

# FOOD 4201: Advanced Nutrition and Energy Metabolism

## Fall 2023

<b>Course Instructor:</b> Dr. Véronic Bézaire <b>How to address me:</b> Véronic <b>Gender Pronouns:</b> (she/her/hers) ( <a href="#">learn more</a> ) <b>Email:</b> <a href="mailto:veronic.bezaire@carleton.ca">veronic.bezaire@carleton.ca</a> If you have a question or would like to talk with me, you can send an email or approach me during class time. <b>Phone:</b> 613-520-2600 x 5012	<b>Office Location:</b> 319 Steacie Building <a href="#">Click here for visual directions.</a> <b>Class Location:</b> 431 Tory Building (In-person) <a href="#">Click here for visual directions.</a>  <b>Class Times:</b> Wednesdays 11:35am-14:25pm ET <b>Prerequisites:</b> FOOD 2001, BIOC 3101 and fourth year standing
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### Course description

Metabolism of macronutrients in the human body. Detailed catabolic and anabolic reactions of carbohydrates, lipids, and proteins. Regulatory control points in healthy and diseased states. Discussion of the literature pertaining to nutrition, metabolism, and chronic diseases.

### Course objectives

This course tackles advanced nutrition and energy metabolism. The basis of nutrition is biochemistry therefore, biochemistry principles will be revisited. The fate of macronutrients from ingestion onwards will be examined. With each macronutrient and pathway, we will discuss relevant nutritional issues, in the healthy and diseased states. Through this course, students will learn to:

#### 1. Describe principles of biochemistry

- Interpret and explain metabolic pathways of macronutrients
- Identify pathway regulatory steps and describe modes of regulation
- Identify and justify the need for tissue-specific pathways, regulation or regulators

#### 2. Integrate nutrition and biochemical knowledge of macronutrients

- Relate nutrient deficiency or overload to disease
- Analyze interactions between nutrients
- Analyze crosstalk between tissues
- Postulate on systemic effects of nutrients

#### 3. Critically analyze topics in nutrition

- Identify credible sources of information appropriate to the scope of a research question
- Evaluate information and its sources critically (relevance, currency, authority, biases)
- Use information effectively and ethically
- Effectively communicate concepts to peers and guide discussion groups

## Land Acknowledgement

Here at Carleton University, it is important that we acknowledge that the land on which we gather is the traditional and unceded territory of the Algonquin nation.

## Inclusive teaching statement

I will continually strive to create inclusive learning environments and would therefore appreciate your support and feedback.

## Community Guidelines

In our course, we will seek to behave according to the International Center for Academic Integrity\*.

	As students, we will...	As a teacher, I will...
<b>Honesty</b>	<ul style="list-style-type: none"> <li>Honestly demonstrate our knowledge and abilities on assignments and exams</li> <li>Communicate openly without using deception, including citing appropriate sources</li> </ul>	<ul style="list-style-type: none"> <li>Give you honest feedback on your demonstration of knowledge and abilities on assignments and exams</li> <li>Communicate openly and honestly the expectations and standards of the course through the syllabus</li> </ul>
<b>Responsibility</b>	<ul style="list-style-type: none"> <li>Complete assignments on time and in full preparation for class</li> <li>Show up to class on time, and be mentally/physically present</li> <li>Participate fully and contribute to team learning and activities</li> </ul>	<ul style="list-style-type: none"> <li>Give you timely feedback on your assignments and exams</li> <li>Show up to class on time, and be mentally &amp; physically present</li> <li>Create relevant assessments and activities</li> </ul>
<b>Respect</b>	<ul style="list-style-type: none"> <li>Speak openly with one another, while respecting diverse viewpoints and perspectives</li> <li>Provide sufficient space for others to voice their ideas</li> </ul>	<ul style="list-style-type: none"> <li>Respect your perspectives even while we challenge you to think more deeply and critically</li> <li>Help facilitate respectful exchange of ideas</li> </ul>
<b>Fairness</b>	<ul style="list-style-type: none"> <li>Contribute fully to collaborative work, so that we are not freeloading off of others</li> <li>Not seek unfair advantage over fellow students in the course</li> </ul>	<ul style="list-style-type: none"> <li>Create fair assignments and exams, and grade them in a fair, and timely manner</li> <li>Treat all students equitably</li> </ul>
<b>Trust</b>	<ul style="list-style-type: none"> <li>Be open and transparent about what we are doing in class</li> <li>Not distribute course materials to others without authorization</li> </ul>	<ul style="list-style-type: none"> <li>Be available to all students when we say we will be</li> <li>Not modify the expectations without communicating with everyone in the course</li> </ul>
<b>Courage</b>	<ul style="list-style-type: none"> <li>Say or do something when we see actions that undermine values above</li> <li>Accept a lower or failing grade or other consequences of upholding and protecting the above values</li> </ul>	<ul style="list-style-type: none"> <li>Say or do something when we see actions that undermine any of the above values</li> <li>Accept the consequences (e.g., lower teaching evaluations) of upholding and protecting the above values</li> </ul>

<sup>2</sup> This class statement of values is adapted from Tricia Bertram Gallant, Ph.D.

## Learning Materials

### Websites:

In pre-class tasks, we will be accessing the following [Metabolic Pathways Website](#) regularly for review and construction of pathways.

In pre-class tasks, we will also be accessing [Perusall](#) to promote asynchronous exchange of ideas on specific readings. The code for our course in Perusall is: **BEZAIRE-YJ8JW**.

### Textbook (optional):

I will be referring to the following textbooks. However, any biochemistry textbook you already have should suffice. Links to readings and online resources will be posted in Brightspace.

Advanced Nutrition and Human Metabolism, 5<sup>th</sup> Edition, Sareen S Gropper, Wadsworth CENGAGE Learning  
Biochemistry: A Short Course, John L. Tymoczko, W.H. Freeman Company.

### Mandatory Technology Checklist:

- ☐ An internet-enabled computer (laptop/desktop)
- ☐ Access to reliable internet

*Note: Mention options here for students who do not have access to these resources. Options include financial aid from Carleton, inexpensive options for technology (Best Buy refurbished products, Kijiji), & single workspaces available for student use on campus.*

## Assessment in this Course

Research about learning strongly suggests that the most important factor in learning is doing the work of reading, writing, recalling, practicing, synthesizing, and analyzing. Learning happens best when people actively engage material on a consistent basis, and that is why I have high standards in this course. I am confident that, with appropriate effort, you **all** can meet those standards. I also reduce unintentional bias by grading anonymously and using rubrics.

## Grade Breakdown

Pre-Class Tasks	Worksheets	10%	5 x 2% (SAT/UNSAT)
	Perusall Readings	12%	4 x 3% (SAT/UNSAT)
In-Class Tasks		10%	10 of 12, x 1% (SAT/UNSAT)
Midterm Assessment		32%	Due date: Oct 20 <sup>th</sup> , 2023 (tentative)
Final Assessment		36%	Due date: formally scheduled

A passing grade must be obtained on the midterm and final assessments to pass the course.

### PRE-CLASS TASKS: Worksheets -

Worksheets are a type of learning activity that contribute to learning objectives 1: *Describe principles of biochemistry* and 2: *Integrate nutrition and biochemical knowledge of macronutrients*.

The worksheets are to be completed before class, as preparation for the synchronous session. There are five sets of worksheet submissions. Worksheet sets are worth 2% each. All five (5) submissions must be submitted by 11:30 ET on the day of class. They will be evaluated as SAT/UNSAT. Revisions will be requested if evaluated as UNSAT.

### PRE-CLASS TASKS: Perusall Readings -

Perusall readings are a type of learning activity that contribute to learning objectives 2: *Integrate nutrition and biochemical knowledge of macronutrients* and 3: *Critically analyze topics in nutrition*.

Readings will help you explore topics in nutrition and energy metabolism that complement material covered in class. As a social annotation tool, Perusall will encourage you to read thoughtfully and discuss the reading with your peers. There are four readings, one for each module. Three (3) of four (4) readings must be completed by 11:30 ET on the day of class. They will be evaluated as SAT/UNSAT.

### IN-CLASS TASKS -

In-class tasks will be completed in groups during with the help of shared documents. They are a type of learning activity that contribute to learning objectives 1: *Describe principles of biochemistry* and 2: *Integrate nutrition and biochemical knowledge of macronutrients*.

The in-class tasks will encourage you to discuss the material with your peers as it is being presented in class. There are a total of 12 in-class tasks, 10 of which must be submitted, for 1% each. The submissions will not be done in Brightspace, but rather simply by completing the shared document during class time. The names of active participants within a group must be added to each shared document. They will be evaluated as SAT/UNSAT.

### Midterm Assessment -

The mid-term assessment contributes to learning objectives 1: *Describe principles of biochemistry* and 3: *Critically analyze topics in nutrition*. This assessment consists of a series of questions on material covered in lectures from SEP 12 to OCT 18. Research each question using ChatGPT. Edit and correct answers generated by ChatGPT using primary literature and your class notes. Support your statements with complete, accurate, and proper referencing (CSE style).

### Final Assessment -

The final assessment contributes to learning objectives 1: *Describe principles of biochemistry*, and 2: *Integrate nutrition and biochemical knowledge of macronutrients*.

This assessment consists of several short answer questions, and a long answer question that integrates material from SEP 12 through DEC 06. The long answer question may require the use of scientific literature (referenced in CSE style) to support your statements.

## Accommodations for Missed Work

Carleton recognizes that students may be experiencing greater stress and other life factors that are not in their control. As a result, Carleton has put into place a protocol for students to apply for accommodations using a self-declaration form in the event of missed work. The form can be found at:

<https://carleton.ca/registrar/wp-content/uploads/self-declaration.pdf> **Email me the filled form if you are unable to complete work on time.** Note that these forms should be used for short-term concerns related to missed work; if you are experiencing chronic, ongoing challenges which necessitate a broader solution, I recommend reaching out to the Paul Menton Centre and/or the Care Support team.

## Academic Integrity

Academic Integrity is upholding the values of honesty, trust, respect, fairness, responsibility, and courage that are fundamental to the educational experience. Carleton University provides supports such as academic integrity workshops to ensure, as far as possible, that all students understand the norms and standards of academic integrity that we expect you to uphold. Your teaching team has a responsibility to ensure that their application of the Academic Integrity Policy upholds the university's collective commitments to fairness, equity, and integrity.

(Adapted from Carleton University's Academic Integrity Policy, 2021).

### Examples of actions that do not adhere to Carleton's Academic Integrity Policy include:

- Plagiarism
- Accessing unauthorized sites for assignments or tests
- Unauthorized collaboration on assignment and exams
- Using artificial intelligence tools such as ChatGPT when your assessment instructions say that it is not permitted

Please review the checklist [linked here](#) to ensure you understand your responsibilities as a student with respect to academic integrity and this course.

## Sanctions for not abiding by Carleton's Academic Integrity Policy

A student who has not upheld their responsibilities under Carleton's Academic Integrity Policy may be subject to one of several sanctions. A list of standard sanctions in science can be found [here](#).

Additional details about this process can be found on the [Faculty of Science Academic Integrity website](#). Students are expected to familiarize themselves with and follow the Carleton University [Student Academic Integrity Policy](#). The Policy is strictly enforced and is binding on all students.

## Academic Accommodations, Regulations, Plagiarism, Etc.

Carleton University is committed to providing access to the educational experience in order to promote academic accessibility for all individuals.

Academic accommodation refers to educational practices, systems and support mechanisms designed to accommodate diversity and difference. The purpose of accommodation is to enable students to perform the essential requirements of their academic programs. At no time does academic accommodation

undermine or compromise the learning objectives that are established by the academic authorities of the University. More information can be found at: <https://students.carleton.ca/course-outline/>

University rules regarding registration, withdrawal, appealing marks, and most anything else you might need to know can be found on the university's website, here:

<https://calendar.carleton.ca/undergrad/regulations/academicregulationsoftheuniversity/>

### Note About COVID-19 & Mental Health

The global pandemic has led to extra stress and uncertainty for everyone, and while we may all be experiencing the same storm, this does not mean that we are all in the same boat! If you are struggling, please do not hesitate to reach out. I am happy to listen, and/or direct you to resources that might help. In terms of class, if you need extra help or missed a lesson, don't stress! Email me and we will set a time to meet. I'll work with you, I promise. Remember that Carleton also offers an array of mental health and well-being resources, which can be found [here](#).

### University Policies

In accordance with the Carleton University Undergraduate Calendar Regulations, the letter grades assigned in this course will have the following percentage equivalents:

A+ = 90-100	B+ = 77-79	C+ = 67-69	D+ = 57-59
A = 85-89	B = 73-76	C = 63-66	D = 53-56
A- = 80-84	B- = 70-72	C- = 60-62	D- = 50-52
F = <50			

WDN = Withdrawn from the course

ABS = Student absent from final exam

DEF = Deferred

FND = (Failed, no Deferred) = student could not pass even with 100% on final exam

### Academic Accommodations for Students with Disabilities

If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or [pmc@carleton.ca](mailto:pmc@carleton.ca) for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. For more details, visit the [Paul Menton Centre website](#).

### Addressing Human Rights Concerns

The University and all members of the University community share responsibility for ensuring that the University's educational, work and living environments are free from discrimination and harassment. Should you have concerns about harassment or discrimination relating to your age, ancestry, citizenship, colour, creed (religion), disability, ethnic origin, family status, gender expression, gender identity, marital

status, place of origin, race, sex (including pregnancy), or sexual orientation, please contact the Department of Equity and Inclusive Communities at [equity@carleton.ca](mailto:equity@carleton.ca).

### Religious Obligations

Please contact me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, please review the Student Guide to Academic Accommodation (PDF, 2.1 MB).

### Survivors of Sexual Violence

As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and where survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: <https://carleton.ca/sexual-violence-support/>

### For Pregnancy

Please contact me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, please review the Student Guide to Academic Accommodation (PDF, 2.1 MB).

### Accommodation for Student Activities

Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, see the Senate Policy on Accommodation for Student Activities (PDF, 25KB).

### Student Rights & Responsibilities

Students are expected to act responsibly and engage respectfully with other students and members of the Carleton and the broader community. See the 7 Rights and Responsibilities Policy for details regarding the expectations of non-academic behaviour of students. Those who participate with another student in the commission of an infraction of this Policy will also be held liable for their actions.

### Student Concerns

If a concern arises regarding this course, **your first point of contact is me**: Email or drop in during student hours and I will do my best to address your concern. If I am unable to address your concern, the next points of contact are (in this order):





**Note:** You can also bring your concerns to Ombuds services.

### Assistance for Students

Academic and Career Development Services: <http://carleton.ca/sacds/>

Writing Services: <http://www.carleton.ca/csas/writing-services/>

Peer Assisted Study Sessions (PASS): <https://carleton.ca/csas/group-support/pass/>

Math Tutorial Centre: <https://carleton.ca/math/math-tutorial-centre/>

Science Student Success Centre: <https://sssc.carleton.ca/>



## Course Outline

DAY	MODULES	TOPICS	PRE-CLASS TASKS	IN-CLASS TASKS	SUMMATIVE ASSESSMENTS
SEP 06	1: Gastrointestinal system	Introduction	---	ChatGPT exercise	
SEP 13		GI System 1	---	Draw an enterocyte	
SEP 20		GI System 2	Perusall 1	Draw gut peptide action	
SEP 27	2: Carbohydrates and their metabolism	Carbohydrates	---	Complete digestive table	
OCT 04		CHO Metabolism 1	Worksheet 2A	Answer pathway questions	
OCT 11		CHO Metabolism 2	Worksheets 2A-2B	Answer pathway questions	
OCT 18		Type 2 diabetes	Perusall 2	Diabetes effects and treatments	Midterm Assessment – OCT 20 (tentative)
NOV 01	3: Lipids and their metabolism	Lipids	---	Complete lipoprotein table	
NOV 08		Lipid Metabolism 1	Worksheet 2A, 3A-3B	Answer pathway questions	
NOV 15		Lipid Metabolism 2	Worksheets 3C-3D	Answer pathway questions	
NOV 22	4: Amino acids and their metabolism	AA and Proteins	Perusall 3	Answer nutrition question	
NOV 29		AA Metabolism	Worksheets 4A-4B	Answer pathway questions	
DEC 06		Integration	Perusall 4	Complete metabolite tables	Final Assessment – formally scheduled

OCT 23-27 is reading week

Pre-class tasks are due at 11:30AM on the day of class.

Summative assessments are due at 10:00PM on designated due dates.

