MMBB 380 INTRODUCTORY BIOCHEMISTRY - Fall 2013
MWF 7:30-8:20 AM; W 5:30-6:20 PM LSS 277

Description: Introduction to the structure, function, and metabolism of major biomolecules of living systems. Emphasis will be given to:

- Protein structure & enzyme function
- Bioenergetics ranging from single reactions to metabolic pathways
- Carbohydrate metabolism with the complete conversion of glucose to CO_2 & energy
- Brief treatments of nucleic acid structure, fatty acid metabolism & photosynthesis

Learning Outcomes: In accordance with UI Learning Outcomes, it is expected that students will:

- **Learn & Integrate:** Students will apply their previous knowledge of chemistry to biology to gain a basic understanding of the molecular basis of life.
- **Think & Create:** Students will be expected to apply the concepts and approaches learned here to solve future academic and professional problems.
- **Communicate:** Students will be expected to better communicate with others using the combined languages of chemistry and biology.
- **Clarify Purpose & Perspective:** It is expected that all students will gain important insights into the chemistry that allows them to exist, read and then contemplate this sentence.
- **Practice Citizenship:** It is every student's responsibility to share their knowledge with others as the general public is ill-informed on many relevant topics like gene and stem cell therapies.

Text: Nelson & Cox. 2013. Lehninger Principles of Biochemistry, 6th Ed. The 5th Ed is acceptable.

Lecture Notes: log on to UI BbLearn to access notes and other materials (*e.g.* old exams and practice problems). After week 1, you will need to print your own notes.

Grading: Grades will be based primarily on 4 one-hour exams and a comprehensive final exam. MMBB 380 will also have 7-8 homework assignments but for the fall of 2013, homework will be optional and not apply to the final grade. Homework is not available on BbLearn; instead, homework is accessed through Sapling Learning which requires a one-time fee of $29.99. Because this is an experiment and requires an additional cost, the homework is optional.

The final exam (7:30 - 9:30 am, Fri, Dec 20) comes very late in the year; I appreciate the issues that may create but please do not ask to take the final exam on an alternate date unless you have >2 exams scheduled for Dec 20. The final exam will be a comprehensive examination covering material presented throughout the course with the possibility of a little new material (if any is presented during dead week). The lowest exam score (including the comprehensive exam) will be dropped. Grading of exams must be contested within a week of being returned.

There will be no extra credit assignments!

Grades will be calculated as follows:

1) Scores on the four best exams will be combined for a total of: **200 x 4 = 800 pts**
4) Grades will be based on the percentage of maximum total points as shown below. If the class distribution warrants, however, these cutoffs will be lowered.

A: 90-100% B: 80-90% C: 68-80% D: 55-68% F: 0-55%

Make-up Examinations: Make-up examinations will be given only for a valid reason (hospital stay or serious family emergency) or by prior arrangement because of necessary obligations and responsibilities to the University of Idaho (field trips, UI sports, or attendance at professional meetings). These missed exams must be made up within a timely manner. Multiple exams on one day are not a valid excuse for rearranging exam dates; this will occur for many of you – please plan accordingly.

Academic Integrity: Any cases of cheating, giving or receiving assistance during an exam, plagiarism, falsification of records, or similar behavior will be handled according to the Student Code of Conduct, Article II-Academic Honesty (p16-17, Policies & Information of Interest to Students, (2009-10). Exams will be proctored by the instructor and, if necessary, assistants. Please bring student or driver's photo ID to the 1st and final exams.

Do not wear a hat on exam day unless you wish to sit in the front row. Hats without brims or baseball caps worn backwards are acceptable. No personal listening devices during exams.

University of Idaho Classroom Learning Civility Clause

In any environment in which people gather to learn, it is essential that all members feel as free and safe as possible in their participation. To this end, it is expected that everyone in this course will be treated with mutual respect and civility, with an understanding that all of us (students, instructors, professors, guests, and teaching assistants) will be respectful and civil to one another in discussion, in action, in teaching, and in learning.

Should you feel our classroom interactions do not reflect an environment of civility and respect, you are encouraged to meet with your instructor during office hours to discuss your concern. Additional resources for expression of concern or requesting support include the Dean of Students office and staff (5-6757), the UI Counseling & Testing Center's confidential services (5-6716), or the UI Office of Human Rights, Access, & Inclusion (5-4285).

Disability Support Services Reasonable Accommodations Statement

Reasonable accommodations are available for students who have documented temporary or permanent disabilities. All accommodations must be approved through Disability Support Services located in the Idaho Commons Building, Room 306 in order to notify your instructor(s) as soon as possible regarding accommodation(s) needed for the course.

- *885-6307*
- *email: dss@uidaho.edu*
- *wed: www.acess.uidaho.edu*

Policies (2013/14) Regarding UI Registration Deadlines & Procedures

Add Classes

- On VandalWeb thru Tue, **Sept 03**
- **Sept 04-09** with change of registration form signed by Instructor

Drop Classes

- On VandalWeb thru 15th day of semester, **Sept 09**
- No forms or signatures (do not need Advisor or Instructor permission)
- After Sept 09, drop (not Withdrawal) requires an academic petition
- No grade appears on transcript

Withdraw from Classes

- On VandalWeb **Sept 10 – Nov 01**; $5 fee for ea withdrawn class
- No hardcopy forms or signatures
- After Nov 01, requires academic petition
- Undergraduates are allowed up to 21 credits of W

MMBB 380 - INTRODUCTORY BIOCHEMISTRY - FALL 2013

MWF 7:30-8:20 & W 5:30-6:20 in LSS 277

Instructor: Doug Cole, 131 Gibb Hall; 885-4071; dcole@uidaho.edu Office Hours: MF 8:30-10:00, W 10:00-12:00

Textbook: Nelson & Cox, Lehninger Principles of Biochemistry, 5th Ed, 2008 or 6th Ed, 2013

Class Web Address: UI Blackboard Learn: https://bblearn.uidaho.edu/webapps/login/

After week 1, each student is responsible for downloading and/or printing their own lecture notes!

Tentative Lecture/Exam Schedule - for MWF 7:30-8:20

Date			Topic	Reading (5th Ed)	Reading (6th Ed)	Other
Aug	26	M	Pick up Materials, Self Study: Cell Architecture/Organic Chem	pg 1-19	pg 1-20	O-Chem Text
	28	W	pH & Buffers	pg 54-63	pg 58-69	
	30	F	Chemical Bonding, Properties of H_2O	pg 43-51	pg 47-55	
Sept	02	M	*HOLIDAY – LABOR DAY*			
	04	W	Nucleic Acids I – The Nucleotides	pg 271-296	pg 281-308	
	06	F	Nucleic Acids II – DNA & RNA	pg 271-296	pg 281-308	
	09	M	Nucleic Acids III – Replication, Transcription & Translation	pg 271-296	pg 281-308	
	11	W	Amino Acids	pg 71-81	pg 75-85	
	13	F	Amino Acids & Peptides	pg 82-85,92-97,113-116	pg 85-88,96-109,115-119	
	16	M	Electrophoresis of Proteins & Nucleic Acids	pg 88-91	pg 89-96	
	18	W	Levels of Protein Structure	pg 113-123	pg 115-126	
	20	F	*EXAM I (self study through amino acids & peptides)*			
	23	M	Myoglobin	pg 153-170	pg 157-174	
	25	W	Hemoglobin	pg 153-170	pg 157-174	
	27	F	Perturbations in Structure: Death by Misfolding			
	30	M	Introduction to Enzymes & Kinetics	pg 183-192	pg 189-198	
Oct	02	W	Enzyme Kinetics I	pg 194-205	pg 200-213	
	04	F	Enzyme Kinetics II	pg 194-205	pg 200-213	
	07	M	Enzyme Kinetics III	pg 194-205	pg 200-213	
	09	W	Catalysis I	pg 205-219	pg 214-230	
	11	F	Catalysis II	pg 205-219	pg 214-230	

Date			Topic	Reading (5th Ed)	Reading (6th Ed)	Other
Oct	14	M	Cytoskeleton & Molecular Motors	pg 8-9,175-179	pg 8-9,179-184	
	16	W	Special Topics/Catch-up/Review			
	18	F	*EXAM II (electrophoresis through catalysis II)*			
	21	M	Carbohydrates	pg 235-244	pg 243-263	
	23	W	Metabolism – An Overview	pg 489-511	pg 501-524	
	25	F	Glycolysis I	pg 527-542	pg 543-558	
	28	M	Glycolysis II	pg 527-542	pg 543-558	
	30	W	Gluconeogenesis	pg 551-563	pg 568-575	
Nov	01	F	Glycogen I	pg 594-609	pg 612-626	
	04	M	Glycogen II	pg 594-609	pg 612-626	
	06	W	Citric Acid Cycle I – Generating Acetyl CoA	pg 615-620	pg 633-638	
	08	F	Citric Acid Cycle II – Harvesting High Energy Electrons	pg 620-638	pg 638-656	
	11	M	Electron Transport (ETS) – Electrons, Electrons, Electrons	pg 707-722	pg 731-747	
	13	W	ETS & Oxidative Phosphrylation – Protons, Protons, Protons	pg 723-735	pg 747-759	
	15	F	*EXAM III (molecular motors through citric acid cycle II)*			
	18	M	Oxidative Phosphorylation – ATP, ATP, ATP	pg 723-735	pg 747-759	
	20	W	Photosynthesis – Tripping the Light Fantastic	pg 742-761	pg 769-788	
	22	F	Photosynthesis – The Synthesis can go Dark	pg 773-786	pg 799-810	
	Nov 25-29		*FALL RECESS*			
Dec	02	M	Lipids I – Nomenclature & Catabolism of Fatty Acids	pg 343-347,647-656	pg 357-362,667-679	
	04	W	Lipids II – Fatty Acid Anabolism	pg 805-819	pg 833-842	
	06	F	*EXAM IV (ETS through Lipids II)*			
	09	M	Special Topics/Catch-up/Review			
	11	W	Special Topics/Catch-up/Review			
	13	F	Cumulative Review (Nucleic Acids – Citric Acid Cycle)			

Dec 20 Friday (7:15-9:30 am) *COMPREHENSIVE FINAL*

EXTRA HOUR - Tentative Lecture & Homework Schedule - for Wed 5:30-6:20 (LSS 277)

Home work Assignments are accessed at Sapling Learning https://www.saplinglearning.com/ibiscms/login/

Week	Date	Lecture Topic	Homework Assignment	Due Date*
1	Aug 28	Organization & Acid/Base Calculations	*-None-*	-------
2	Sept 04	Nucleic Acids & the Law of Beer	#1 Acid/Base & Absorbance	Sept 11
3	Sept 11	Amino Acids	#2 Amino Acids; Analysis	Sept 18
4	Sept 18	Protein Analysis	*-None-*	-------
5	Sept 25	AA Sequence Dictates 3D Structure	*-None-*	-------
6	Oct 02	Enzyme Kinetics	#3 Enzyme Kinetics I	Oct 09
7	Oct 09	Enzyme Kinetics	#4 Enzyme Kinetics II	Oct 16
8	Oct 16	Molecular Motors	*-None-*	-------
9	Oct 23	Metabolism - Thermodynamics	#5 Energy Balance	Oct 30
10	Oct 30	Pentose Phosphate Pathway	*-None-*	-------
11	Nov 06	Radioisotopes & Carbon Dating	#6 Isotopes	Nov 13
12	Nov 13	Oxidation/Reduction	#7 Oxidation/Reduction	Nov 20
13	Nov 20	Chemiosmotic Theory	*-None-*	-------
		Fall Recess - No Class		
14	Dec 04	*topic to be determined by class vote*	*-None-*	-------
15	Dec 11	*to be determined*	*-None-*	-------

*The Sapling Learning online homework assignments are optional; they will not contribute to the final grade. Sapling has a free 14 day trial and a cost of $29.99 per course per semester. The Due Dates listed above are target dates; question regarding specific homework problems will be fielded on each due date. The homework problems are designed to prepare you for the calculation-based portion of Exams 1-4.

Useful, albeit optional, books – if you plan to spend significant time working at the bench in a life science research lab or taking additional biochemistry courses, this is an excellent resource that has withstood the test of time.

"Biochemical Calculations" 2nd Ed, Irwin H. Segel. 1976. John Wiley & Sons. ISBN-10: 0471774219

Paperback available new at Amazon.com for $ 64.71 (Aug 13, 2013); significantly less for like-new and used copies.

"Used Math for the First Two Years of College" Clifford E. Swartz. 1993. ISBN-10: 0917853504; $32.30 (new, paper) at Amazon

One copy of each should be on 2 hr reserve at the UI library.