

**FOOD 4201/5101**  
**ADVANCED NUTRITION AND ENERGY METABOLISM**

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### **SYNOPSIS**

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. Pre-requisite: FOOD2001.

### **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**

- 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 cross-talk between tissues
- d. Postulate on systemic effects of nutrients

#### **3. Critically analyze topics in nutrition**

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

### **TENTATIVE SCHEDULE**

Synchronous: **2h weekly - Wednesdays 12:25 – 14:25**. If you cannot attend, please inform the Instructor.  
Asynchronous: **6h weekly - on your own time**.

## RESOURCES

We will be accessing the following website regularly for construction of metabolic pathways:

<http://www.metabolicpathways.teithe.gr/?part=all&lang=en>

I will be referring to the following textbooks (no purchase necessary):

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. However, any biochemistry textbook you already have should suffice. Links to readings and online resources will be posted on *cuLearn*.

## CLASS COMMUNICATION

The following information related to FOOD 4201 will be on the *cuLearn* course page: announcements, lecture slides, learning activities, assessments and marks. The Perusall platform will be used for reading assignments and will require the creation of an account. Please use the '*Ask Your Instructor*' forum to ask questions. Please also use the '*Ask Your Classmates*' forum to connect with your peers and build a learning community in this course.

## EXPECTATIONS

There are many different pieces to this course so you need to be organized to succeed. Follow the class schedule at the end of this document and the calendar in *cuLearn* to help you organize your time. Don't be shy to ask questions. We are in this together.

## TENTATIVE COURSE ASSIGNMENTS AND GRADING

Pre-Class Tasks	Worksheets	10%	6 x 1 or 2% (SAT/UNSAT)
	Perusall Readings	9%	3 of 4, x 3% (SAT/UNSAT)
In-Class Tasks		9%	12 of 17, x 0.75% (SAT/UNSAT)
Midterm Assessment		34%	Due date: Feb 26 2021
Final Assessment		38%	Due date: Apr 27 2021

### 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 six worksheet submissions, including some re-submissions after having developed new knowledge. Worksheets are worth 1 or 2% each. All six (6) submissions must be submitted by 11:30 AM on the day of class. They will be evaluated as SAT/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 AM on the day of class. They will be evaluated as SAT/UNSAT.

### **IN-CLASS TASKS –**

In-class tasks will be completed in groups (breakout rooms) during synchronous sessions 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 17 in-class tasks, 12 of which must be submitted, for 0.5% each. The submissions will not be done in cuLearn, 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.

### **Mid-term 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 Modules 1 and 2. Research each question. Provide a complete answer using your class notes AND scientific literature. Support your statements with complete 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 Modules 1 through 4. The long answer question may require the use of scientific literature (referenced in CSE style) to support your statements.

### **MINIMUM TECHNOLOGY REQUIREMENTS**

- Latest version of Google Chrome, Mozilla Firefox, Apple Safari, or Microsoft Edge
- Pop-ups: enabled
- Cookies: enabled (with prompt or without)
- Java: ensure you have an up-to-date version of Java by visiting <http://www.java.com>
- Headphones

### **GETTING HELP**

#### **Technical –**

cuLearn support: <https://carleton.ca/culearnsupport/students/>

ITS Helpdesk: [its.service.desk@carleton.ca](mailto:its.service.desk@carleton.ca)

#### **Academic –**

Carleton Student Support: <https://students.carleton.ca/>

Centre for Student Academic Support: <https://carleton.ca/csas/>

Academics Support: <https://students.carleton.ca/academics/>

#### **Wellness -**

Student Support Services - Wellness: <https://students.carleton.ca/wellness/>

Resource Finder: <https://carleton.ca/wellness/living-well/resource-finder/>

Coronavirus (COVID-19): <https://newsroom.carleton.ca/coronavirus-covid-19/>

### **COMPASSIONATE GRADING**

The grading scheme includes built-in flexibility, with a choice of activities (Worksheets, Perusall Readings) to be completed. SAT/UNSAT grading is also used for 36% of the final grade. Requests for compassionate grading can be requested for the midterm and final assessments.

### **ACADEMIC MISCONDUCT**

The consequences of copying, plagiarism and other forms of cheating are substantial. Students are referred to the 2020/2021 Undergraduate Calendar for information on this topic. The Carleton University Academic Integrity Policy can be found online at <https://carleton.ca/registrar/academic-integrity/>. It is **your responsibility** to know the contents of these policies so it is highly recommended that you read them.

### **ACADEMIC ACCOMODATIONS**

You may need special arrangements to meet your academic obligations during the term. For an accommodation request, the processes are as follows:

#### **Pregnancy obligation -**

Please contact your instructor 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, visit the Equity Services website: [carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf](https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf)

#### **Religious obligation -**

Please contact your instructor 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, visit the Equity Services website: [carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf](https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf)

#### **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. [carleton.ca/pmc](https://carleton.ca/pmc)

#### **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 your instructor 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. <https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf>

### **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 is 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: [carleton.ca/sexual-violence-support](https://carleton.ca/sexual-violence-support)

For more information on academic accommodation, please contact the departmental administrator or visit: [students.carleton.ca/course-outline](https://students.carleton.ca/course-outline)

## TENTATIVE COURSE OUTLINE

DAY	MODULE	TOPIC	PRE-CLASS TASK	IN-CLASS TASK	SUMMATIVE ASSESSMENTS
JAN 13 2021	1: Gastrointestinal system	GI System 1	---	Draw an enterocyte	
JAN 20 2021		GI System 2	Perusall 1	Draw gut peptide action	
JAN 27 2021	2: Carbohydrates and their metabolism	Carbohydrates	---	Complete digestive table	
FEB 03 2021		CHO Metabolism 1	Worksheet 2A	Answer pathway questions	
FEB 10 2021		CHO Metabolism 2	Worksheets 2A-2B	Answer pathway questions	
FEB 24 2021		Type 2 diabetes	Perusall 2	Diabetes effects and treatments	Midterm Assessment – FEB 26
MAR 03 2021	3: Lipids and their metabolism	Lipids	---	Complete lipoprotein table	
MAR 10 2021		Lipid Metabolism 1	Worksheet 2A, 3A-3B	Answer pathway questions	
MAR 17 2021		Lipid Metabolism 2	Worksheets 3C-3D	Answer pathway questions	
MAR 24 2021	4: Amino acids and their metabolism	AA and Proteins	Perusall 3	Answer nutrition question	
MAR 31 2021		AA Metabolism	Worksheets 4A-4B	Answer pathway questions	
APR 07 2021		Integration	Perusall 4	Complete metabolite tables	Final Assessment – APR 27

Note: APR 14 2021: No class - Friday schedule