
MCB 354 Fall 2019 Course Lecture Syllabus

Day	Date	Instructor	Lecture Topic
M	26 Aug.	Procko	1: Revision of background knowledge: Chirality and Stereochemistry, Functional Groups, Thermodynamics, Coupled Reactions
W	28 Aug.	Procko	2: Water, Dipole Moments, Hydrogen Bonds, Solvation, Hydrophobic Effect, Acid-Base Chemistry, pK _a , and Amino Acid Ionization
F	30 Aug.	Procko	3: Ionization Equilibria, Amino Acids, Chirality, Structural Hierarchy of Proteins, Ramachandran Plot
M	2 Sept.	Labor Day- No classes	
W	4 Sept.	Procko	4: Protein 2° Structure: α-Helices, β-Sheets; Protein 3° & 4° Structure; Motifs & Domains; Sequence Alignments
F	6 Sept.	Procko	5: Methods for Protein Structure Determination: X-Ray Crystallography
M	9 Sept.	Procko	6: Methods for Protein Structure Determination: Solution Nuclear Magnetic Resonance and Single Particle Electron Microscopy
T	10 Sept.	Quiz 1	
W	11 Sept.	Procko	7: Protein Folding: Protein Misfolding Diseases, Thermodynamics of Folding, Chaperones, Chemical and Thermal Denaturation, and Mutational Analysis of Protein Stability
F	13 Sept.	Procko	8: Reaction Rates, 1 st and 2 nd Order Kinetics, Arrhenius Equation, Introduction to Enzymes, Principles of Catalysis, Transition State Theory, and Catalytic Mechanisms
M	16 Sept.	Procko	9: Michaelis-Menten Rate Equations
W	18 Sept.	No lecture!	
F	20 Sept.	Procko	Exam I Review
M	23 Sept.	Procko	10: Enzyme Inhibition
T	24 Sept.	Exam I (7:00-9:00 PM)	
W	25 Sept.	Procko	11: Case Study of Enzyme Mechanisms: Serine Proteases, Enzyme Engineering

F	27 Sept.	Procko	12: Allosteric Control of Enzyme Activity; Feed-back and Feed-forward Regulation; Hemoglobin and O ₂ -binding
M	30 Sept.	Procko	13: Hemoglobin & O ₂ -binding; The Hill Equation
W	2 Oct.	Procko	14: Introduction to Lipids and Bilayers; Principles of Micelle Formation; Calculation of Hydrophobicity
F	4 Oct.	Procko	15: Integral Membrane Proteins, Lipid-Anchored Proteins
M	7 Oct.	Procko	16: Membrane Transport, Energetics of Coupled Transport
T	8 Oct.	Quiz 2	
W	9 Oct.	Procko	17: Introduction to Carbohydrates; Glycosidic Linkages; Polysaccharides
F	11 Oct.	Procko	18: Glycogen Production and Breakdown, Hormone Regulation
M	14 Oct.		Exam II Review
T	15 Oct.	Exam II (7:00-9:00 PM)	
W	16 Oct.	<i>No lecture!</i>	
F	18 Oct.	Fratti	19: Overview of Metabolism (Enzymatic Themes); Bioenergetics I; High-Energy Triphosphates
M	21 Oct.	Fratti	20: Bioenergetics II; Electron Carriers; Redox Half-Reactions and Relationship between ΔG and ΔE
W	23 Oct.	Fratti	21: Glycolysis I
F	25 Oct.	Fratti	22: Glycolysis II
M	28 Oct.	Fratti	23: Gluconeogenesis, Fermentation; Glycogen; Other Carbohydrates
T	29 Oct.	Quiz 3	
W	30 Oct.	Fratti	24: Regulation of Carbohydrate Metabolism; Pentose Phosphate Pathway
F	1 Nov.	Fratti	25: Tricarboxylic Acid Cycle I
M	4 Nov.	Fratti	26: Tricarboxylic Acid Cycle II
W	6 Nov.	Fratti	27: Oxidative Phosphorylation
F	8 Nov.	Fratti	Exam III Review
M	11 Nov.	Fratti	28: ATP Synthase
T	12 Nov.	Exam III (7:00-9:00 PM)	
W	13 Nov.	Fratti	29: Amino Acid Catabolism & Urea Cycle

F	15 Nov.	Fratti	30: Fatty Acid Catabolism I
M	18 Nov.	Fratti	31: Fatty Acid Catabolism II; Ketone Bodies
W	20 Nov.	Fratti	32: Fatty Acid Biosynthesis
F	22 Nov.	Fratti	33: Sterols & Eicosanoids
M-F	25-29 Nov.	<i>Fall Break- No classes</i>	
M	2 Dec.	Fratti	34: Amino Acid Biosynthesis
T	3 Dec.	Quiz 4	
W	4 Dec.	Fratti	35: Porphyrins & Nucleotides
F	6 Dec.	Fratti	36: Lipoproteins & Fat Metabolism
M	9 Dec.	Fratti	37: Metabolic Integration; Diabetes
W	11 Dec.	Fratti	Final Exam Review
W	18 Dec.	Final Exam (1:30-4:30 PM)	