CHEM/BIOL 314- Biochemistry
Spring 2022

When and where: Tuesday and Thursday 9:30 – 10:50 AM in ISC 1127
Instructor: Lisa M. Landino Ph.D.
Office/Phone: ISC 1283, 221-2554
Email: lmland@wm.edu
Office Hours: Tuesday 1:30 – 2:30 PM, Wednesday 10:15 – 11:15 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. 3 hrs. lecture.

Required Text: Trudy McKee and James R. McKee Biochemistry **7th Edition** (preferred), Oxford University Press. The 6th edition and solutions manual are on reserve in Swem library. The 6th edition is acceptable though some page and figure numbers will be different.

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 **Friday, May 13th, 2022 from 9 am to noon in ISC 1127 (and probably a 2nd room)**. 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**
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 84%, grades will be assigned based on the scale shown. If the class average is below 84%, 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. A typical homework will have TWO parts: A) problems/questions from lecture content and B) a short reading assignment or a case study with separate questions. **For problems/questions that require you to show work, you will print the assignment (1 page) and bring it to class on the due date.** *Answers to all other homework questions will be submitted on Blackboard*. Late assignments will incur a 20% deduction per day (24 hour period). Please attempt to do these assignments on your own; however, for homework, you may work with a classmate. Each of you must submit your own answers both on paper and on Blackboard.

How do I succeed in biochemistry? I heard it was a lot of material… The best advice is to attend class! There are only 25 lectures. Here's my advice in order: 1) show up 25 times; 2) write your own notes and review my notes & lectures; 3) read the book sections; 4) do homework assignments on your own or with classmates; 5) attend office hours if you don't understand something; 6) do suggested problems from the book; 7) treat old exams (which I will post) as exams; 8) attend review sessions before exams 1 & 2 and the final exam.

What is cheating? Do your own work, respect the Honor Code and do not give me reasons to distrust you. In recent years, too many students have relied on websites like Chegg to find answers to homework assignments. Is that cheating? How is this helping you learn the material? Those are philosophical questions… For the 3rd exam which is take home, open book, please don't cheat. If you have to ask "is this cheating?" it probably is.

What about exam re-grades? If you have a concern related to grading of your exams, you may submit a written request for a re-grade explaining why you think you deserve more points. You must submit your written request within 7 days of receiving your graded exam. I will post exam grades and answer keys to Blackboard; the 7 day window begins on the date that I return the exams to the class. Further, you may be asked to come to my office to explain your rationale for the re-grade. Lastly, if you completed your exams in pencil, then no re-grades are permitted unless it is an obvious math error on my part.

What if you are sick or test positive for COVID 19 and have to isolate? Class lectures will be recorded and uploaded to Blackboard. You can watch them (as many times as you like ☺) so that you can keep up with the material. If you are so sick that you cannot keep up or do the assignments, then let me know by email. If you cannot complete a homework assignment on time or even a few days late, I will drop that assignment and have the others count more. I'm optimistic that, in a highly vaccinated community, cases will be mild.

SAS Accommodations William & Mary accommodates students with disabilities in accordance with federal laws and university policy. Students should contact Student Accessibility Services (sas@wm.edu) well in advance of any exams or assignment due dates. It is your responsibility to communicate with the professor regarding scheduling of exams in the Watson lab or in another location.

Due dates for all assignments and exams are included in the table below. Assignments are due in class or on Blackboard at 9:30 AM.

Please be attentive in class! No talking, texting, web browsing or other disrespectful or disruptive behavior!

Lecture Dates	Class reading from text book (7th edition)
1/27	Course overview; Review Primer (P1 – P34) and Ch. 1 & 2 pp. 1-70;
2/1 & 2/3	Chapter 3 - water and noncovalent interactions pp. 76-104; Ch. 4 – Energy pp. 110-128
2/8 & 2/10	last of Ch. 4; Ch. 5 – amino acids, peptides and protein basics pp. 133-150 **HW #1 due Thursday 2/10/22**
2/15 & 2/17	3D structure of proteins & thermodynamics of folding pp. 151-168; Fibrous proteins & hemoglobin structure & function pp. 172-180;
2/22 & 2/24	Ch. 6 – enzyme basics and catalysis pp. 195-218 Ch. 6 – enzyme kinetics and inhibition & pp. 218-238; **HW #2 due Thursday 2/24/22**
3/1 & 3/3	**Exam 1 Tuesday 3/1/22** on Chapters 3-6 Ch. 7 – carbohydrates pp. 245-274; Ch. 8 – carbohydrate metabolism overview and start glycolysis pp. 280-291
3/8 & 3/10	Ch. 8 – glycolysis & gluconeogenesis pp. 291-309; regulation by kinases & phosphatases **HW #3 due Thursday 3/10/22**
3/15 & 3/17	Spring Break
3/22 & 3/24	Ch. 8 - glycogen metabolism pp. 315-323; pentose phosphate pathway pp. 309-315 and Ch. 8 regulation; start Ch. 9 – TCA cycle overview pp. 329-343
3/29 & 3/31	Ch 9 – TCA cycle reactions & regulation pp. 344-353 Ch. 10 - electron transport pp. 362-384 **HW #4 due Thursday 3/31/22**
4/5 & 4/7	**Exam 2 Tuesday 4/5/22** on Chapters 7-9 Ch. 10.3 – reactive oxygen species pp. 384-396; Ch. 11 – overview of lipids and membranes pp.401-413
4/12 & 4/14	Fat storage & transport; Ch. 12.1 pp. 443-451; Ch. 12 – fatty acid oxidation and synthesis pp. 451-468; Regulation of fatty acid metabolism pp. 468-471
4/19 & 4/21	Ch. 11 & 12 cholesterol pp. 417-422 & 475-484; Ch. 17 - Nucleic acids – DNA & RNA chemistry and physical properties pp. 633-654 **Exam 3* due Thursday 4/21/22**
4/26 & 4/28	Ch. 18.1 – DNA replication and repair pp. 686-704 Ch. 18.2 – Transcription (pp. 718-729) and some gene expression (pp. 732-742)
5/3 & 5/5	Ch. 19 – Ribosome structure, protein expression pp. 751-767 & class summary **HW #5 due Thursday 5/5/22**

*Take home exam on Chapters 10 – 12 is due in class on April 21st .

Final Exam: **Friday May 13th, 9 am to noon**