

York University
Department of Chemistry and Department of Biology

Advanced Biochemistry, Winter 2024

Biology 3010 3.0 / Chemistry 3050 3.0 / Biochemistry 3010 3.0

Instructor: Derek Wilson

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Lectures: M/W/F 9:30 – 10:30

M/W/F Steadman Lecture Hall D

Office Hours: Monday, Wednesday, and Friday 10:30-11:30 LSB331C

Prerequisites: SC/BIOL 2020 4.0 or BCHM 2020 4.0 or SC/CHEM 2050 and SC/CHEM 2020 6.0.

Calendar Description: A detailed discussion of enzyme structure and function. The chemistry and metabolism of biological molecules. Metabolic regulation at the level of enzyme activity. Knowledge of general concepts of metabolism and of basic aspects of enzyme structure and function is assumed.

Text*: I recommend ‘*Biochemistry*’ Donald Voet and Judith Voet, any edition, John Wiley & Sons, Inc. publishers.

* This text is recommended, but **not** required. *Almost All* of the material will be available in any recent, university level biochemistry text and in the (online) lecture notes.

Library Material: A number of biochemistry textbooks are on reserve in the Steacie Library including...

Lehninger Principles of Biochemistry, Nelson & Cox.

Biochemical Calculations, Segel.

Biochemistry, Horton, Moran, *et al.*

Biochemistry, Stryer.

Introduction to Protein Structure, Branden & Tooze.

Website: Course material can be accessed by linking from <http://www.yorku.ca/dkwilson>. All documents pertaining to the course will be posted.

Marking scheme:

Midterm exam 1 - 30% February 16th

Midterm exam 2 - 30% March 22rd

Final exam - 40%

Grading: The grading scheme for the course conforms to the 9-point grading system used in undergraduate programs at York (e.g. A+=9, A=8, B+=7, B=6, C+=5, C=4, D+=3, D=2, E=1, F=0). A letter grade for the course will be assigned based on the final percentage grade (A+=90-100, A=80-89, B+=75-79, B=70-74, C+=65-69, C=60-64, D+=55-59, D=50-54, E=40-49, F=0-39).

Academic Honesty:

York students are required to maintain high standards of academic integrity and are subject to the **Senate Policy on Academic Honesty:**

(<https://www.yorku.ca/secretariat/policies/policies/academic-honesty-senate-policy-on/>)

Students may also review York's 'SPARK' materials on the **Academic Integrity:**

(<https://spark.library.yorku.ca/academic-integrity-what-is-academic-integrity/>)

Access/Disability: Students with disabilities, including physical, medical, systemic, learning and psychiatric disabilities may need accommodation in exam requirements. Students are encouraged to notify the course director and to seek advice from the Counselling and Development Centre. Failure to notify the course director of your needs in a timely manner may jeopardize the opportunity to arrange for academic accommodation.

Notes:

(1) **E-mail policy.** All emails must include the name of the sender. It is preferred that your@yorku.ca email address be used. Messages from accounts like bleh@hotmail.com or similar may not receive a reply, probably because the email will be sent to my spam box.

(2) **Test Marking:** Test grades are normalized to test difficulty by 'bumping' the entire class by an amount that makes the highest grade 100% (*i.e.*, if the highest grade is a 98%, then everyone's grade will be increased by 2%).

(3) **Missed tests and exams:** There **may or may-not** be a make-up for missed midterm tests/exams. If not, for each missed midterm (with appropriate documentation) the value of the test will be added to the remaining midterm and final exam (for a missed midterm exam 1) or to the final exam (for a missed midterm exam 2).

(4) **Re-grade policy.** If, after tests are graded and returned, there is a question concerning the grading of a test, the *entire* test should be returned. The *entire* test may then be re-graded. All requests for re-grading must be made in writing and must be submitted to Dr. Wilson no later than the end of lecture 1 week after the test is returned to the class. The request should identify the question of concern and briefly explain the marking error and/or scientific reason why your answer merits further consideration.

Course Outline (Approximate!!)

Week 1 (Jan 8th - 12th): *Introduction. What is this thing called 'metabolism'? WHY??*

Week 2 (Jan 15th - 19th): *Proteins – Amino acids to Peptides to Proteins*

Week 3 (Jan 22nd – 26th): *Enzymes and Protein Structure*

Week 4 (Jan 29th – Feb 2nd): *Enzyme Regulation and Mechanisms – Kinetics and Thermodynamics*

Week 5 (Feb 5th – 9th): *Enzyme Regulation, Enzyme dynamics and Function*

Week 6 (**Feb 12th – 16th**): *Enzyme Function, Review, **Mid-Term!** (Feb 16th)*

Reading Week (Feb 19th – 23rd)

Week 7 (Feb 26th – March 1st): *Metabolic Pathways, Enzymes and Energy Metabolism*

Week 8 (March 4th – March 8th): *Metabolism of Fatty Acids*

Week 9 (March 11th – March 15th): *Metabolism of Nucleotides and Amino Acids*

Week 10 (**March 18th – March 22nd**): *Metabolism, Review, **Mid Term!** (March 22nd)*

Week 11 (March 25th – March 29th): *Metabolism of Iron/Calcium*

Week 12 (April 1st - April 5th): *Metabolism of Caffeine, Metabolic Poisons*

Week 13 (April 8th): *Exam prep*

Extra, maybe!: *Evolution of Metabolism*