

# BIOCHEMISTRY 202

## Fall Term Outline: 2017W

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**Lectures:** MWF, 8:00 - 8:50 in Earth Sciences Building 1012 (ESB1012).

**Textbook:** *Lehninger, Principles of Biochemistry (7<sup>th</sup> edition)*. Nelson, D. L., Cox, M. M., Freeman and Company 2017.

**Instructor:**

W. Williams (**Course chair**)

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**Key Dates:**

Thanksgiving: Monday, October 9<sup>th</sup>

Midterm 1: Thursday, October 12<sup>th</sup> at 6pm.

Midterm 2: Thursday, November 9<sup>th</sup> at 6pm.

Remembrance Day Observed: Monday, November 13<sup>th</sup>

Christmas exam: TBA (as per final exam schedule)

**Exam Weighting:**

<b>Midterm 1</b>	<b>33.4%</b>
<b>Midterm 2</b>	<b>33.3%</b>
<b>Final exam</b>	<b>33.3%</b>

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**Course Website:** [www.connect.ubc.ca](http://www.connect.ubc.ca) gives the students access to all slides shown in class, lecture summaries and problem sets (voluntary).

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*All prescribed examinations are mandatory. Students who miss an examination or are unable to complete other tests or graded work because of medical, emotional or other problems have to follow the procedures for requesting Academic Concession" [see UBC Calendar]. An inconvenient examination timetable is absolutely not grounds for deferring an examination in Bioc202. Deferred examinations necessitated by health considerations for reasons that are completely out of the control of the student will be written on a date set by the instructor. The Department will not schedule make-up examinations for any student who does not notify his or her dean and does not provide appropriate documentation **within 5 days** of the exam in question. **Students without appropriate medical excuses for missing any examination will have zero recorded as their mark for that exam.***

*Students should not book airline flights home for Christmas until the definitive final exam schedule has been posted, as preliminary schedules are often changed. December examinations are December 5 to December 20 (inclusive). Note that Saturdays are included in the exam schedule.*

**A note about the midterm exams:**

*Four years ago, the BIOC202 class voted 80% in favor of having a three exam system (each worth ~33%) with the two midterm exams being held in the evening\*. Therefore, we are continuing this exam format. If you have a scheduling conflict between an evening midterm and another course, work, or intramural sports; you should contact Dr. Williams at the beginning of the term. Do **NOT** leave this to the last minute! Students reporting a potential conflict a day before a midterm exam will be unlikely to get deferral status.*

\*as compared to the previous two exam system with each exam worth 50% and the midterm being held in class.

## Lecture schedule:

**Note:** The outline below is an approximate guide to lecture topics, and may be subject to change.

<u>Date</u>	<u>Lecture</u>	<u>Topic</u>
Sept. 6 <sup>th</sup>	1	Introduction. Chemical review: Biomolecules, atoms & bonding
Sept. 8 <sup>th</sup>	2	Chemical review: Bonding, water, & thermodynamics
Sept. 11 <sup>th</sup>	3	Chemical review: Thermodynamics, pH, & buffers
Sept. 13 <sup>th</sup>	4	Protein structure: Amino acid structure & classification
Sept. 15 <sup>th</sup>	5	Protein structure: Amino acid classification
Sept. 18 <sup>th</sup>	6	Protein structure: Primary structure and peptide bonds
Sept. 20 <sup>th</sup>	7	Protein structure: Secondary structure ( $\alpha$ helices & $\beta$ sheets)
Sept. 22 <sup>nd</sup>	8	Protein structure: Tertiary and quaternary structure
Sept. 25 <sup>th</sup>	9	Protein structure: Protein folding
Sept. 27 <sup>th</sup>	10	Enzyme kinetics: Characteristics of enzymes
Sept. 29 <sup>th</sup>	11	Enzyme kinetics: Enzyme thermodynamics and kinetics
Oct. 2 <sup>nd</sup>	12	Enzyme kinetics: Michaelis-Menten equation, $K_m$ , $V_{max}$ , $K_{cat}$
Oct. 4 <sup>th</sup>	13	Enzyme kinetics: Enzyme inhibition
Oct. 6 <sup>th</sup>	14	Protein function: Chymotrypsin
<b>Oct. 9<sup>th</sup></b>	<b>THANKSGIVING</b>	
Oct. 11 <sup>th</sup>	15	Protein function: Chymotrypsin/Hemoglobin
<b>Oct. 12<sup>th</sup></b>	<b>MIDTERM 1 (Note the 6pm start time). Location TBA</b>	
Oct. 13 <sup>th</sup>	16	Protein function: Hemoglobin
Oct. 16 <sup>th</sup>	17	Thermodynamics and biochemical pathways
Oct. 18 <sup>th</sup>	18	Thermodynamics & ATP/Carbohydrates
Oct. 20 <sup>th</sup>	19	Carbohydrates
Oct. 23 <sup>rd</sup>	20	Glycolysis: Introduction, the 10 rxns: Stages 1 & 2
Oct. 25 <sup>th</sup>	21	Glycolysis: The 10 rxns: Stage 3
Oct. 27 <sup>th</sup>	22	Glycolysis: Redox & carrier molecules, fermentation, & regulation
Oct. 30 <sup>th</sup>	23	Pyruvate dehydrogenase complex: Cofactors, & enzymes
Nov. 1 <sup>st</sup>	24	Pyruvate dehydrogenase complex: Mechanism & regulation
Nov. 3 <sup>rd</sup>	25	Krebs cycle: The 8 rxns, regulation
Nov. 6 <sup>th</sup>	26	Oxidative phosphorylation: Intro, $e^-$ transfer & thermodynamics
Nov. 8 <sup>th</sup>	27	Oxidative phosphorylation: The electron transport chain (ETC)
<b>Nov. 9<sup>th</sup></b>	<b>MIDTERM 2 (Note the 6pm start time). Location TBA</b>	
Nov. 10 <sup>th</sup>	28	Oxidative phosphorylation: ATP synthase: Overview & $F_1$
<b>Nov. 13<sup>th</sup></b>	<b>Remembrance Day observed</b>	
Nov. 15 <sup>th</sup>	29	Oxidative phosphorylation: ATP synthase: $F_0$
Nov. 17 <sup>th</sup>	30	Oxidative phosphorylation: Regulation, uncouplers, transporters
Nov. 20 <sup>th</sup>	31	Oxidative phosphorylation: Transport and ATP yield of glucose
Nov. 22 <sup>nd</sup>	32	Glycogen metabolism: Synthesis and breakdown
Nov. 24 <sup>th</sup>	33	Gluconeogenesis: Substrates, rxns, stoichiometry, & regulation
Nov. 27 <sup>th</sup>	34	Integration of metabolism: Blood glucose, hormones, tissue types
Nov. 29 <sup>th</sup>	35	Integration of metabolism: Fed/fast cycle & Glucose transporters
Dec. 1 <sup>st</sup>	36	Integration of metabolism: Type I diabetes (Time permitting)