

BIOCHEMISTRY 507
General Biochemistry I
Fall 2010

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Recommended readings are shown for Nelson and Cox, *Lehninger Principles of Biochemistry*, 5e (POB).

Part I: Structure and Properties of Biological Molecules

<u>Date</u>	<u>Lecture</u>	<u>Lecturer</u>	<u>Topic</u>
9/3	1	Cox	Course introduction and D2L; class photos
9/8	2	Cox	Evolution and Water POB: Ch. 1–2, especially pp. 29-36 and 43-65
9/10	3	Cox	Amino acids and peptides: chemistry, stereochemistry, ionization, structure of the peptide bond, biological activities of peptides; chemical synthesis of peptides POB: Ch. 3, pp 71-84; 100-102
9/13	4	Cox	Protein Methods: purification, composition, quantification POB: Ch. 3, pp 85-92
9/15	5	Cox	Protein structure; primary; amino acid sequence; sequence homology and its relevance to evolution POB: Ch. 3 (pp. 92-107)
9/17	6	Cox	Protein structure; secondary and tertiary POB: Ch. 4 (pp. 113-131)
9/20	7	Cox	Protein Structure; tertiary and quaternary POB: Ch. 4 (pp. 131-149)
9/22	8	Cox	Protein function: ligand binding; allostery; regulation POB: Ch 5 (pp. 153-170)
9/24	9	Cox	Enzymatic catalysis: principles that explain catalytic power and specificity; transition-state complementarity POB: Ch. 6 (pp. 183–192)
9/27	10	Cox	Enzymes: role of cofactors POB: Ch. 6 (pp. 192–194; pH section on 204)
9/29			Exam 1 covers lectures 1–10
10/1	11	Cox	Enzyme kinetics 1: an approach to understanding mechanism POB: Ch. 6 (pp. 194–199)
10/4	12	Cox	Enzyme kinetics 2: bisubstrate kinetics, inhibition, etc. POB: Ch. 6 (pp. 199–205)
10/6	13	Cox	Enzyme mechanisms: selected illustrations of principles POB: Ch. 6 (pp. 205–220)
10/8	14	Cox	Enzyme regulation: allosteric and covalent POB: Ch. 6 (pp. 220–228)
10/11	15	Cox	Carbohydrates: review of structure, nomenclature, stereochemistry, glycosidic bond, disaccharides POB: Ch. 7 (pp. 235–244)
10/13	16	Cox	Polysaccharides: structure, analysis, physical properties of glycogen, starch, chitin, peptidoglycan, hyaluronic acid, chondroitin sulfate; extracellular matrix POB: Ch. 7 (pp. 245–257)
10/15	17	Cox	Informational carbohydrates POB: Ch. 7 (pp. 257–265)
10/18	18	Cox	Nucleotides and nucleic acids: structure and physical properties POB: Ch. 8 (pp. 271–287)

10/20	19	Cox	Nucleic acids: determination of sequence; chemical synthesis POB: Ch. 8 (pp. 287–298)
10/22	20	Cox	Genomics and proteomics POB: Ch. 9 (pp. 303–338)
10/25			Exam 2 covers lectures 11–20
10/27	21	Nelson	Lipids: structure and properties POB: Ch. 10 (pp. 343–357)
10/29	22	Nelson	Lipids: functions POB: Ch. 10 (pp. 357–367)
11/1	23	Nelson	Membranes POB : Ch.11 (pp.371-389)
11/3	24	Nelson	Transport across membranes POB: Ch. 11 (pp. 389-413)
11/5	25	Nelson	Principles of bioenergetics: free-energy changes in biology POB: Ch. 13 (pp.485-495)

Part II: Bioenergetics and Catabolism

11/8	26	Nelson	Chemical Sense in Metabolism POB: Ch. 13 (pp. 495-501)
11/10	27	Nelson	ATP and phosphoryl group transfers: chemistry and biology POB: Ch. 13 (pp. 501-511)
11/12	28	Nelson	Electron transfers in biology: cofactors, chemistry and energetics POB: Ch. 13 (pp. 512-521)
11/15	29	Nelson	Glycolysis and gluconeogenesis POB: Ch. 14 (pp. 527-558)
11/17	30	Nelson	Glycogen metabolism and metabolic regulation POB: Ch. 15 (pp. 569-609)
11/19	31	Nelson	Pyruvate oxidation and the citric acid cycle; cofactor role of thiamine pyrophosphate POB: Ch. 16 (pp. 615-640)
11/22			Exam 3 covers lectures 21–30
11/24	32	Nelson	Oxidation of fatty acids; B ₁₂ as cofactor POB: Ch. 17 (pp. 647-668)
11/25- 11/28			Thanksgiving vacation
11/29	33	Nelson	Amino acid catabolism: metabolism of amino groups, role of PLP as cofactor; urea cycle POB: Ch. 18 (pp. 673-687)
12/1	34	Nelson	Amino acid catabolism: oxidation of keto acids POB: Ch. 18 (pp. 687-702)
12/3	35	Nelson	Mitochondrial electron transfer reactions POB Ch. 19 (pp. 707-722)
12/6	36	Nelson	ATP synthesis coupled to electron transfer POB Ch. 19 (pp. 723-735)
12/8	37	Nelson	Other functions of mitochondria POB Ch. 19 (pp. 735-742)
12/10	38	Nelson	Photophosphorylation in chloroplasts and bacteria POB: Ch 19 (pp. 742-764)
12/13	39	Nelson	Summary: Energy-yielding metabolism
12/15	40	Nelson	Ethanol metabolism: its metabolic and medical consequences
12/22			Final exam, 12:25 PM. Cumulative; includes a major section on lectures 31-40