IPHY 4580</td>
<td>Sleep Physiology</td>
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<td>IPHY 4600</td>
<td>Immunology</td>
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<td>IPHY 4650</td>
<td>Exercise Physiology</td>
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<tr>
<td>IPHY 4720</td>
<td>Neurophysiology</td>
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<td></td>
<td>IPHY Major Electives</td>
<td>4-6</td>
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<td>The number of IPHY major elective credit hours needed to reach the</td>
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<td>requirement for 30 credit hours in IPHY coursework and 38 total</td>
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<td>major credit hours will vary based on what major courses are taken and</td>
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<td>could be unnecessary.</td>
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<td>Required Ancillary Coursework</td>
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<td>One of the following Statistics courses</td>
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<tr>
<td>IPHY 3280</td>
<td>Intro to Data Science and Biostatistics</td>
<td>3-4</td>
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<tr>
<td>or EBI 1010</td>
<td>Introduction to Statistics and Quantitative Thinking for Biologists</td>
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<tr>
<td>or MATH 2510</td>
<td>Introduction to Statistics</td>
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<tr>
<td>or PSYC 2111</td>
<td>Psychological Science I: Statistics</td>
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<tr>
<td>or SOCY 2061</td>
<td>Introduction to Social Statistics</td>
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<tr>
<td>CHEM 1113 &amp; CHEM 1114</td>
<td>General Chemistry 1 and Laboratory in General Chemistry 1</td>
<td>5</td>
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<tr>
<td>CHEM 1133 &amp; CHEM 1134</td>
<td>General Chemistry 2 and Laboratory in General Chemistry 2</td>
<td>5</td>
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Students apply no 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.

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

Spring Semester
EBIO 1220 General Biology 2 4
& EBIO 1240 General Biology Laboratory 2 1
CHEM 1113 General Chemistry 1 5
& CHEM 1114 Laboratory in General Chemistry 1 1
Gen. Ed. Distribution (example: Arts & Humanities) 3
Elective - IPHY 2400 2
Credit Hours 14

Year Two
Fall Semester
CHEM 1133 General Chemistry 2 5
& CHEM 1134 Laboratory in General Chemistry 2 1
IPHY 3280 Intro to Data Science and Biostatistics 3
or MATH 2510
or PSYC 2111
or EBIO 1010
or SOCY 2061
or Quantitative Thinking for Biologists
or Introduction to Social Statistics
IPHY 3410 Human Anatomy 3
Gen. Ed. Distribution course (example: Social Sciences) 3
Credit Hours 14

Spring Semester
IPHY 3435 or IPHY 3437 Physiology Lab or Virtual Human Physiology Laboratory
Elective 3
IPHY Major Core Course #1 3-5
Gen. Ed. Distribution course (example: Social Sciences) 3
Upper-division Elective 3
Credit Hours 12-14

Year Three
Fall Semester
IPHY 3435 or IPHY 3437 Physiology Lab or Virtual Human Physiology Laboratory
Elective 3
IPHY Major Core Course #1 3-5
Gen. Ed. Distribution course (example: Social Sciences) 3
Upper-division Elective 3
Elective 3
Credit Hours 15-17

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 15-19

Year Four
Fall Semester
IPHY Major Core Course #3 4-5
IPHY Major Core Course If Needed 3-5
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 114-124

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 five 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 (all with minimum 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.

Please contact the Integrative Physiology graduate program (iphygrad@colorado.edu) or visit the website Integrative Physiology - Master of Science (MS) (https://catalog.colorado.edu/graduate/colleges-schools/arts-sciences/programs-study/integrative-physiology/integrative-physiology-master-science-ms/) for more information on the BAM degree.