



# University of Colorado

Department of Integrative Physiology  
Bachelor of Arts

<http://www.colorado.edu/intphys/>

## Mission of the Department

Physiology is the field of biology that deals with function in living organisms. The Department of Integrative Physiology engages in and promotes the study of how genes, cells, tissues, and organisms function. The program of study emphasizes both the role of physical activity in health and function across the human lifespan and the responses of different organisms to various forms of stress. Our multidisciplinary teaching program requires students to take foundational courses in anatomy, biochemistry, mathematics, physics, physiology, and statistics. With this basic knowledge, students can undertake a flexible curriculum that includes the study of biomechanics, cell physiology, comparative physiology, endocrinology, immunology, exercise physiology, and neurophysiology. The Department also encourages student participation in research.

## Prospective Majors:

To **DECLARE** Integrative Physiology as your major, please **sign up for a Prospective Major Meeting** at <http://aac.colorado.edu/iphy/signin.asp>, or, **complete an online Prospective Major Meeting** at <http://www.colorado.edu/intphys/advising/tutorial.html> (passcode: 3527).

## Undergraduate Advising:

To make an appointment with an advisor, sign up on the web at: <http://advising.colorado.edu/>

<u>Ms. Laura Bonney, Academic Advisor</u> Office: TB1—109 <a href="mailto:laura.bonney@colorado.edu">laura.bonney@colorado.edu</a>	<u>Ms. Lou Stenger, Academic Advisor</u> Office: TB1—112 <a href="mailto:mary.stenger@colorado.edu">mary.stenger@colorado.edu</a>
<u>Dr. Euphemia Williams, Academic Advisor</u> Office: TB1—105 <a href="mailto:euphemia.williams@colorado.edu">euphemia.williams@colorado.edu</a>	<u>Dr. David Sherwood, Undergraduate Coordinator</u> <b>Career Advising, Internships, Independent Study, Honors.</b> Office hours as posted. Office: TB1—101 Phone 303.492.7561 <a href="mailto:david.sherwood@colorado.edu">david.sherwood@colorado.edu</a>
<u>Advising Support Office: Ms. Carrie Mares</u> Clare Small, Room 114 Phone: 303.492.7333 Fax: 303.492.4009 <a href="mailto:iphyinfo@colorado.edu">iphyinfo@colorado.edu</a>	

## Integrative Physiology Student Board

As an IPHY major, you are automatically a member of the Physiology Club. The IPHY Student Board is made up of Club volunteers; they direct the activities of the Club. The Board promotes professional development in our field through interactions among students, faculty, and professionals in the community. The Board organizes informative events and provides brochures and other materials in the department's student lounge, Clare Small 111A. Watch your CU email for announcements of events. New Board members are welcomed at all times. Serving on the Board is a great way to:

- Get to know other majors, faculty, and graduate students
- Contribute to making our great department even better
- Perform a service that you can list on your resume

To find out more about the Physiology Club, go to: <http://www.colorado.edu/intphys/club/index.html>

## I. Selected Degree Requirements:

[MAPS (high school requirements) are not included here; see the University Catalog for details.]

1. 120 semester hours minimum. See your advisor about residency requirements.
2. A minimum of 45 upper division hours; at least 18 upper division hours of IPHY coursework C- or better, at least 12 upper division hours in the major taken at CU-Boulder. Upper division courses here are numbered 3000 or above.
3. A cumulative grade point average of 2.0 or better in all University of Colorado coursework.
4. 30 semester hours of IPHY coursework with grades of C- or better, 2.0 or better cumulative major GPA.
5. No more than 45 semester hours in any one department.
6. All required courses must be taken for a grade. **No requirement may be taken pass/fail.**

For further information on general degree requirements, please consult your catalog, degree and major audit, or your advisor.

## II. College of Arts and Sciences Core Curriculum Requirements:

Students must comply with the A&S core curriculum requirements. Specific courses for this purpose may be found through Schedule Planner, <http://plus.colorado.edu/plus/planner/>. Course listings may also be found in the University Catalog, available online at <http://www.colorado.edu/catalog/>. The core curriculum is organized into two major sections: **Skills Acquisition** and **Content Areas of Study**.

### A. Skills Acquisition:

- **Foreign Language:** May be satisfied by completion of third level language in high school, or three successive semesters in college.
- **Quantitative Reasoning and Mathematical Skills:** MATH 1300-5, MATH 1310-5, or APPM 1350-4 will meet this requirement.
- **Written Communication:** IPHY 1950-3 (Lower Division) and IPHY 3700-3 (Upper Division) may be used to meet this requirement. There are other approved writing classes, not in the major, which also fulfill this requirement. See the University Catalog for details.
- **Critical Thinking:** IPHY 4660-3 or IPHY 4680-3 are strongly recommended. Critical Thinking classes usually have a substantial number of prerequisites, and are most commonly taken during one's senior year. See the University Catalog for details.

### B. Content Areas of Study:

- **Historical Context:** 3 credit hours (lower or upper division).
- **Cultural and Gender Diversity:** 3 credit hours (lower or upper division).
- **United States Context:** 3 credit hours (lower or upper division).
- **Literature and the Arts:** 6 credit hours (at least 3 hours must be upper division, unless either HUMN 1010-6 or HUMN 1020-6 is used to meet this requirement).
- **Natural Science:** 13 credit hours. *Integrative Physiology majors are exempt from this requirement.*
- **Contemporary Societies:** 3 credit hours (lower or upper division).
- **Ideals and Values:** 3 credit hours (lower or upper division).

### III. Integrative Physiology Major Requirements

These requirements apply to you if:

- You have declared the Integrative Physiology major in *Summer 2007* or later

<b>A. Ancillary Courses (C- or better required)</b>	<i>Course Number (Total Credit Hours)</i>
Biology Sequence: .....	EBIO 1210 & 1230 (4) <b>-and-</b> EBIO 1220 & 1240 (4);
	<b>-or-</b> MCDB 1150 & 1151 (4) <b>-and-</b> MCDB 2150 & 2151 (4)
Chemistry Sequence: .....	CHEM 1111 & 1131 (10)
Physics Sequence: .....	PHYS 2010 & 2020 (10) ( <i>Algebra-based</i> )
	<b>-or-</b> PHYS 1110 (4) & 1120 (4) & 1140 (1) ( <i>Calculus-based</i> )
Calculus 1: .....	MATH 1300 (5) <b>-or-</b> 1310 (5) <b>-or-</b> APPM 1350 (4)
<b>Ancillary Total Hours:</b>	<b>31-33 Credit Hours</b>

### B. IPHY Specifically Required Courses (C- or better required)

<i>Course Number - Credit</i>	<i>Course Title</i>	<i>Prerequisites</i>
IPHY 2800-3	Introduction to Statistics	
IPHY 3410-3 (Lecture) & IPHY 3415-2 (Lab)	Human Anatomy & Human Anatomy Lab	One year of general biology (see Part A above)
IPHY 3470-3 (Lecture)	Human Physiology 1	One year of general biology & One year of general chemistry (see Part A above); IPHY 3410 & 3415
IPHY 3480-3 (Lecture) & IPHY 3435-2 (Lab)	Human Physiology 2 & Human Physiology Lab	IPHY 3470 ( <i>pre-req. for 3480 and 3435</i> ) IPHY 2800 ( <i>pre-req. for 3435 only</i> )

**IPHY Hours Sub-Total: 16 Credit Hours**

### C. IPHY Major Core Courses (C- or better required)

Students choose 3 of the following 6 courses (2 of which must be taken at CU Boulder):

<i>Course Number - Credit</i>	<i>Course Title</i>	<i>Prerequisites</i>
IPHY 3060-4 ( <i>Fall only</i> )*	Cellular Physiology	IPHY 2800 and IPHY 3470
IPHY 4600-4 ( <i>Spring only</i> )*	Immunology	IPHY 2800 and IPHY 3470
IPHY 4440-4 ( <i>Fall, Spring</i> )*	Endocrinology	IPHY 2800 and IPHY 3470
IPHY 4540-5 ( <i>Fall, Spring</i> )*	Biomechanics	IPHY 2800 and IPHY 3470; First semester Physics and Calculus 1 (see Part A above)
IPHY 4650-5 ( <i>Fall, Spring</i> )*	Exercise Physiology	IPHY 2800 and IPHY 3470; IPHY 3480 & 3435
IPHY 4720-4 ( <i>Fall, Spring, Summer</i> )*	Neurophysiology	IPHY 2800 and IPHY 3470

**IPHY Core Sub-Total: 12-14 Credit Hours**

*\*This is the current schedule pattern. Course availability is subject to change in the future.*

**Total IPHY Hours Required For Major: 30 Credit Hours**

**NOTE: Only 45 IPHY hours MAXIMUM can be counted toward the degree.**

#### IV. Electives in Integrative Physiology (6-21 credit hours)

##### A. Electives That Meet CORE Requirements

- IPHY 1950-3 Introduction to Scientific Writing in Integrative Physiology\*
- IPHY 3700-3 Scientific Writing in Integrative Physiology \*\*
- IPHY 4660-3 Critical Thinking in Integrative Physiology \*\*\*

- or -

IPHY 4680-3 Critical Thinking in Exercise Physiology\*\*\*

\* *This satisfies the Arts & Sciences Lower Division requirement for Written Communication.*

\*\* *This satisfies the Arts & Sciences Upper Division requirement for Written Communication.*

\*\*\* *This satisfies the Arts & Sciences requirement for Critical Thinking.*

##### B. Variable Credit Electives

- IPHY 4860-(1→3) Independent Study - (*For more information, see the FAQ section of this document*)
- IPHY 4870-3 Honors Thesis - (*For more information, see the FAQ section of this document*)
- IPHY 4930-(1→6) Internship - (*For more information, see the FAQ section of this document*)

##### C. Additional Electives the Department May Offer:

Please see the online catalog for course descriptions at <http://www.colorado.edu/catalog/>. **NOTE:** Many of these classes have prerequisites. Please see the Schedule Planner, <http://plus.colorado.edu/plus/planner/>, for the electives currently offered and the prerequisites for those electives.

IPHY 2600-2 Introduction to Research Methods  
IPHY 2910-(1→3) Practicum in Integrative Physiology  
IPHY 3010-(1→2) Teaching in Integrative Physiology  
IPHY 3420-3 Nutrition, Health, and Performance  
IPHY 3450-3 Comparative Animal Physiology  
IPHY 3460-5 Comparative Vertebrate Anatomy (*may be taken in lieu of IPHY 3410 + IPHY 3415*)  
IPHY 3500-2 Applied Clinical Research  
IPHY 3660-3 Dynamics of Motor Learning  
IPHY 3800-3 Forensic Biology  
IPHY 3810-1 Forensic Biology Laboratory  
IPHY 4010-(1→3) Seminar in Integrative Physiology (Upper Division)  
IPHY 4200-3 Physiological Genetics and Genomics  
IPHY 4470-3 Biology of Human Reproduction  
IPHY 4480-3 Comparative Reproduction  
IPHY 4740-3 Theory of Motor Skill Learning

Seniors may also take up to 6 hours of 5000-level graduate courses as electives.

## Integrative Physiology Major Suggested 4-year plans

(I = Integrative Physiology Course)

### Integrative Physiology: covering major requirements only.

Year	Fall	Spring
1	Biology with lab – 4	Biology with lab – 4 Calculus (MATH 1300 – 5 <b>or</b> MATH 1310 – 5 <b>or</b> APPM 1350 – 4)
2	CHEM 1111: General Chemistry 1 – 5 I 3410: Human Anatomy (Lecture) – 3 I 3415: Human Anatomy (Lab) – 2	CHEM 1131: General Chemistry 2 – 5 I 2800: Intro. to Statistics – 3
3	PHYS 2010: General Physics 1 – 5 I 3470: Human Physiology 1 – 3	PHYS 2020: General Physics 2 – 5 I 3480: Human Physiology 2 – 3 I 3435: Human Physiology Lab – 2
4	IPHY Major Core Course - #1* IPHY Major Core Course - #2*	IPHY Major Core Course - #3* I 4660 or I 4680: Critical Thinking – 3

### Integrative Physiology + Additional Chemistry: often required for pre-health programs.

Year	Fall	Spring
1	Biology with lab – 4 CHEM 1111: General Chemistry 1 – 5	Biology with lab – 4 CHEM 1131: General Chemistry 2 – 5 Calculus (MATH 1300 – 5 <b>or</b> MATH 1310 – 5 <b>or</b> APPM 1350 – 4)
2	CHEM 3311: Organic Chemistry 1 – 4 CHEM 3321: OChem Lab 1 – 1 I 3410: Human Anatomy (Lecture) – 3 I 3415: Human Anatomy (Lab) – 2	CHEM 3331: Organic Chemistry 2 – 4 CHEM 3341: OChem Lab 2 – 1 I 2800: Intro to Statistics – 3 I 3470: Human Physiology 1 – 3
3	PHYS 2010: General Physics 1 – 5 I 3480: Human Physiology 2 – 3 I 3435: Human Physiology (Lab) – 2 CHEM 4611: Survey of Biochemistry – 3	PHYS 2020: General Physics 2 – 5 IPHY Major Core Course - #1*
4	IPHY Major Core Course - #2*	IPHY Major Core Course - #3* I 4660 or I 4680: Critical Thinking – 3

*\*See page 3 for course selection and prerequisites.*

## Answers to Frequently Asked Questions About the Integrative Physiology Program

### 1. What if I don't have the background to go directly into the science courses required for the major?

For some students with little or no high school chemistry or physics or precalculus, or for those students who have been out of school for some time, it may be worth your while to take a preparatory course.

To prepare for Calculus 1:

Algebra: MATH 1001-3 or MATH 1011-3 *plus*

Trigonometry: MATH 1021-2

-or-

Precalculus: MATH 1150-4 (*includes both college algebra and trigonometry*)

To prepare for CHEM 1111-5: take CHEM 1021-4.

To prepare for Physics 1: take PHYS 1000-3.

***When in doubt, see your advisor!***

### 2. Do some IPHY *elective* courses count both toward IPHY elective credit and for College Core areas?

Yes. IPHY 1950-3 (*Introduction to Scientific Writing in Integrative Physiology*) fulfills the lower division written communication requirement. IPHY 3700-3 (*Scientific Writing in Integrative Physiology*) fulfills the upper division written communication requirement. IPHY 4660-3 (*Critical Thinking in Integrative Physiology*) and IPHY 4680-3 (*Critical Thinking in Exercise Physiology*) fulfill the critical thinking requirement. These courses also help fulfill the 30-hour requirement in Integrative Physiology.

### 3. What ancillary courses outside the major also count for College Core Areas?

Any course that fulfills our calculus requirement (MATH 1300-5, 1310-5 or APPM 1350-4) will fulfill the College requirement in quantitative reasoning. Integrative Physiology majors are exempt from the natural sciences Core requirement because of the biology, chemistry and physics required in the major.

### 4. How do I get a transfer course approved?

**BEFORE** you take an **Integrative Physiology** course at another U.S. institution, bring the 'Pre-approval' form (available in Woodbury 109) and the course description to your advisor for evaluation of the course. For courses from foreign institutions, begin the process at the Office of International Education in the Environmental Design building.

For pre-approval of **non-IPHY coursework** (ancillary or Core courses) you will need to submit course descriptions, and sometimes syllabi, to the Academic Advising Center in Woodbury 109. It can take 3 to 5 weeks for a response. For courses from Colorado colleges, see your advisor.

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**5. How many IPHY electives do I need?**

You need 30 IPHY credit hours of C- or better to complete the major. The number of elective credits you need will vary based upon what 3 IPHY core courses you choose to take. Also, if you take your statistics class outside the department, you may need additional IPHY elective hours.

**6. Do I have to take writing through IPHY?**

Only if you pursue honors or a BA/MS degree (see Questions 12 and 13). IPHY 3700 is strongly recommended for certain PreHealth majors and as preparation for graduate school. See your PreHealth advisor if you have additional questions about IPHY 3700's applicability to graduate health programs.

**7. How do I get involved in research or independent study?**

There are many ways to get involved in research. One way to get started is to go to the departmental website, <http://www.colorado.edu/intphys/>, and check out the research areas in which the faculty are engaged. When you find an area that interests you, talk to the faculty member to see how you can get involved. Credit can be gained via independent study or funding can be provided via the Undergraduate Research Opportunities Program (UROP):

<http://www.colorado.edu/Research/UROP/>. Minimum prerequisites for independent study are junior standing and an overall GPA of 2.0. See the independent study application for details: [http://www.colorado.edu/intphys/ugrad/iphy\\_4860\\_application.pdf](http://www.colorado.edu/intphys/ugrad/iphy_4860_application.pdf).

**8. How do I get involved in teaching?**

We offer the opportunity for students to be Teaching Assistants in courses which have a laboratory component. Students must be of junior standing and must have earned at least a B in the course they wish to assist. See the IPHY 3010 (*Teaching in Integrative Physiology*) application for more details: [http://www.colorado.edu/intphys/ugrad/iphy\\_3010\\_application.pdf](http://www.colorado.edu/intphys/ugrad/iphy_3010_application.pdf).

**9. Are internships required?**

No, but they are highly recommended. Those students whose goal is a graduate health program will probably be doing a number of volunteer internships in situations related to the program of interest. See the PreHealth office for more information. For students who plan careers not requiring an advanced degree (corporate health, health administration, pharmaceutical or health supplement sales, for example) an internship for credit can provide an opportunity to work in the field of interest and develop contacts. Prerequisites for IPHY 4930 are junior standing, completion of at least 2 of the upper division major core courses, and an overall GPA of 2.0 (see the internship application for details: [http://www.colorado.edu/intphys/ugrad/iphy\\_4930\\_application.pdf](http://www.colorado.edu/intphys/ugrad/iphy_4930_application.pdf)).

Freshmen and sophomores with an internship possibility can look into IPHY 2910 (*Practicum in Integrative Physiology*): [http://www.colorado.edu/intphys/ugrad/iphy\\_2910\\_application.pdf](http://www.colorado.edu/intphys/ugrad/iphy_2910_application.pdf). See Dr. Sherwood or your advisor for more information.

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**10. How do I find out about internships?**

Check the Integrative Physiology bulletin board in Clare Small. Call the hospital/clinic/health club you are interested in. Watch for emails from advising or the Physiology Club. Go to the Career Services Office, <http://careerservices.colorado.edu/>. And/or check with PreHealth advising for additional opportunities: <http://www.colorado.edu/ArtsSciences/aacforstudents/prehealth.html>. (The PreHealth office keeps an updated handout on local volunteer opportunities, among many other useful things.)

**11. How do I find out about careers in Integrative Physiology?**

Ask the faculty. For health-related careers, contact PreHealth advising in Old Main 1B-90. Watch for emails from Academic Advising or the Integrative Physiology Student Board. Go to Career Services. And finally, see Dr. Sherwood for more information.

**12. I'm interested in doing an Honors Thesis. Do you have an Honors Program?**

Yes, we offer the opportunity for strong students to pursue departmental honors. To apply, you need to be a sophomore or junior with a minimum cumulative GPA of 3.3. A written research thesis will be required of students in order to graduate with departmental honors. For more information, please contact Dr. Sherwood.

**13. Can I earn a BA and an MS in five years?**

Yes. The Department offers a concurrent BA/MS program for strong, highly motivated students with at least a 3.3 cumulative GPA. For more information or to apply, contact Dr. Sherwood during your sophomore year (and *no later* than the second semester of your junior year).