Biochemistry II Lecture & Lab Schedule

Spring 2025
BB 422/622

version 10

Lectures: 9:05 – 9:55 am **MWF** **SCI-113**
Exams: 7:15-9:15 pm **W** **CGS-129**

Professor Dean Tolan
email: tolan@bu.edu
Room 702, LSE (24 Cummington)

Office hours: M 4:00-5:00 (LSE-704), W12:00-1:00, in LSE-604, and by appointment

Pre-lab Discussions:

Tolan	C3 2:30 pm – 4:15 pm	**Mon**	CAS 326
Tolan	C1 1:30 am – 3:15 pm	**Thr**	PSY B33
Tolan	C2 2:30 pm – 4:15 pm	**Fri**	SCI 115

Laboratory Coordinators:
Dean Tolan, Yinze Wu, Jackson Ho

Laboratory Teaching Fellows:	**Sections**	**email**	**Office hours**
Pavle Gajic	B5, B7 & B2	pavleg@bu.edu	*M 10:00-11:00 AM & W 1:00-2:00 PM (SCI-161)*
Jackson Ho	B6	jvho3@bu.edu	*T 4:30-5:30 PM (Slack, LSE1004)*
Devin Lloyd	B1 & B3	dlloyd7@bu.edu	*T 9:30-10:30 AM (LSE1004)*
Yunwei Lu	B6 & B2	yunweilu@bu.edu	*T 12:00-1:00 PM (LSE-304)*
Suraj Math	B3	surajm@bu.edu	*W 4:00-5:00 PM (SCI-296)*
Kenneth Rodriguez-Lopez	B7 & B1	kenrlopz@bu.edu	*F 1:15-2:15PM (LSE 904)*
Yinze Wu	B5	yinzewu@bu.edu	*R 3:30-4:30 PM (SCI-296)*

Laboratory Sections:

Sec#	**Day**	**Time**	**Instructors**	**Coordinator**	**Room**
B5	Thr	5:30 pm - 9:30 pm	Yinze Wu & Pavle Gajic	Tolan	SCI 162
B6	Fri	10:10 am - 2:10 pm	Jackson Ho & Yunwei Lu	Tolan	SCI 162
B7	Fri	3:35 pm - 7:35 pm	Pavle Gajic & Kenneth Rodriguez-Lopez	Wu	SCI 162
B1	Mon	6:00 - 10:00 pm	Kenneth Rodriguez-Lopez & Devin Lloyd	Wu	SCI 162
B2	Tue	8:00 am - 12 noon	Pavle Gajic & Yunwei Lu	Ho	SCI 162
B3	Tue	5:30 pm - 9:30 pm	Devin Lloyd & Suraj Math	Ho	SCI 162

Project Help:

	Day	**Time**	**Instructors**	**Room**
(starting 2/13)	Fri	4:00-4:30 pm	Dean Tolan	LSE-604 or 704

Required texts:

1) "Lehninger's Principles of Biochemistry 8th edition" by Nelson and Cox.*
2) "Biochemistry Laboratory Manual, 6th Edition" by Dean R. Tolan, Jose L. Medrano & Wen Yi Low
3) "Achieve" Website

Biochemistry-II Home Page: http://www.bu.edu/aldolase/biochemistry2/

Prerequisites: Students are REQUIRED to have taken BB 421/621, or equivalent, which has a prerequisite of four semesters of chemistry, **AND** First Year Writing Seminar (e.g., WR 100 or WR 120).

Grading 422: Lab: 30%; Project: 7%; Homework: 7%; Lecture: 56% (Best 4/5; each worth 14%).
Grading 622: Lab: 25%; Grad Project: 12%; Homework: 7%; Lecture: 56% (Best 4/5; each worth 14%)

Registration in Discussion and Lab

The table below shows the appropriate sections that will work for you this semester. Red shading combinations are not allowed, pink shading are highly not recommended., yellow shading is not recommended due to limited time between discussion and lab or too much time, and green are preferred combinations of lab and discussion. If possible, if you are in the Monday/Tuesday labs, try to move into the Friday afternoon (C2) discussion. If you are in the wrong discussion/lab combination, please drop/add to adjust. If the lab section is closed, please email Dr. Tolan your preferences.

Lab Time	Lab Section	Appropriate Pre-lab Discussion Section		
		C3 M (2:30-3:30)	C1 R ((1:30-2:30)	C2 F ((2:30-3:30)
M 6:00pm	B1	YES	YES	**YES**
T 8:00am	B2	YES	YES	**YES**
T 5:30pm	B3	YES	YES	**YES**
R 5:30pm	B5	YES	YES	NO
F 10:10am	B6	YES	YES	NO
F 3:35pm	B7	YES	YES	NO

Homework Policy: Using the *ACHIEVE* website, there will be 33 problem-sets assigned as weekly homework. Most will come from the end-of-chapter questions, which are mostly due weekly. In addition, there will be about 16 chapter adaptive quizzes designed to help study for each exam, which are due at noon on the day of each exam. These will be hard deadlines, there will be no makeup opportunities on the homework or quizzes regardless of any reason. The entire set of 49 assignments of homework and quizzes will comprise 7% of your overall grade, mostly as incentive to help prepare yourself for the exams. Because no makeups are allowed, your lowest quarter of all the homework and quizzes will not count. In other words, only your top 25 homework scores (of 33) and top 12 quiz scores (of 16) will be used for calculating your overall homework score.

SYLLABUS DETAILS: The rest of the syllabus is posted on the Web site and contains important information about grades, lab, behavior, well-being, etc.

Academic Conduct:

Unauthorized downloading, uploading, sharing, and/or duplicating course materials including, but not limited to, assignments, exams, quizzes, slides, videos, and any other material created and/or provided by the instructor without the instructor's express permission

*If you only have available Lehninger's Principles of Biochemistry, **7th edition**, note that the problems might not have the same numbers as those suggested for this year. Also, there is no 8th edition of the study guide; those problems are not listed this year. McMillan published a conversion guide, including what was changed with the problems at the end of the chapter. It's a large file, but also available on *Achieve*.

SCHEDULE OF EVENTS

Date	Day	Lecture No.	Topic	Reading	HW†	Lab/Proj
Jan 22	W	1	What's Metabolism about? – *An overview of how nutrients yield both energy and building blocks for cell syntheses.*	*Chapter 13.1 & 13.3*		
Jan 24	F	2	Bioenergetics	*Chapter 13.2 & 13.4*	**1**	
Jan 27	M	3	Bioenergetics	*Chapter 11.1-2(review)*	**2**	
Jan 27	M	–	Start of First Discussion Section – C3			**Disc starts**
Jan 29	W	4	Crossing the Berlin Wall of the cell – Membrane Transport *How does food get from outside into the cell?*	*Chapter 11.3*		
Jan 30	R	–	Start of First Laboratory Section – B5			**Lab Starts**
Jan 31	F	5	**CATABOLISM I: Digestion and utilization of carbohydrates** Glycogen metabolism – *From glycogen to glucose*	*Chapter 15.2 & Chapter 14.2*		**Ch 7**
Feb 3*	M	6	Glycolysis (1) – *From C_6 to 2 x C_3*	*Chapter 14.1*	**3**	
Feb 5	W	7	Glycolysis (2) – *From triose-P to pyruvate (NAD^+ to $NADH+H^+$)*	*Chapter 14.1*		
Feb 7	F	8	How do sucrose, fructose, and lactose enter glycolysis? Anaerobic fates of pyruvate*: from C_3 to C_2 + CO_2*	*Chapter 14.2-14.3*	**4**	**Ch 6a/8ab**
Feb 10	M	9	Anaerobic fates of pyruvate*: from C_3 to C_2 + CO_2* Aerobic fate of pyruvate: formation of acetyl-S-CoA	*Chapter 16.1 Chapter 19*		
Feb 10	M	–	*Review Session for Exam 1 (4:00-5:00 in SCI-117)*			
Feb 12	W	10	Tricarboxylic acid cycle (1) – Evidence for the cycle	*Chapter 16.2*	**5**	
Feb 12	**W 7:15 pm**	–	**Exam #1** (covers 1-8; Jan 22 to Feb 7) (8:4:3) 7:15-9:15 PM in CGS-129		**Q: 1,2,3**	
Feb 14 ♥	F	11	Tricarboxylic acid cycle (2) – Burning 2C's to CO_2	*Chapter 16.2 Chapter 19*	**6**	No Lab
Feb 17	M		**HOLIDAY**			
Feb 18	T	12	Tricarboxylic acid cycle (3) – regenerating the C_4 acceptor	*Chapter 16.2 & 16.4*	**7**	
Feb 19	W	13	Oxidative phosphorylation (1) – *Electron Transport*	*Chapter 19.1*	**8**	
Feb 21	F	14	Oxidative phosphorylation (2) – *Electron Transport*	*Chapter 19.1*	**9**	*Ch 7 due*
Feb 24 Feb 25**	M T	15	Oxidative phosphorylation (3) – *The chemiosmotic theory and ATP synthesis.*	*Chapter 19.2*		
Feb 26	W	16	Oxidative phosphorylation (4) – *The chemiosmotic theory and ATP synthesis.*	*Chapter 19.2 & 19.3*	**10**	***Proj-1 due***
Feb 28	F	17	**CATABOLISM II: Digestion and utilization of fat** Lipids; fatty acid degradation (1) – *How are fats broken down to intermediates of glycolysis and the TCA cycle?*	*Chapter 17.1-17.2*	**11**	
Mar 3	M	18	Lipids; fatty acid degradation (2) – *saturated, unsaturated, and other fatty acids*	*Chapter 17.2*	**12**	
Mar 3	M	–	*Review Session for Exam 2 – (4:00-5:00 in SCI-117)*			
Mar 5	W	19	Lipid degradation (3) – *ketone bodies and acidosis* **CATABOLISM III: Digestion and utilization of proteins and nucleic acids** – Protein degradation (1)	*Chapter 17.3 Chapter 27.3*	**13**	
Mar 5	**W 7:15 pm**	–	**Exam #2** (covers 9-16; Feb 10 to Feb 26) (8:6:2) 7:15-9:15 PM in CGS-129		**Q: 4,5**	
Mar 7	F	20	Protein degradation (2) – the Ubiquitin pathway & the transaminase reaction; *How is the N of amino acids liberated and eliminated?*	*Chapter 27.3 Chapter 18.1*	**14**	**Ch 9AB**
Mar 8 – Mar 16			**SPRING BREAK**			
Mar 17	M	21	Protein degradation (3) – Urea cycle and bi-cycle and Elimination of Ammonia-N by fish, flesh and fowl – control of Urea Cycle	*Chapter 18.2*	**15**	
Mar 19	W	22	Protein degradation (4) Amino-acid catabolism *How are Carbon Skeletons of Amino acids metabolized?*	*Chapter 18.2*	**16**	P

Mar 21	F	23	Protein degradation (5) - Amino acid degradation	*Chapter 18.3* *Chapter 17.2*	**17,18**	*Ch 6/8 due*
Mar 24	M	24	Nucleic acid degradation (6) – uric-acid formation	*Chapter 22.4*	**19**	
Mar 24	M	–	*Review Session for Exam 3 – (4:00-5:00 in SCI-117)*			
Mar 26	W	25	**ANABOLISM I: Biosynthesis of carbohydrates** **Photosynthesis (1)** – *How does light power anabolism?*	*Chapter 20.1-20.2*	**20**	
Mar 26	**W** **7:15 pm**		**Exam #3** (covers 17-24; Feb 28 to Mar 23) (8:9:3) 7:15-9:15 PM in CGS-129		**Q:6,7,8**	
Mar 28	F	26	**Photosynthesis (2)** – *How does CO_2 get fixed?* – Calvin cycle – *How is the net formation of glucose from CO_2 achieved?*	*Chapter 20.3-20.4*	**21**	**Ch 10A-D**
Mar 31	M	27	**Photosynthesis (3)** – Calvin cycle – completing the cycle; Regulation	*Chapter 20.4-20.5, p735-6*	**22**	
April 2	W	28	**Photosynthesis(4)** – Biomass, C_4 Plants & Kornberg cycle **Carbohydrate Biosynthesis in Animals** – Gluconeogenesis – *From pyruvate to glucose*	*Chapter 14.4*	**23**	***Proj-2 due***
April 4 ***	F	29	– Glycogen metabolism – *From glucose to glycogen* – Pentose-Phosphate Pathway –*generation of NADPH & C_5-sugars*	*Ch 15.2* *Chapter 14.5-14.6*	**24**	
April 7 April 8	M T	30	– Regulation of carbohydrate metabolism in animals	*Chapter 15.3*	**25,26**	*Ch 9 due*
April 9	W	31	– Anaplerosis – *How can the TCA cycle supply both energy and synthetic precursors?* **ANABOLISM II: Biosynthesis of Fatty Acids & Lipids** – Fatty acid synthesis – *biosynthesis versus catabolism?*	*Ch 16.3* *Chapter 21.1*	**27**	
April 11	F	32	– Fatty acid synthesis & diversification – Eicosanoids & prostaglandins	*Chapter 21.1*	**28**	
April 14	M	33	– Lipid synthesis – *How are phospholipids & fats formed?* – HMG-CoA junction between ketone bodies & isoprenes	*Chapter 21.3-21.4* *Chapter 19.4(partial)*		
April 14	M	–	*Review Session for Exam 4 – (4:00-5:00 in SCI-117)*			
April 16	W	34	– Cholesterol & Steroid synthesis –*From C_2 units to a complex polycyclics.* – Cholesterol homeostasis and regulation	*Chapter 21.4* *Chapter 19.4(partial)*	**29**	
April 16	**W** **7:15 pm**		**Exam #4** (covers 25-32; Mar 26 to Apr 11) (8:9:5) 7:00-9:00 PM in CGS-129		**Q:9,10, 11,12,13**	
April 18	F	35	**ANABOLISM III: Biosynthesis of Nitrogen Compounds** N_2 Fixation & assimilation – *How is atmospheric N_2 fixed and then assimilated into amino acids?*	*Chapter 22.1*	**30**	
April 21	M		**HOLIDAY – PATRIOT'S DAY**			
April 23	W	36	– Amino-acid biosynthesis – Non-essential Amino acids & essential Amino acids	*Chapter 22.2*	**31**	*Mon lab*
April 25	F	37	– Nucleoside & nucleotide biosynthesis (1) –*How are the building blocks for Nucleic Acids formed?* Purine *de novo*	*Chapter 22.4*	**32**	**Ch 11** *Ch10 due*
April 28	M	38	– Nucleoside & nucleotide biosynthesis (2) Salvage pathways & pyrimidines *de novo* – *How is deoxyribose formed?* Ribonucleotide reductase	*Chapter 22.1-22.4*	**33**	
April 30	W	39	– Nucleoside & nucleotide biosynthesis (3) – Control of nitrogen metabolism; feedback inhibition – Other secondary products of amino acid metabolism; Biosynthesis and degradation of heme	*Chapter18* *Chapter 22.3*		
May 4	Sun	–	*Review Session for Exam 5 (4:00-5:00 PM in CAS 226)*			
		–	*Final Projects in Metabolism Due by midnight*			***Proj-3 due***
May 5	M	–	*Review Session for Exam 5 (5:15-6:15 PM in SCI 117)*			
May 7	**W**	–	**Exam #5** (covers 33-39; Apr 14 to April 30) (7:5:3 + 10% cumulative) 8:00-11:00 AM in SCI 109		**Q: 14, 15,16**	

†See Homework policy (**Bold** indicates HW #). *ADD deadline: **M Feb 3** **DROP deadline: **T Feb 25** ***W deadline: **F Apr 4**

F; Clinical Correlations Fridays