

# Chemistry 314 Biochemistry

## Spring 2019

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**SMALL 111; MWF 9:00-9:50 am**

<b>Instructor:</b>	<u>Office</u>	<u>Phone</u>	<u>Office Hours*</u>	<u>email</u>
Doug Young	ISC 2037	221-2539	W (1:00–2:30); R (10:30–12:00)	dyoung01@wm.edu

\* Please note that office visitations are not necessarily restricted to these times. Additional times arranged by appointment.

**Text:** T. McKee & J.R. McKee, *Biochemistry: The Molecular Basis of Life*, 6th Edition, Oxford University Press. Text web address: [www.oup.com/us/mckee](http://www.oup.com/us/mckee)

**Course Goals:** This course is intended for science concentrators and pre-medical students. It introduces the student to the chemistry of living organisms. The course will act as a survey of biochemistry to provide a fundamental background on a variety of topics including key biomacromolecules (e.g. proteins, DNA, lipids, etc.), metabolic pathways, enzymatic mechanisms, and thermodynamic and kinetic properties associated with biological reactions.

**Examinations:** The three tests and the final exam will have (i) problems requiring numerical answers similar to the problems in the problem sets, (ii) short-answer questions, and (iii) multiple-choice questions. The final exam will cover material from the entire course, with slightly added emphasis given to the subject matter for the final section of the syllabus. The first 2 exams will be in class, closed-book with potential take-home components, while the third exam will be take-home and you will have one full week to complete it. If you need to reschedule an exam, please contact me BEFORE the exam date.

### Grading:

	<u>Chapters in Textbook</u>	<u>Date</u>
15% First Test	1 – 6	Feb 22 (Friday)
15% Second Test	7 – 10	Mar 29 (Friday)
15% Third Test	12 – 17	Apr 19 (Friday)
25% Final Exam	Course	May 2 (9:00 AM)
15% Problem Sets (5 x 3% each)*		*number of problem sets may change
15% Protein Project (5% rough draft/peer edit; 10% final submission)		

Final grades will be based on the typical 10 pt scale (e.g. 100-90 = A/A-, 89-80 = B+/B/B-, etc.). If you obtain a score on this scale you will be guaranteed at least that letter grade; however, based on overall student performance, a curve MAY be instituted adjusting grades UP in an equivalent manner. No grades will be adjusted down.

**Final Exam:** The final exam will be **Thursday, May 2<sup>nd</sup> 9:00 am – 12:00 in SMALL 111**. The final will be cumulative; however, chapters 17-19 will be more heavily weighted.

**Homework Sets:** At least 5 graded problem sets will be assigned during the semester. Problem sets will be distributed in class or posted on Blackboard at least 1 week before the due date. There will be either, 1) several exam-style questions to answer AND/OR 2) a short reading assignment with separate questions AND/OR 3) a case study. Late assignments will incur a 10% deduction per day (24 hour period). Please attempt to do these assignments on your own; however, for problem sets, if you do work on a problem or problems with a classmate, *please write the names of the other students clearly at the top of your problem set before turning it in.*

**Protein Project:** Students will select a protein of choice, review its overall relevance and conduct a primary literature search to evaluate current investigations on the protein. The project will culminate in a 3-6 page paper due at the end of the semester. More details will be provided later in the semester.

Week	Class reading from text book
1/14	Ch. 1 & 2 pp. 1-69; start Ch. 3 – water and noncovalent interactions
1/21	more about water and noncovalent interactions pp. 75-103; Ch. 4 – Energy pp. 108-125
	<b>PS #1 Due 1/25/19</b>
1/28	Ch. 5 – amino acids, peptides and proteins pp. 130-159
	<b>PS #2 Due 2/1/19</b>
2/4	last of proteins in Ch. 5 pp. 159-175; Ch. 6 – enzyme basics and kinetics pp. 190-209
2/11	Ch. 6 – enzyme catalysis & regulation pp. 212-232; Ch. 7 – carbohydrates pp. 238-265
	<b>PS #3 due 2/15/19</b>
2/18	<b>Exam 1 Friday 2/22/19</b> on Chapters 3-6 Ch. 8 – glycolysis pp. 271-290
2/25	Ch. 8 – gluconeogenesis pp. 290-298; Ch. 8 - glycogen metabolism pp. 304-311
3/4	Spring Break
3/11	pentose phosphate pathway pp. 298-302 and Ch. 8 regulation; Ch. 9 – TCA cycle pp. 316-340
3/18	Ch. 10 - electron transport pp. 348-367 Ch. 10 – reactive oxygen species pp. 367-373; Ch. 11 – overview of lipids and membranes
	<b>PS #4 due 3/22/19</b>
3/25	<b>Exam 2 Friday 3/29/19</b> on Chapters 7-10 Ch. 12 - lipid metabolism pp. 424-451
4/1	Ch. 15.2 amino acid catabolism pp. 559-572; overview of Ch. 16 - integration of metabolism
4/8	Ch. 17 - Nucleic acids – chemistry and physical properties
4/15	Ch. 18 – DNA replication and repair; Ch. 18 – Transcription and gene expression
	<b>Exam 3* due 4/19/19</b>
4/22	Ch. 19 – protein expression & class summary
	<b>PS #5 due 4/26/19</b>