

CHEM/BIO 314- Biochemistry Spring 2019

When and where: Tuesday and Thursday 9:30 – 10:50 AM

Instructor: Lisa M. Landino Ph.D.

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Office Hours: Monday 1:45 – 3 PM, Wednesday 9:30 – 10:30 AM and by appointment

Course Objectives: The primary objective of this course is to introduce students to the chemistry of living organisms. The course will examine the structures and functions of key biological macromolecules including proteins, lipids and DNA. Metabolic pathways, in particular those that use carbohydrates and fats as reactants (and sources of energy) will be studied in the context of enzyme mechanisms, thermodynamics and reaction kinetics. Some discussion of diseases resulting from changes in metabolism including diabetes and cancer will be incorporated. This section is geared toward those students who are majoring in the physical sciences. 3 hrs. lecture.

Required Text: Trudy McKee and James R. McKee Biochemistry Sixth Edition, Oxford University Press. This is the only text for the course and will be a valuable resource for those who plan to attend graduate or medical school. **Text web address:** www.oup.com/us/mckee

Exams and Grades Your final grade will be based on a possible total of 100 points distributed as follows:

Homework assignments (5 x 4 points each)	20 points
Exam 1	20 points
Exam 2	20 points
Take home exam	15 points
Final Lecture Exam	25 points

Mid-semester exams Two exams will be in class, closed-book exams. A third exam will be take-home, open-book and you will have one full week to complete it. Should there be a change in scheduling, this will be announced at least 1 week in advance of the actual exam. If you need to reschedule a mid-semester exam, please contact me *BEFORE* the exam.

Final Exam: The final exam will be **Tuesday April 30, 2019 9 am to noon in Small 111**. The final will be cumulative; however, chapters 17-19 will be more heavily weighted.

Letter grades will be determined according to the following standard scale:

Grade	Average
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A	93.0 - 100
A-	90.0 - 92.9
B+	87.0 - 89.9
B	83.0 - 86.9
B-	80.0 - 82.9
C+	77.0 - 79.9
C	73.0 - 76.9
C-	70.0 - 72.9
D	55.0 - 69.9
F	< 55

Final course averages will be determined for each member of the class and then those averages will be used to generate a class mean. If the class mean falls at or above 83%, grades will be assigned based on the scale shown. If the class average is below 83%, then an adjustment of the class mean may be made at the instructor's discretion and all individual grades will be adjusted UP in an equivalent manner. No grades will be adjusted down.

Homework: Five graded homeworks will be assigned during the semester. Assignments will be posted on Blackboard at least 1 week before the due date. There will be several exam-style questions to answer AND either 1) a short reading assignment with separate questions OR 2) 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 homework, 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 homework before turning it in.*

Tentative due dates for all assignments are included in the table below. **Assignments are due at the beginning of class unless otherwise noted.**

Lecture Dates	Class reading from text book (6th edition)
1/17	Review Primer (P1 – P34) and Ch. 1 & 2 pp. 1-70; start Ch. 3 – water and noncovalent interactions
1/22 & 1/24	Chapter 3 - water and noncovalent interactions pp. 75-101; Ch. 4 – Energy pp. 108-126
1/29 & 1/31	Ch. 5 – amino acids, peptides and proteins pp. 130-165 HW #1 due Thursday 1/31/19
2/05 & 2/07	last of proteins in Ch. 5 pp. 167-175; (skip 5.4) Ch. 6 – enzyme basics and kinetics pp. 190-211
2/12 & 2/14	Ch. 6 – enzyme catalysis & regulation pp. 212-232; Ch. 7 – carbohydrates pp. 238-266 HW #2 due Thursday 2/14/19
2/19 & 2/21	Exam 1 Monday 2/19/19 on Chapters 3-6 Ch. 8 – glycolysis pp. 271-290
2/26 & 2/28	Ch. 8 – gluconeogenesis pp. 290-298; Ch. 8 - glycogen metabolism pp. 304-311 HW #3 due Thursday 3/02/19
3/05 & 3/07	Spring Break
3/12 & 3/14	pentose phosphate pathway pp. 298-302 and Ch. 8 regulation; Ch. 9 – TCA cycle pp. 316-344
3/19 & 3/21	Ch. 10 - electron transport pp. 348-367; Ch. 10 – reactive oxygen species pp. 367-377; Ch. 11 – overview of lipids and membranes pp.382-394; start fatty acid metabolism Ch 12.1 pp. 424-432 HW #4 due Thursday 3/21/19
3/26 & 3/28	Exam 2 Monday 3/26/19 on Chapters 7-10 Ch. 12 – fatty acid oxidation and synthesis pp. 424-451
4/02 & 4/04	Ch. 12 phospholipids and cholesterol pp. 453-467; Ch. 15.2 amino acid catabolism pp. 559-572; overview of Ch. 16 - integration of metabolism
4/09 & 4/11	Ch. 17 - Nucleic acids – DNA & RNA chemistry and physical properties pp. 613-656 Exam 3* due Thursday 4/11/19
4/16 & 4/18	Ch. 18.1 – DNA replication and repair; pp. 665-681 Ch. 18.2 – Transcription (pp. 697-708) and some gene expression (pp. 708-712)
4/23 & 4/25	Ch. 19 – protein expression & class summary HW #5 due Thursday 4/25/19

*Take home exam on Chapters 11, 12, 15.2, 16 – due in class on April 11th.

Final Exam: Tuesday April 30th, 9 am to noon in Small 111