McGill

BIOC 311 – METABOLIC BIOCHEMISTRY
COURSE OUTLINE - Fall 2022

Location and Time: **Lectures:** 12:35 PM – 13:25 PM Montreal time / Days: Mondays, Wednesdays & Fridays
Location: MCMED 522
Review Sessions: 6:00 - 8:30 PM Room TBA

Instructors: M. Denis ***(Coordinator)***, Room 903B, McIntyre Medical Building, Tel: 514-398-1421, maxime.denis@mcgill.ca
L. Kazak, Room 713, McIntyre Building, Tel: 514-398-5605, lawrence.kazak@mcgill.ca
K. Gehring, Room 469, Bellini Life Sciences Building, Tel: 514-398-7287, kalle.gehring@mcgill.ca
V. Giguère, Room 710A, McIntyre Medical Building, Tel: 514-398-5899, vincent.giguere@mcgill.ca

Teaching Assistants: caitlynn.mirabelli@mail.mcgill.ca; shayan.hajhashemi@mail.mcgill.ca; simon.roitman@mail.mcgill.ca; wided.akik@mail.mcgill.ca

Date	Lecture	Lecture	Instructor	T.A.
AUG 31, SEPT 2	**MODULE 1 – Carbohydrates** Metabolic Design, Glycolysis, Dietary Carbohydrates, Pentose pathway, Gluconeogenesis *(Textbook, Chapters 8, 14, 15 & 22)* **+ Problem-based Learning**	5 h	Dr. Max Denis	Wided
SEPT 5 No Class - Labor Day				
SEPT 7, 9, 12				
SEPT 20		Review Session Sept 20th, 6:00 – 8:30, McMed 1034		
SEPT 21	**QUIZ #1 (12.5%); Sept 21, 8:00 PM - 10:00 PM**			
SEPT 14, 16, 19, 21, 23	**MODULE 2 – Glycogen and TCA cycle, Mitochondria** Glycogen, Pyruvate Dehydrogenase, TCA cycle *(Textbook, Chapters 16, 17 & 22)* **+ Problem-based Learning**	5h	Dr. Lawrence Kazak	Shayan
SEPT 26 - no class				
SEPT 28, 30	Ana/cataplerotic, Redox reactions, Oxidative Phosphorylation (Textbook, Chapter 18) **+ Problem-based Learning**	5h	Dr. Lawrence Kazak	Caitlynn
OCT 3 No Class - Election Day				
OCT 5, 7				
OCT 10, 12 No Class - Fall Break				
OCT 13 (Monday schedule)				
OCT 18		Review Session Oct 18th, 6:00 – 8:30, McMed 504		
OCT 19	**QUIZ #2 (12.5 %); Oct 19, 8:00 PM - 10:00 PM**			
OCT 17, 19, 21, 24, 26, 28, 31, NOV 02	**MODULE 3 – Lipids** Fatty Acid Synthesis & Degradation, TAG & Phospholipids, Ketogenesis Lipoproteins, Isoprenoids, Cholesterol *(Textbook, Chapters 20 & 22)* **+ Problem-based Learning**	8h	Dr. Max Denis	Shayan / Wided
NOV 8		Review Session Nov 8th, 6:00 – 8:30, McMed 504		
NOV 9	**QUIZ #3 (12.5%); Nov 9, 8:00 PM - 10:00 PM**			
NOV 4, 7, 9, 11, 14	**MODULE 4 – Amino Acids & Nucleotides** Nitrogen Balance, Pyridoxal Phosphate Enzymes, Urea Cycle, Amino Acids as Carbon Sources *(Textbook, Chapter 21)* **+ Problem-based Learning**	5h	Dr. Max Denis	Simon
NOV 16, 18, 21, 23	Purines, Pyrimidines *(Textbook, Chapter 23)* **+ Problem-based Learning**	4h	Dr. Kalle Gehring	Simon
NOV 29		Review Session Nov 29th, 6:00 – 8:30, McMed 504		
NOV 30	**QUIZ #4 (12.5%); Nov 30, 8:00 PM - 10:00 PM**			
NOV 25, 28	**MODULE 5 – Hormonal Regulation of Metabolism** Steroid & thyroid hormones, Gene regulation of Metabolism, Circadian Cycle; RTKs, GPCRs, Ghrelin & Leptin *(Chap. 13, 22 & 28.3B)* **+ Problem-based Learning**	2h	Dr. Vincent Giguère	Caitlynn
NOV 30, DEC 2 & 5		3h	Dr. Max Denis	
DEC 6, No Class	**Deadline to complete all Exercises (10 %) = Dec 5th, 11:59 PM)**	Review Session Dec 5th, 6:00 – 8:30, McMed 521		
FINAL 40% (52.5%) Dec 7-21	**3h In-person Integrative FINAL: Modules 1 -5 inclusive. Final Exam = Dec 13th, 9 AM - 12 PM**			

5 Exercises = 10 %; 4 Quizzes = 50 %; Final = 40 %. The Supplemental exam is worth 100 %.
NOTE: Students unable to write the Final must contact the Exam Center (https://www.mcgill.ca/exams/) and register for a deferred Final.

BIOC 311 – METABOLIC BIOCHEMISTRY (3 credits)
Workload/week = 3 h lecture + 6 h personal work = 9 h / week

Pre-requisites

BIOL 200, BIOC/ANAT 212 or BIOL 201, and CHEM 222 or CHEM 234

Learning Outcomes – Theoretical Content & Higher Skills

The aim of this course is to understand the physiological regulation of metabolic reactions.

- **Theoretical Content -** The course material covers the generation of metabolic energy in higher organisms with an emphasis on its regulation at the molecular, cellular and organ level. Chemical concepts and mechanisms of enzymatic catalysis are also emphasized. Included: selected topics in carbohydrate, lipid and nitrogen metabolism; complex lipids and biological membranes; hormonal signal transduction.
- **Critical Thinking** - Solve problems related to biochemical metabolism
- **Independent Learning** - Find reliable sources of information and organize knowledge
- **Communication** - Communicate science to various types of audiences
- **Team Working** – Resolve problems in small groups in an interdisciplinary environment

Recommended Textbook

"Fundamentals of Biochemistry" 2016 (5th Edition) Voet D., Voet J. & Pratt C., Chap. 14 – 23 Wiley Editors
ISBN: 978-1-118-91846-3 https://www.wiley.com/en-ca/Fundamentals+of+Biochemistry%3A+Life+at+the+Molecular+Level%2C+5th+Edition-p-9781118918401
Older versions are acceptable surrogates.

The e-textbook is available through McGill's *Le James Bookstore* https://lejames.ca/textbooks
OR www.wileyplus.com/go/login Course Section ID: **B86169**

Instructional Methods in this Course

- In-class interactive lectures. Include theoretical content, exercise and problem-based learning.
- Five review sessions (by Teaching Assistants).
- The instructional approach is based on students' **attendance** and **active participation to exercises.**
- Problem-based learning is an important component of this course.

Polling: Students are invited to install the Slido polling app on their mobile device ahead of class.
https://www.mcgill.ca/polling/

Evaluation Method (5 Exercises, 4 Quizzes, 1 Cumulative Final)

In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change.

- **10 % Self-assessment Exercises (online)**

- 5 X self-assessment Exercises (multiple-choice questions), worth 2 % each. Time limit of 45 min/Exercise.
- The grade for each Exercise = average score of up to 4 attempts.
- Students take these Exercises at their own pace. The deadline to complete all Exercises is Dec 5th 11:59 PM. *However, it is strongly recommended to complete the Exercises before taking the corresponding quiz.*

- **50 % (or 37.5%) Timed Quizzes (online)**

- 4 X MyCourses/Quizzes, at the end of Modules # 1, 2, 3, 4, and worth 12.5% each. Short answers and problem-solving.
- Designed to be answered in 45 min (+ 10 min grace) and are available between 8:00 PM and 10:00 PM (Montreal time).
- QUIZZES MUST BE ANSWERED INDIVIDUALLY.
- ***Warning**: Once a student has accessed a quiz on MyCourses, he/she cannot change his/her mind. The quiz will be marked based on the submitted answers. An accessed quiz for which no answer is submitted gets zero.*

- **40 % (or 52.5%) Final (in-person)**

- Cumulative Final, integrating metabolism and its regulation (Module 5). Short-answers and problem-solving.
- The Final exam is designed to be answered in a maximum of 3h*****.

*** OSD:** Upon receiving a request from the Office for Students with Disabilities, the Coordinator will grant a 2X (+ 10 min grace) to any student registered with OSD. Remote assessments (quizzes) are managed by the Coordinator; the in-person Final is managed by OSD.

- **Flexible Grading Policy**

Too busy with writing a lab report in another course? Feeling unprepared or sick? Must attend a funeral service? For any reason, students are allowed to opt out of ONE quiz and automatically have the Final worth 52.5% instead of 40%. No justification required. Any other skipped quiz gets zero. No deferred quizzes available.

	Main Scenario	Alternative Scenario (opting out 1 quiz)
Answered quizzes	4 / 4	3 / 4
Grading Scheme	10 % Self-assessment Exercises, 50 % Quizzes, 40 % Final	10 % Self-assessment Exercises, 37.5 % Quizzes, 52.5 % Final

- **Language**

Les étudiants peuvent soumettre en anglais ou en français tout travail écrit destiné à l'évaluation.
In accord with McGill University's Charter of Students' Rights, students have the right to submit in English or in French any written work that is to be graded (except in courses where knowledge of a language is one of the objectives of the course).

- Assessments may be subjected to text-matching in accordance with the Policy on Text-Matching Software.

• Deferred Final and Supplemental

The Deferred Final (worth like the Final) and Supplemental (worth 100% of the grade) are managed by Exam Center and are usually written during March break. Students unable to attend the final exam must contact the Exam Center and follow the procedure stated here https://www.mcgill.ca/exams/. In some cases, a valid medical note may be required.

• Procedure for Challenging Grades

1. Politely ask for explanations

Students have the right to seek additional feedback on their quiz grades **without any penalty**.
However, students and graders alike have the right to be treated with dignity and respect. Hence, students may **respectfully** email graders to get further explanations of their mistakes. McGill University being a safe place to study and work, any verbal, written and/or physical violence will NOT be tolerated and immediately reported to the Disciplinary Officer (https://www.mcgill.ca/medhealthsci-respectful-environments/about).

***Hint:** If you feel angry while writing an email, it may be wiser to sleep on it and send that email on a calmer day.*
Etiquette for writing professional emails: https://www.mcgill.ca/onboardingcentral/files/onboardingcentral/student_email_etiquette_tips.pdf

2. Request a re-read

a) <u>In-semester quizzes</u>

After getting explanations of their mistakes, students who think the grader did not follow the quiz rubric can officially request a Quiz re-read by emailing the Course Coordinator (maxime.denis@mcgill.ca). Requests for Quiz re-reads must be received by the Coordinator BEFORE Final Exams begin. Any request past that date will be declined. Requests for quiz rereads will be examined within 10 business days.

The purpose of a re-read is to determine whether the grader has misinterpreted the grading rubric.

<u>The Coordinator may impose a 1% penalty on</u> <u>any marking challenge that is not based on sound academic grounds</u>.

Examples: Should the re-read: 1) be in favor of the student, the student gets the disputed marks back.
2) NOT be in favor of the student, a 1% penalty is imposed on the total course grade.

b) Rereads of the <u>Final Exams</u> are centrally managed: https://www.mcgill.ca/student-records/reread

<u>Course Grades:</u> *The department of Biochemistry does **NOT** revise/upgrade marks except on sound academic grounds. Once computed, the marks in this course will **NOT** be altered/increased. Decimal points will be "rounded of" as follows: if the final aggregate mark is computed to be 79.5%, the mark will be reported as 80% (an A-); a final aggregate mark of 79.4% will be reported as 79% (a B+). These marks are **FINAL and NON-NEGOTIABLE**. Any unsupported request to increase marks will be systematically turned down.*

Useful resources

- **Student Rights and Responsibilities**

https://www.mcgill.ca/students/srr/academicrights

McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating , plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see http://www.mcgill.ca/students/srr/honest/ for more information).

- **McGill Academic Calendar** (add/drop, withdrawal and other deadlines)

https://www.mcgill.ca/importantdates/key-dates#Fall_2022

- SKILLS21

Stay on top of time and stress management, note-taking and exam-writing with these invaluable resources for students!
https://www.mcgill.ca/skills21/

- **Time management**

https://www.mcgill.ca/osd/student-resources/learningresources/time-management

- **Stress management**

https://www.mcgill.ca/osd/student-resources/learningresources/stress-management

- **Office for Students with Disabilities (OSD)**

https://www.mcgill.ca/osd/

- **Health and Wellness Resources at McGill**

Student well-being is a priority for the University. All of our health and wellness resources have been integrated into a single Student Wellness Hub, your one-stop shop for everything related to your physical and mental health. If you need to access services or get more information, visit the Virtual Hub at www.mcgill.ca/wellness-hub or drop by the Brown Student Services Building (downtown) or Centennial Centre (Macdonald Campus). Within your faculty, you can also connect with your Local Wellness Advisor (to make an appointment, visit https://mcgill.ca/lwa).

WileyPLUS

How to access your course

Your Course Section ID

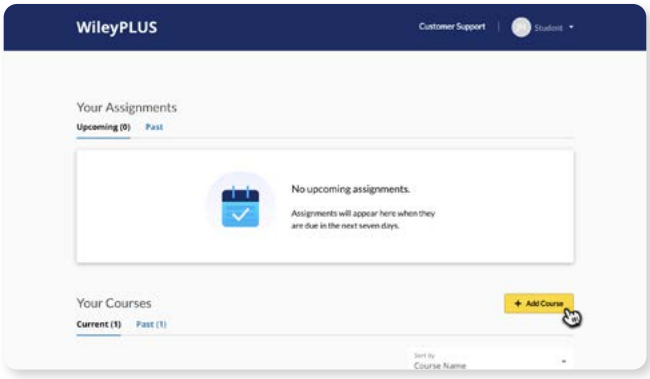
B86169

1

Log in to WileyPLUS

- Log in at **www.wileyplus.com/go/login**
- Select **Add Course**

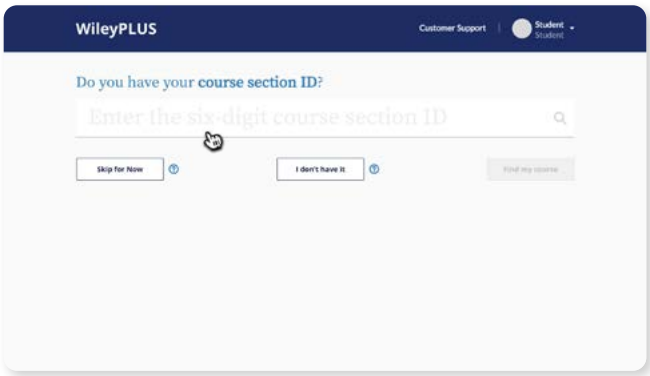
Don't have a WileyPLUS account? Create one at **www.wileyplus.com/go/signup**



2

Find your course

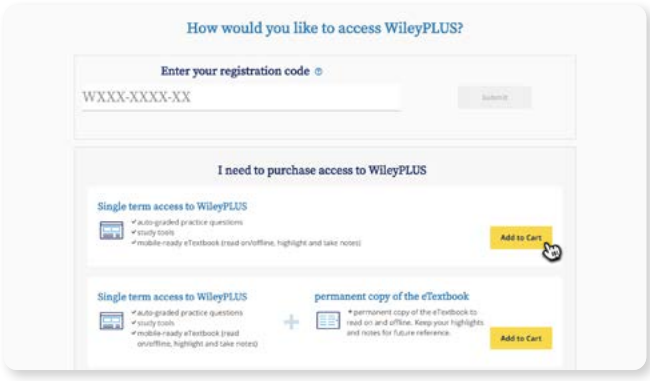
- Enter your **Course Section ID** and select **Find my course**
- Review your course section details, then click **Next**



3

Register and access

- **Already purchased?** Just enter your registration code.
- **Haven't purchased?** Choose a purchase option or start a free trial.
- **Access your course** and start learning!



Go to **www.wileyplus.com/go/wpngsupport** for registration help

WILEY