

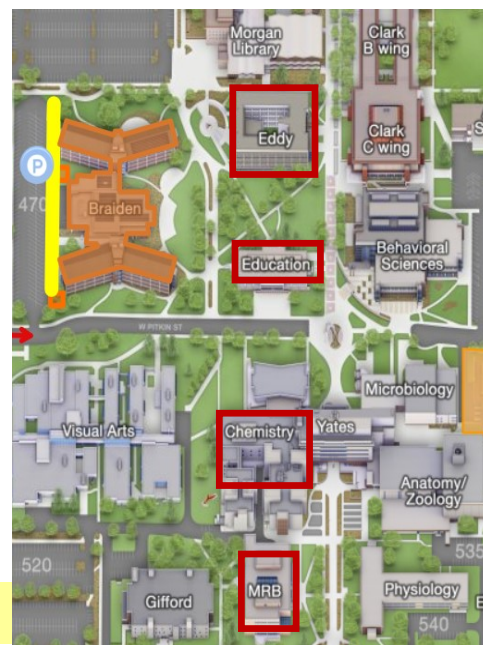
BC 351 Principles of Biochemistry Spring 2018 - Section 3

MWRF 2:00 to 2:50 PM, EDUC 7

Instructor: N. Sreerama (Sree)
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Office Hours: **MWRF** *Before* (~1:30 PM) and *After* class (3:00 – 3:30 PM)
and By Appointment
Location: **MRB 212** South Door

Text (Optional): **Lehninger Principles of Biochemistry**, 6^h Edition, by Nelson and Cox, 2013, ISBN 9781429234146, W.H.Freeman and Company, New York

You may use any Biochemistry text as reference (you have to find the relevant sections). I will be referencing specific pages from the text listed above.



Exam Schedule

Q&A session

Exam I	Monday, Feb 5	Block of 10 lectures	Sunday, Feb 4
Exam II	Monday, Feb 26	Block of 10 lectures	Sunday, Feb 25
Exam III	Monday, Mar 26	Block of 10 lectures	Sunday, Mar 25
Exam IV	Monday, Apr 16	Block of 10 lectures	Sunday, Apr 15
Final Exam	<u>Tuesday, May 8</u> (8:00 AM)	~60% Lect. 41-50 ~40% Lect. 1-40	Sunday, May 6

Exams: **Four** in-term exams (**Weeks 4, 7, 10, 13**) and a **final** exam (**Week 16**). Exams will be objective questions (*multiple choice*). Final grade will be decided as an average of all exams.
Exams I to IV will have approx. 30 – 40 questions (each for 2, 3, 4, or 5 points – total of **100** points) from a specified block of lectures.

Final Exam will have 50 – 60 questions (each for 2, 3, 4, or 5 points – total of **160** points); It is cumulative and about half of the questions will be from the topics covered in the first four exams.

5 Quizzes (on Canvas) 8 points each – **Weeks 2, 5, 8, 11, and 14 (Friday 10 AM – Tuesday 5 PM)**

5 Extra credit Quizzes (on Canvas) 6 points each – **Weeks 3, 6, 9, 12, and 15 (Friday 10 AM – Sunday 5 PM)**

Reviews: There will be an **in-class brief-review** (lecture may include some new material) for each exam.
Open Q&A sessions are planned between **5-7 PM** on **Sundays (Sunday before the exam)**

Grades: Assigned from total points from all exams and quizzes. Max: **600** ($100 \times 4 + 160 + 40$)
The letter grades will follow the table below, but may be relaxed (the averages required for a specific grade may be reduced, e.g., A – 85 – 100%) to compensate a low class average.

Grade	Final Average
A	90 – 100 %
B	80 – 89 %
C	70 – 79 %
D	60 – 69 %
F	Below 60 %

Some factual information required for the exam-questions will be provided (See *sample exams*).

A **partial credit may be given** if a proper explanation for a wrong answer is provided (*need to see me in my office!*) – goes toward your understanding of the subject and critical thinking.

For the **final exam** a **cheat-sheet** (*one-page, A4, written on one side, DO NOT cut and paste questions from other exams – Exams 1-4 or sample exams*) may be allowed. **Details will be discussed in the class at appropriate time.**

Lecture Slides, Supplemental Material, Sample Exams, and Problem Sets will be posted on Canvas Periodically

Tentative Lecture Schedule (May change depending on the circumstances)(A) *If there are errors (typing or otherwise) please let me know.*(B) **Slides** used will be placed as PDF files on Canvas. **It is your responsibility to print a copy for taking notes.**(C) **Quizzes will be online (on Canvas). It is your responsibility to take them on time.** They open on Friday at 10 AM and close at 5 PM on Tuesday (Quiz 1, 2, etc) or Sunday (Quiz 1A, 2A, etc).(D) *Exams will be in class.*

Week	Day	Topic	Quiz
Week 1	W	Introduction; Biomolecules	
	R	Building blocks; Chemical basis of life	
	F	Thermodynamics: ΔH , ΔG ; ΔG° and K_{eq}	
Week 2	M	Oxidation number; Functional Groups	
	W	Water; Non-covalent interactions; polar/nonpolar groups	
	R	pH, pK; acid/base and ionized forms; Buffers	
	F	Nucleic Acids: Central Dogma;	<i>Quiz 1</i>
Week 3	M	DNA & RNA: Sugar, Base, Nucleotides; Chargaff's rules	
	W	DNA & RNA: Secondary structures; Gene; mRNA, tRNA, rRNA	
	R	DNA Stability; DNA sequencing (Sanger's sequencing)	
	F	REVIEW I (may include new material)	<i>Quiz 1A</i>
Feb 5	M	Exam I (Block of first 10 lectures)	
Week 4	W	Exam I discussion; PCR,	
	R	Recombinant DNA; Cloning	
	F	Gene expression: Genetic Code, mutations	
Week 5	M	Site-directed mutagenesis; mutations and disease	
	W	DNA polymorphism, DNA fingerprinting	
	R	Proteins: classification; Levels of structure; Amino acids	
	F	Amino acids: classification, pK and charges	<i>Quiz 2</i>
Week 6	M	Peptide bond; Ramachandran Plot; Secondary structures – α and β	
	W	Tertiary Structures - Globular Proteins	
	R	Secondary structure rules	
	F	REVIEW II (may include new material)	<i>Quiz 2A</i>
Feb 26	M	Exam II (Block of about 10 lectures)	
Week 7	W	Exam II discussion; Secondary structure rules	
	R	Structural Proteins: Fibrous Proteins: Myosin; Actin, Keratin, Collagen	
	F	Protein Folding: principles and energetics	
Week 8	M	Protein sequencing; 2D-gel; Sanger and Edman reagents	
	W	Structure/Function: Myoglobin and Hemoglobin O ₂ binding	
	R	Binding curves; Cooperative binding – Allostereism,	
	F	BPG, Bohr effect, mutations and hemoglobin function	<i>Quiz 3</i>
SPRING BREAK			
Week 9	M	Sickle Cell anemia; Cytoskeletal proteins; Muscle structure;	
	W	Muscle contraction; Lipids: Fatty acids; Membrane and storage lipids	
	R	Fluid mosaic model, Membrane proteins	
	F	REVIEW III (may include new material)	<i>Quiz 3A</i>
Mar 26	M	Exam III (Block of about 10 lectures)	

Week	Day	Topic	Quiz
Week 10	W R F	Exam III discussion; Membrane Permeability; Membrane transport Active and Passive transport; Ion channels; gating Enzymes: Catalysis, active site, Free Energy diagram; models	
Week 11	M W R F	Enzyme Kinetics: rate constants, K_M , K_{cat} ; Enzyme Inhibition Enzymatic reactions; Chymotrypsin; Substrate specificity Enzyme mechanism: Serine proteases; Catalytic steps Transitions state Stabilization; Regulation of Enzyme activity	<i>Quiz 4</i>
Week 12	M W R F	Biochemical reaction classes; Metabolism; Fuels, ATP, NADH; metabolic flux Carbohydrates: monomers, polymers, α and β forms Glucose Metabolism: four pathways, locations and purpose; Glycolysis – phases, reactions, intermediates REVIEW IV (may include new material)	<i>Quiz 4A</i>
Apr 16	M	Exam IV (Block of about 10 lectures)	
Week 13	W R F	Exam IV discussion; Glycolysis continued; ATP yield Gluconeogenesis – unique steps; futile cycle; Regulation of glycolysis/gluconeogenesis Pentose Phosphate Pathway – purpose; PDH reaction – acetyl-CoA	
Week 14	M W R F	Citric Acid cycle: Energy Generation, Regulation of the cycle Oxidative Phosphorylation: Electron transport chain ATP synthase; P:O ratio Lipid Metabolism: lipoproteins – HDL, LDL, etc	<i>Quiz 5</i>
Week 15	M W R F	β -oxidation, ATP yield, Ketogenesis – ketone bodies Nitrogen Metabolism Nitrogen Fixation, N-Cycle, Transamination; Glucogenic/ketogenic amino acids Regulation of Metabolism: Insulin/Glucagon; diet and metabolic pathways REVIEW V (may include new material)	<i>Quiz 5A</i>
May 8	T	Final Exam (8:00 AM – 9:30 AM)	

Disclaimer: I hope to cover these topics. However, depending on the pace of the course I may have to skip certain topics.

Usually things get a little hectic towards the end.

I will however give you a fair shake of the processes. **Exams will be on what is covered in class.**