

BIOC 3101 (0.5 credit): Course Syllabus

General Biochemistry I, Fall 2008

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 and amino acid metabolism, and highlights their industrial and medical 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: Monday & Wednesday 11:35AM-12:55PM; 208 Tory Building, Sep 04, 2008 - Dec 01, 2008.

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 Noon-3:00PM, or by appointment throughout week.

Grading:

Introductory Quiz, 15% (Thursday Sept 11 -Friday Sept 12, 2008)

Assignment I, 7% (September 24, 2008)

Assignment II, 10% (October 29, 2008)

Assignment III, 8% (November 26, 2008)

Midterm, 25% (October 15, 2008)

Final Exam, 35% (date TBA)

The midterm and final exams will consist of multiple choice, short answer, and long answer questions. The final exam does not cover material that was on the midterm. Questions on exams will be derived from material given in lectures and the assigned readings.

Text:

Fundamentals of Biochemistry, 3rd Edition (2008). Voet, Voet & Pratt. Wiley.

or Biochemistry, 3rd (2004), by Voet & Voet. Wiley.

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 Accommodations: Students with disabilities who need accommodation should contact the Paul Menton Centre (500 Unicentre, 520-6608) to complete the necessary letters of accommodation. Please discuss your needs with me at least two weeks in advance of the first midterm, so that I can arrange for the accommodations.

BIOC 3101, General Biochemistry I, Fall 2008

Tentative Schedule:

	Date	Subject	VV&P (2008)	V&V (2003)
		<i>Before Lecture 1 you must be familiar with (i.e. can solve textbook problems):</i> Thermodynamics, Amino Acids, Proteins, Lipids, Enzymes, Kinetics (QUIZ DUE on Friday September 12)	1.3, 2.2, 4,6,7,8,9	Ch3-4 Ch8 Ch12,13,14
L1	Mon Sept 8	Introduction Catalysis I: Catalytic Strategies and Tactics	11.1,11.2,11.3	Ch2 (review) Ch15:496-507
L2	Wed Sept 10	Catalysis II: Case studies: Lysozyme, Serine Protease	11.4,11.5	Ch 8 (review) Ch13 (review) Ch15:507-528
Q1	Fri Sept 12	WebCT Quiz 1: Introductory Material	1.3, 2.2, 4,6,7,8,9	Ch3-4 Ch8 Ch12,13,14
L3	Mon Sept 15	Catalysis III: Organic Reaction Mechanisms Kinetics & Thermodynamic control	12.1,12.2,12.3	Ch3 (review) Ch16:549-559 Ch16:567-571 Ch16:574-577
L4	Wed Sept 17	Catalysis IV: Principles of Drug Design	12.4	Ch14 (review) Ch15:528-541
L5	Mon Sept 22	Carbohydrate Metabolism I: Reactions of Glycolysis	14.1-14.3 15	Ch11 (review) Ch17: 581-602
L6	Wed Sept 24	Carbohydrate Metabolism II: Reactions of Glycolysis	15	Ch17: 581-602
A1	Wed Sept 24	Assignment I due (Drug Design)		
L7	Mon Sept 29	Carbohydrate Metabolism III: Metabolic & Flux Control		Ch17:607-618
L8	Wed Oct 1	Carbohydrate Metabolism IV: Glycogen & Other Hexose Metabolism	16	Ch17:618-621 Ch18:626-655
L9	Mon Oct 6	Carbohydrate Metabolism V: Citric Acid Cycle	17	Ch21:765-794
L10	Wed Oct 8	Carbohydrate Metabolism VI: Gluconeogenesis & Glyoxylate	15.5	Ch23:843-851
L11	Mon Oct 13	Carbohydrate Metabolism VII: Pentose Phosphate Pathway	15.6	Ch23:862-869
Exam	Wed Oct 15	Mid Term Exam covers Lectures 1-11		
L12	Mon Oct 20	Lipid Metabolism I: Fatty Acid Oxidation	20	Ch12 (review) Ch25:909-928

L13	Wed Oct 22	Lipid Metabolism II: Fatty Acid Synthesis	20	Ch25:930-942
L14	Mon Oct 27	Lipid Metabolism II: Ketogenesis, cholesterol metabolism & regulation	20	Ch25:928-930 Ch25:942-959
L15	Wed Oct 29	Lipid Metabolism III: Phospholipid & glycolipid metabolism	20	Ch25:969-979
A2	Mon Oct 29	Assignment II due (Metabolic Modeling)		
L16	Mon Nov 3	Amino Acid Metabolism I: Deamination, urea cycle	21.1-21.3	Ch4 (review) Ch26:985-995
L17	Wed Nov 5	Amino Acid Metabolism II: Catabolism	21.4	Ch26:995-1013
L18	Mon Nov 10	Amino Acid Metabolism III: Biosynthesis & precursors	21.5	Ch26:1013-1044
L19	Wed Nov 12	Health and Disease I: Human Variation & Disease		
L20	Mon Nov 17	Health and Disease II: Health & Regulation		
L21	Wed Nov 19	Health and Disease III: Organ specialization	22	Ch27:1054-1067
L22	Mon Nov 24	Medical/Industry Talk: TBD		
L23	Wed Nov 26	Systems Biology: TBD		
A3	Wed Nov 26	Assignment III due (Regulatory Modeling)		
L24	Mon Dec 1	Review		
Exam		Exam covers Lectures 12-23		