



USC Dornsife College of  
Letters, Arts and Sciences

## **HBIO302L – Nutrition and Metabolism**

**4 Units**

**Fall 2023 — Tuesday & Thursday —Time: 5:30-6:50PM**

**Lecture Location: WPH B27**

**Labs:** **Monday,** 2:00-4:50 pm  
**Tuesday,** 8:00-10:50 am  
**Tuesday,** 2:00-4:50 pm  
**Wednesday,** 8:00-10:50 am  
**Wednesday,** 2:00-4:50 pm  
**Thursday,** 11:00-1:50 pm

**Lab Location: PED B12**

**Instructor: Casey Donovan, Ph.D., Professor (*he/him/his*)**

**Office: AHF 251 & on-line via Zoom**

**Office Hours: Wednesdays, 1:00-2:00 pm & by appointment (Zoom)**

**Contact Info: [donovan@usc.edu](mailto:donovan@usc.edu), (213) 740-2492**

*\*Wednesday office hours: These office hours will be held in AHF 251 or Zoom depending on student preference. They will be open to any interested students from the class, but please notify the instructor ahead of time if you plan on attending. If you have an issue specific to yourself, e.g. exam score, status in the class, etc., you should schedule an individual appointment with the professor directly via email request. Office hours by appointment will be conducted on Zoom.*

**Lab Instructors: Bara Floyd, MS (*she/her/hers*) [gbfloyd@usc.edu](mailto:gbfloyd@usc.edu)**

**Office: PED 109: Office hours: TBA**

**Lauren Visconti (*she/her/hers*) [lviscont@usc.edu](mailto:lviscont@usc.edu)**

**Office: PED 109: Office hours: TBA**

**Peer Tutor: Caitlin Nguyen (*she/her/hers*) [cnguyen5@usc.edu](mailto:cnguyen5@usc.edu)**

**Lab Director: Anh-Khoi Nguyen, PhD (*he/him/his*)**

**Office: PED 109; Office Hours: by appointment**

**Contact Info: [agnguyen@usc.edu](mailto:agnguyen@usc.edu)**

## Course Description

- Gastrointestinal physiology and energy metabolism as it relates to macronutrient intake and their regulation. This course is a pre-requisite for HBIO 407L.
- This course is intended to introduce HBIO majors to the physiological principles associated with the digestion and absorption of macronutrients as well as the major catabolic pathways associated with carbohydrate, lipid and protein metabolism. The course also examines the primary metabolic pathways involved in energy storage. Food digestion and absorption as well as cellular metabolism are the foundation of life; food intake dictates energy intake and cellular metabolism regulates energy output. Upon completion of this course, students should be able to think about energy intake and output at the cellular level and be able to assess the impact of dysregulation in disease.

## Learning Objectives

- to describe the structure/function of selected cells, tissues, organs and organ systems of the gastrointestinal tract
- to describe the metabolic pathways associated with the catabolism of lipids, carbohydrates and proteins.
- to describe the metabolic pathways associated with the storage of energy as lipids or carbohydrates.
- to relate the knowledge of nutrition and metabolism to a healthy lifestyle
- to correlate metabolic markers with dietary intake
- to complete a research experiment using biological instrumentation, perform statistical analysis and report data.

**Prerequisite:** BISC 220L or BISC 221L

## Required Readings and Supplementary Materials

When ordering books online from the bookstore, please go to [usctext.com](https://usctext.com) and you can either select in-store pick-up or have them shipped to your home.

1. **Gastrointestinal Physiology, 2nd Edition, by Barrett, K., Publisher: McGraw-Hill Medical Publishing (2014).** This textbook is available at the USC bookstore, directly from McGraw-Hill <https://www.mhprofessional.com/gastrointestinal-physiology-2-e-9780071774017-usa> or various resellers. The book is available in hardcopy or as an e-text for rent or download.
2. **Biochemistry (Illustrated Review), 8<sup>th</sup> edition, by Abali, et al. Wolters Kluwer/LWW, Philadelphia (2022).** This textbook can be purchased at the USC bookstore, directly from the publisher Wolter Kluwers/LWW < <https://shop.lww.com/Lippincott-Illustrated-Reviews--Biochemistry/p/9781975155063>> or at various resellers. The book is available in hardcopy or as an e-text for rent or download. This book can also be found under the "View Online" option of the link below which is linked to the USC library. Before access is provided, you will be prompted for your USC credentials.  
[https://uosc.primo.exlibrisgroup.com/permalink/01USC\\_INST/hs9vaa/alma991043480725303731](https://uosc.primo.exlibrisgroup.com/permalink/01USC_INST/hs9vaa/alma991043480725303731)
3. **HBIO 302L Lab Manual:** available as hardcopy in the USC bookstore

## **Technological proficiency and Hardware/Software required**

- You will need an internet-enabled device with browser capabilities, such as a tablet or laptop/desktop computer. Students will also need to download/install the Respondus Lockdown Browser to take all scheduled exams. Please make certain this is the latest version distributed by USC IT Services.
- This course requires the use of Blackboard which will be your gateway to access course materials (e.g. slide-decks/notes, announcements, exams, etc.) and view your grades.
- Information for these resources can be found at the ITS Customer Support Center: <https://itservices.usc.edu/contact/> and <https://blackboardhelp.usc.edu/>.
- The lab portion of this course also requires the use of Microsoft Word, Excel and Powerpoint.
- USC Technology Rental Program: <https://itservices.usc.edu/spaces/laptoploaner/>  
Students in need of resources to participate in this class can apply to the university's equipment rental program and the Student Basic Needs team will work with you to determine eligibility and distribute equipment.

## **Grading and Assessment**

Grading for the class will be based on three midterm exams, a cumulative final exam, and your laboratory grade. The midterm & final exams are generally comprised of multiple-choice questions but may contain some short answer questions as well. Grading for the lab portion includes lab assignments, quizzes and exams, and is conducted separately from the lecture.

## **Grading Breakdown**

Midterm Exam #1	15%
Midterm Exam #2	15%
Midterm Exam #3	15%
Final Exam	30% ( <i>comprehensive exam</i> )
Lab Grade	25%

## **Grading Scale**

- The lecture portion of this course uses a “relative” grading scheme (i.e. curve) based on the class mean (average) and SD (variance). Essentially, you are graded based on your performance in the class relative to the other students.
- The lab portion of the course employees a separate grading scheme that will be discussed in your first lab section meeting.
- At the end of the course you will receive separate letter grades for the “Lecture” and “Lab” portions of the course. These will be converted to Grade Points utilizing a standard scale (e.g. A=4.0; A-=3.7; B+=3.3; B=3.0, B-=2.7; C+=2.3; C=2.0, etc.), assigned the appropriate weighting (Lecture = 0.75; Lab = 0.25), then added together to generate your final Course Grade.

## **Grading Timeline**

- Lecture exam grades (letter) are usually provided within 48 hours of the exam.
- Lab grades for assignments/quizzes/exams are usually provided within a week.

## **Course Specific Policies**

### **Lectures:**

- 1) Lectures for this course are scheduled to be delivered in-person without Zoom recording. The Zoom platform will only be employed in unique situations, eg. instructor illness, conflicting commitments, etc. If you have not used this platform before, please go to <https://keepteaching.usc.edu/students/student-toolkit/classroom/zoom/> for instructions.
- 2) If copies of lecture slides/notes are provided these will be found on Blackboard and may differ from those presented in class (e.g. different illustrations, added notes, etc.). These are not intended as a replacement for attending lecture and you will be responsible for material covered in lecture that does not appear on any provided powerpoints/notes.
- 3) Any powerpoints/notes provided for this course are solely for your use in class and are not to be used or disseminated beyond this course. (see “Course Content Distribution and Synchronous Session Recordings Policies” below)

#### ***University Policy on Course Content Distribution and Synchronous Session Recordings***

*USC has policies that prohibit recording and distribution of any synchronous and asynchronous course content outside of the learning environment.*

*Recording a university class without the express permission of the instructor and announcement to the class, or unless conducted pursuant to an Office of Student Accessibility Services (OSAS) accommodation. Recording can inhibit free discussion in the future, and thus infringe on the academic freedom of other students as well as the instructor. ([Living our Unifying Values: The USC Student Handbook](#), page 13).*

*Distribution or use of notes, recordings, exams, or other intellectual property, based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study. This includes but is not limited to providing materials for distribution by services publishing course materials. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the internet, or via any other media. ([Living our Unifying Values: The USC Student Handbook](#), page 13).*

### **Exams:**

- 1) While exams will be given in-person/in-class, they will be provided online and require the use of the Respondus LockDown Browser. If you are unfamiliar with the Respondus LockDown Browser, please see the following link <https://keepteaching.usc.edu/students/student-toolkit/classroom/respondus/>
- 2) You will need to access the exams through Blackboard, which will be found under the “Assignments” tab. A practice exam will be provided within the first few weeks for the purpose of familiarizing you with exam format and use of Lockdown Browser. Please make certain that your computer is using the latest version of the Lockdown Browser, obtained through the USC Information Technology Services.
- 3) Make-up Exams:
  - a) As a rule, make-up exams will not be given unless preapproved by the instructor or written/verifiable evidence of a medical emergency or other extenuating circumstance is provided.
  - b) Make-up exams will not be preapproved unless University policy provides for such accommodations (e.g. religious holidays, athletic competition, etc.).

- c) Where accommodations can be anticipated (e.g. religious holidays, athletic competition) requests must be made within the first 3 weeks of the semester.
- d) *Note: While covering the same material, make-up exams may be distinct from the main exam in content (ie. different questions) and format.*

### **Communication Policies**

- 1) Use your USC email account for all correspondence with the instructor (*Class inquiries that originate from non-USC email accounts will not receive a response*).
- 2) Students are *strongly* encouraged to contact the instructor regarding all matters involving course content or policy during normal office hours. In these cases, office hours must be scheduled ahead of time though such sessions will generally be open to multiple students.
- 3) Should you have a question about specific course content and cannot attend office hours, you are encouraged to submit the question via email. Simple questions will be answered by email and best attempts will be made to answer such emails within 48 hours (72 hours over a weekend and the work day following a holiday).
- 4) To promote independence and critical thinking, students are encouraged to work through the following process for obtaining answers to course-related questions before contacting the instructor.
  - First, consult the course powerpoints/notes and/or textbook(s).
  - If you cannot find the answer you need, next consult a classmate(s) if available.
  - If you still cannot find a satisfactory answer, email the instructor using your USC email address. In your email, please indicate the steps you have taken to seek the answer for your question.

### **Attendance**

Attendance does not constitute any part of the grading for this course, but you are required to learn the material presented in class and non-attendance is not a viable excuse for failing to do so. Students missing lectures must make their own arrangements to acquire the information provided in the lecture, e.g. other students in the class, an assigned note-taker, etc. Sessions will not be presented via Zoom or taped for subsequent viewing.

### **Classroom norms**

- Students attending lecture are expected to be attentive, focus on the lecture and avoid any disruptive activities (*eg. talking, eating, checking phone or websites, etc.*).
- Cell phones must be silenced and not used during class (*no texting, answering calls, etc.*)
- Computers/tablets are allowed for note taking only and are not to be used for checking emails, social media or any other websites. Excessive abuse of this policy will result in the disallowance of computers/tablets in class for the remainder of the semester.
- **Photographing slides presented in class is strictly prohibited.** The relevant material can be found in your textbooks or may be provided in Blackboard using the same figures or suitable substitutes.
- Questions on material presented in class are encouraged, but please raise your hand and wait to be acknowledged before proceeding with your question.

### Tentative Course Lecture Schedule:

(see below for tentative lecture schedule and associated reading assignments)

Date	Lecture Topic	Readings/Chapters	
		<i>Barrett</i>	<i>Abali, et.al.</i>
Aug. 22	Course Overview; Digestion Introduction	Ch. 1	
Aug. 24	Digestion/Gastric Secretion	Ch. 3	
Aug. 29	Digestion/Salivary & Pancreatic Secretion	Ch. 4	
Aug. 31	Digestion/Esophageal & Gastric Motility	Ch. 7 & 8	
Sept. 5	Digestion/Intestinal Motility	Ch. 9	
Sept. 7	Digestion/Water & Electrolyte Absorption	Ch. 5	
Sept. 12	Digestion/Absorption of CHO & Protein	Ch. 15	
Sept. 14	Digestion/Absorption of Lipids	Ch. 16	
Sept. 19	<b>Midterm #1</b>		
Sept. 21	Liver: Anatomy of Liver & Biliary System	Ch. 10	
Sept. 26	Liver: Bile Formation/Secretion & Gallbladder	Ch. 11 & 12	
Sept. 28	Introduction to Metabolism & Carbohydrates		Ch. 7 & 8
Oct. 3	Glucose Uptake & Glycolysis		Ch. 8 & 12
Oct. 5	Glycolysis & Glycogenolysis		Ch. 11
Oct. 10	Pyruvate DH Complex & TCA cycle		Ch. 9
Oct. 12	<i>Fall Recess</i>		
Oct. 17	Electron Transport & Electron Shuttles		Ch. 6
Oct. 19	<b>Midterm #2</b>		
Oct. 24	Oxidative Phosphorylation		Ch. 6
Oct. 26	Lipolysis & Lipid Transport/Uptake		Ch. 15 & 18
Oct. 31	Lipid uptake & Beta-oxidation		Ch. 16
Nov. 2	Gluconeogenesis & Glycogen Storage		Ch. 10
Nov. 7	Fatty Acid Synthesis & Triglyceride Formation		Ch. 16
Nov. 9	Protein & Amino Acid structure		Ch. 1 & 2
Nov. 14	Proteolysis & Amino Acid Degradation		Ch. 19 & 20
Nov. 16	<b>Midterm #3</b>		
Nov. 21	Ammonia Disposal & Urea Formation	Ch. 14	
Nov. 23	<i>Thanksgiving Recess</i>		
Nov. 28	Nutrition: Macronutrients		Ch. 27
Nov. 30	Nutrition: Micronutrients		Ch. 28 & 29
<b>Dec. 7 (Thurs)</b>	<b>FINAL EXAM – 4:30 – 6:30 PM</b>		

## **Course Evaluations**

Course evaluations occur at the end of the semester university-wide and are an important review of students' experience in their classes. Students will be contacted by the university towards the end of the semester with instructions and timelines for submitting these evaluations.

## **Statement on Academic Conduct and Support Systems**

### **Academic Integrity:**

The University of Southern California is a learning community committed to developing successful scholars and researchers dedicated to the pursuit of knowledge and the dissemination of ideas. Academic misconduct, which includes any act of dishonesty in the production or submission of academic work, compromises the integrity of the person who commits the act and can impugn the perceived integrity of the entire university community. It stands in opposition to the university's mission to research, educate, and contribute productively to our community and the world.

All students are expected to submit assignments that represent their own original work, and that have been prepared specifically for the course or section for which they have been submitted. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s).

Other violations of academic integrity include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), collusion, knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university. All incidences of academic misconduct will be reported to the Office of Academic Integrity and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see [the student handbook](#) or the [Office of Academic Integrity's website](#), and university policies on [Research and Scholarship Misconduct](#).

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

### **Students and Disability Accommodations:**

USC welcomes students with disabilities into all of the University's educational programs. [The Office of Student Accessibility Services](#) (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at [osas.usc.edu](https://osas.usc.edu). You may contact OSAS at (213) 740-0776 or via email at [osasfrontdesk@usc.edu](mailto:osasfrontdesk@usc.edu).

### **Support Systems:**

[Counseling and Mental Health](#) - (213) 740-9355 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

[988 Suicide and Crisis Lifeline](#) - 988 for both calls and text messages – 24/7 on call

The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

[Relationship and Sexual Violence Prevention Services \(RSVP\)](#) - (213) 740-9355(WELL) – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

[Office for Equity, Equal Opportunity, and Title IX \(EEO-TIX\)](#) - (213) 740-5086

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

[Reporting Incidents of Bias or Harassment](#) - (213) 740-5086 or (213) 821-8298

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

[The Office of Student Accessibility Services \(OSAS\)](#) - (213) 740-0776

OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

[USC Campus Support and Intervention](#) - (213) 740-0411

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

[Diversity, Equity and Inclusion](#) - (213) 740-2101

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

[USC Emergency](#) - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

[USC Department of Public Safety](#) - UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call

Non-emergency assistance or information.

[Office of the Ombuds](#) - (213) 821-9556 (UPC) / (323-442-0382 (HSC)

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

[Occupational Therapy Faculty Practice](#) - (323) 442-2850 or [otfp@med.usc.edu](mailto:otfp@med.usc.edu)

Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.