

BIOC 3101 (0.5 credit): Course Syllabus

General Biochemistry I, Fall 2009

Calendar Description: Chemistry, structure and function of proteins, lipids, carbohydrates and nucleic acids. Monomers, linkages and types of biochemical polymers that are formed. Mechanism of action of enzymes, regulatory control mechanisms of proteins and integration of biochemical pathways.

Course Content: This course focuses on the mechanism of enzymatic catalysis and regulation of carbohydrate, lipid, nucleic acid and amino acid metabolism, and highlights their health and biotechnological implications.

Prerequisites: CHEM 2203 (Organic Chemistry I) and CHEM 2204 2203 (Organic Chemistry II); CHEM 2103 (Physical Chemistry I) or BIOC 2300 (Physical Biochemistry), or BIOC 2200/BIOL 2200 (Cell Physiology and Biochemistry) with a grade of C- or better, or permission of the Institute.

Lectures: Tuesday & Thursday 8:35AM-9:55AM; 208 Tory, Sep 10 - Dec 3, 2009.

Instructor: Dr. Michel Dumontier

Office: 4610 Carleton Technology and Training Center (CTTC)

Telephone: 520-2600 x4194

E-mail: Use email through WebCT

Office hours: Thursdays 1:00-3:00PM, or by appointment.

Grading:

Quizzes (4x5%)	20%
Assignment I	15%
Assignment II	15%
Mid-term	25%
Final Exam	25%

In class quizzes (10-20 min), mid term (75 minutes) and final (90 minutes) may be composed of multiple-choice, short and/or long answer.

Quizzes

1. Enzyme Mechanism
2. Enzyme Kinetics, Regulation and Bioenergetics
3. Carbohydrate Metabolism
4. Lipid Metabolism
5. Amino Acid Metabolism

Text:

Fundamentals of Biochemistry, 3rd Edition (2008). Voet, Voet & Pratt. Wiley.
or Biochemistry, 3rd (2004), by Voet & Voet. Wiley. ISBN: 978-0-470-12930-2

Other Reference Texts on Reserve in Library: (1) Fundamentals of Biochemistry, Upgrade Edition (2002), by D. Voet, J.G. Voet, and C.W. Pratt, (2) Biochemistry, Third edition (2005), by R.H. Garrett and C.M. Grisham, and (3) Lehninger Principles of Biochemistry, Fourth Edition (2005), by David L. Nelson and Michael M. Cox.

WebCT: Announcements, information on the course, lecture slides, assigned readings, supplemental readings, quizzes, and other assigned practice questions will be made available on WebCT. Also, use the email component of WebCT to contact me.

Missed Exams: A student who misses an exam because of illness or other circumstances beyond their control must notify me (for mid-terms) or their registrar (for the final exam) within 5 working days of the missed exam. The student's petition to be excused from a midterm or to write a deferred final exam must be accompanied by: 1) a medical certificate clearly stating that the student was seen by a doctor on, or prior to, the date of the exam and was medically incapable of writing the exam at the appointed time, or 2) other official documents indicating that the student's absence was due to circumstances beyond their control.

There will be no make-up exam for students who miss a midterm. The marks for missing the midterm will be shifted to the final exam. The final exam will be scheduled during the regular examination period at the end of the term. It is the responsibility of the student to be present during this period; in particular, holiday travel arrangements must not be made before the examination schedule is known.

Academic Accommodation: You may need special arrangements to meet your academic obligations during the term because of disability, pregnancy or religious obligations. Please review the course outline promptly and write to 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. Students with disabilities requiring academic accommodations in this course must register with the Paul Menton Centre for Students with Disabilities (PMC) for a formal evaluation of disability-related needs. Documented disabilities could include but not limited to mobility/physical impairments, specific Learning Disabilities (LD), psychiatric/psychological disabilities, sensory disabilities, Attention Deficit Hyperactivity Disorder (ADHD), and chronic medical conditions. Registered PMC students are required to contact the PMC, 613-520-6608, every term to ensure that your Instructor receives your Letter of Accommodation, no later than two weeks before the first assignment is due or the first in-class test/midterm requiring accommodations. If you only require accommodations for your formally scheduled exam(s) in this course, please submit your request for accommodations to PMC by the last official day to withdraw from classes in each term. You can visit the Equity Services website to view the policies and to obtain more detailed information on academic accommodation at <http://carleton.ca/equity/accommodation>

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	Date	Subject	VV&P (2008)	V&V (2003)
		<i>Before Lecture 1 you must be familiar with Major Biomacromolecules, Thermodynamics and Enzyme Kinetics</i>	1.3, 2.2, 4,6,7,8,9	2-4, 8, 12-14
L1	Sept 10	Introduction: Purpose, outline, refresher.		
L2	Sept 15	Enzymes I: Catalytic Strategies & Tactics	11	13,15
L3	Sept 17	Enzymes II: Case Studies: Lysozyme & Chymotrypsin	11	15
L4	Sept 22	Enzymes III: <i>Q1 – mechanisms</i> Enzyme Kinetics & Regulation	12	13-14
L5	Sept 24	Enzymes IV: Pharmacogenomics & Drug Discovery	12	14-15
L6	Sept 29	Metabolism Pathways and Bioenergetics	14	16
L7	Oct 1	Carbohydrate Metabolism I: Glycolysis & Fermentation	15	17
A1	Oct 2	Assignment I due (Drug Design)		
L8	Oct 6	Carbohydrate Metabolism II: <i>Q2 – kinetics, regulation & bioenergetics</i> Metabolic Control and Glycogen	16	17-18
L9	Oct 8	Carbohydrate Metabolism III: Citric Acid Cycle	17	21,23
L10	Oct 13	Carbohydrate Metabolism IV: Gluconeogenesis & ETC	17, 18	22-23
L11	Oct 15	<i>Review</i> <i>Q3 – carbohydrate metabolism</i>		
Oct 20 Mid-Term Exam				
L12	Oct 22	Lipid Metabolism I: Dietary fats, Fatty Acid Oxidation,	20	25
L13	Oct 27	Lipid Metabolism II: Ketogenesis, Fatty Acid Synthesis	20	25
L14	Oct 29	Lipid Metabolism III:	20	25
L15	Nov 3	<i>Dr. Xiaohui Zha -Cholesterol and Disease</i>		
L15	Nov 5	Metabolic Engineering <i>Q4 – lipid metabolism</i> Modeling & Flux		
L16	Nov 10	Amino Acid Metabolism I: Protein Degradation, Deamination	21	26
L17	Nov 12	Amino Acid Metabolism II: Urea Cycle, AA degradation	23	28
L18	Nov 17	Amino Acid Metabolism III: AA Biosynthesis, Heme Metabolism		
L19	Nov 19	Integrative Metabolism I: Hormones and Biochemical Signaling	22	27
L20	Nov 24	Integrative Metabolism II: <i>Q5 – AA metabolism</i> Organ specialization	22	27
L21	Nov 26	Integrative Metabolism III: Integrative metabolism Vitamins		
A2	Nov 27	Assignment II due (Metabolic Modeling)		
L22	Dec 1	<i>Dr. Jeremy Kunkel - Biologics</i>		
L23	Dec 3	Review		
Final Exam				