# FOOD 4201 (Winter 2026)

## ADVANCED NUTRITION AND ENERGY METABOLISM

We, the people of the Faculty of Science at Carleton University, acknowledge that our campus is located on the traditional, unceded territories of the Algonquin Anishinabeg people. Miigwetch for your hospitality and stewardship of this territory and the teachings that come from it. We are grateful for this land, the air that we breathe, and the water that sustains us all as well as for the animals, plants and other living beings: these enable us to research, teach, mentor, support, study, and learn. We recognize our responsibility to our natural environment and to reconciliation with Indigenous peoples.

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**Course Instructor:** Véronic Bézaire

**How to address me:** Professor Bézaire

**Gender Pronouns:** she/her/hers

**Email:** veronic.bezaire@carleton.ca

**Office Location:** Room 319, Steacie

**Unit:** Chemistry

**Class Location:** Check Carleton Central

**Class Times:** Mondays, 2:35-5:25 ET

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## Inclusive Teaching Statement

This course is committed to creating an inclusive and respectful learning environment. All students are valued for their diverse backgrounds, experiences, and perspectives. This course incorporates diverse teaching methods and assessments to support varied learning styles and needs. My door is always open for questions, concerns, or feedback about the course. If you experience any barriers to learning or feel excluded, please let me know so I can support you.

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## Learning Outcomes

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**
    a. Interpret and explain metabolic pathways of macronutrients
    b. Identify pathway regulatory steps and describe modes of regulation
    c. Identify and justify the need for tissue-specific pathways, regulation or regulators
2. **Integrate nutrition and biochemical knowledge of macronutrients**
    a. Relate nutrient deficiency or overload to disease
    b. Analyze interactions between nutrients
    c. Analyze crosstalk between tissues
    d. Postulate on systemic effects of nutrients
    e. Interpret scientific literature in nutritional biochemistry

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## Topics To Be Covered

See last page for details.

## Assessments

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 generated the following learning activities and summative assessments. I am confident that, with appropriate effort, you **all** can meet those standards.

| COMPONENT | GRADE | DATE |
|---|---|---|
| **Pre-Class Tasks** | 12 % as 4 of 5 @ 3% (SAT/UNSAT) | Throughout |
| **In-Class Tasks** | 27 % as 9 of 11 @ 3% (SAT/UNSAT) | Throughout |
| **Summative Assessment 1** | 23 % | Feb 13, 2026 |
| **Summative Assessment 2** | 23 % | Mar 13, 2026 |
| **Summative Assessment 3** | 15 % | Apr 6, 2026 |

### Pre-Class Tasks

Pre-class 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*.

- Complete and submit worksheets **before** class, as preparation for class.
- **Best 4 of 5** will count as 3% each.
- Submissions are due by 2:30 ET on the day of class and will be evaluated as SAT/UNSAT.
- Revisions within 72 hours will be requested when evaluated as UNSAT.
- Submissions can be made early should you know in advance that you must miss class.
- **Missed or late activities will be assigned UNSAT with no chance of revision.**

### In-Class Tasks

In-class tasks will be completed in groups during class with the help of shared documents. As formative assessments, they contribute to learning objectives 1: *Describe principles of biochemistry* and 2: *Integrate nutrition and biochemical knowledge of macronutrients*.

- Encourage discussion of concepts with your peers in real time for deeper learning.
- **Best 9 of 11** will count as 3% each.
- Completion and quality of in-class tasks will be evaluated by inspection in class.
- They will be evaluated as SAT/UNSAT.
- Revisions within 72 hours will be requested when evaluated as UNSAT.
- **Missed or late submission will be assigned UNSAT with no chance of revision.**

### Summative Assessments 1 - 3

The summative assessments contribute to learning objectives 1: *Describe principles of biochemistry* and 2: *Integrate nutrition and biochemical knowledge of macronutrients*.

- All assessment consists of three questions to be answered with a schematic diagram, a choice of creative writing, and a video recording of your explanations.
- Class notes, scientific literature, and online resources will be required.
- You are responsible for the credibility of online resources you choose to use.
- All summative assessments are due at 10PM.
- **A 48h grace period past the due date is available for Summative Assessments 1 and 2 (but not 3), with no questions asked.**

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## Late and Missed Work Policies

### Pre-Class and In-Class Tasks:

Due to built-in flexibility, missed or late submission will be assigned UNSAT with no chance of revision.

### Summative Assessments 1 – 3:

A 48h grace period past the due date is available for Summative Assessments 1 and 2 (but not 3), with no questions asked.

You may need special arrangements to meet your academic obligations during the term.

- **Deferred/missed term work for short-term accommodation (5 days or less):** Should you require short-term accommodation, please inform your course Instructor and submit the **Academic Consideration for Coursework Form**.
- **Deferred/missed term work for longer term incapacitation (5 days or longer):** Should you require accommodations for this course that are longer than the 5-day (short-term) period, please email me to discuss how/whether accommodation needs could be met for this course.

**A passing grade on each element of the course must be obtained to be eligible to pass the course.**

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## Learning Material

There are no required costs associated with this course.

### Websites:

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

### Textbook (optional):

I will be referring to the following textbooks. However, any biochemistry textbook you already have should suffice.

Advanced Nutrition and Human Metabolism, 5th 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

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## Academic Accommodations and Regulations

Carleton is committed to providing academic accessibility for all individuals. You may need special arrangements to meet your academic obligations during the term. The accommodation request processes are outlined on the Academic Accommodations website (https://students.carleton.ca/course-outline/).

**Statement on Artificial Intelligence (AI) Use (Minimal Use – Basic Assistance Only)**

**AI use in this course:** Students may use AI tools for basic word processing functions, including grammar and spell checking (e.g. Microsoft Word Editor).

**Documenting AI use:** It is not necessary to document the use of AI for the permitted purposes listed above. If you have questions about a specific use of AI that isn't listed above, please consult your instructor.

**Why have I adopted this policy?** This policy ensures that student voices and ideas are prioritized and authentically represented, maintaining the integrity of the work produced by students. The goal of adopting a limited use of AI is to help students develop foundational skills in content comprehension and application, as well as writing and critical thinking, by completing course activities and practicing substantive content creation and study skills without the support of AI.

While some learners use AI as a study aid (e.g., to quiz themselves before exams), remember that the content may be inaccurate, regardless of how confidently it is presented.

As our understanding of the uses of AI and its relationship to student work and academic integrity continue to evolve, students are required to discuss their use of AI in any circumstance not described here with the course instructor to ensure it supports the learning goals for the course.

**Statement on Academic Integrity**

Students are expected to uphold the values of academic integrity, which include fairness, honesty, trust, and responsibility. Examples of actions that that compromise these values include but are not limited to plagiarism, accessing unauthorized sites for assignments or tests, unauthorized collaboration on assignments or exams, and using artificial intelligence tools, including ChatGPT.

Misconduct in scholarly activity will not be tolerated and will result in consequences as outlined in Carleton University's Academic Integrity Policy. A list of standard sanctions in the Faculty of 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 abide by Carleton University's Academic Integrity Policy.

**Student Rights & Responsibilities**

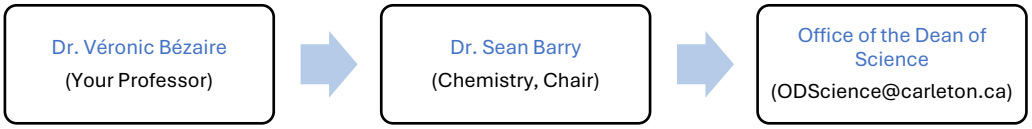
Students are expected to act responsibly and engage respectfully with other students and members of the Carleton and the broader community. See the 7 Rights and

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 me 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.



## Topics To Be Covered

| DAY | MODULES | TOPICS | PRE-CLASS TASKS | IN-CLASS TASKS | SUMMATIVE ASSESSMENTS |
|---|---|---|---|---|---|
| **JAN 05** | Welcome | | | | |
| **JAN 12** | 1: Gastrointestinal system | Anatomy & Digestion | --- | Draw an enterocyte | |
| **JAN 19** | 2: Carbohydrates and their metabolism | Carbohydrates | --- | Complete digestive table | |
| **JAN 26** | | CHO Metabolism 1 | Worksheet 2A | Answer pathway questions | |
| **FEB 02** | | CHO Metabolism 2 | Worksheets 2A-2B | Answer pathway questions | |
| **FEB 09** | | Type 2 diabetes | --- | Diabetes effects and treatments | Summative #1 **Fri FEB 13** |
| **FEB 16** | WINTER BREAK | | | | |
| **FEB 23** | 3: Lipids and their metabolism | Lipids | --- | Complete lipoprotein table | |
| **MAR 02** | | Lipid Metabolism 1 | Worksheet 2A, 3A-3B | Answer pathway questions | |
| **MAR 09** | | Lipid Metabolism 2 | Worksheets 3C-3D | Answer pathway questions | Summative #2 **Fri MAR 13** |
| **MAR 16** | 4: Amino acids and their metabolism | AA and Proteins | --- | Answer nutrition question | |
| **MAR 23** | | AA Metabolism | Worksheets 4A-4B | Answer pathway questions | |
| **MAR 30** | | Integration | --- | Complete metabolite tables | |
| **APR 06** | | --- | --- | --- | Summative #3 **Mon APR 6** |