

Biochemistry 384 – Foundations in Biochemistry

Module	Video	Lecture Title (<i>Lecture Videos and PPT Slides</i>)	Video Length	Textbook (3rd Edition)
1 D2Q-01 SW-01	M1T1	<i>What is Biochemistry?</i>	17:06	<i>Chapter 1.1</i>
	M1T2	<i>The Chemical Basis of Life</i>	18:30	<i>Chapter 1.2</i>
	M1T3	<i>Storage and Processing of Genetic Information</i>	15:51	<i>Chapter 1.3</i>
	M1T4	<i>Biomolecular Structure and Function</i>	18:10	<i>Chapter 1.4</i>
	M1T5	<i>Energy Conversion in Biological Systems</i>	23:12	<i>Chapter 2.1a</i>
	M1T6	<i>Bioenergetics: Gibbs Energy Changes (ΔG and ΔG°)</i>	21:13	<i>Chapter 2.1b</i>
2 D2Q-02 SW-02	M2T1	<i>Coupled Reactions in Metabolism</i>	23:33	<i>Chapter 2.2</i>
	M2T2	<i>Properties of H₂O and Weak Noncovalent Interactions</i>	19:00	<i>Chapter 2.3abc</i>
	M2T3	<i>Review of Acids, Bases, and pK_a</i>	22:59	<i>Chapter 2.3d</i>
	M2T4	<i>Structure of DNA and RNA</i>	22:42	<i>Chapter 3.1abcd</i>
	M2T5	<i>Methods in Nucleic Acid Biochemistry</i>	17:37	<i>Chapter 3.3bcd</i>
	M2T6	<i>Introduction to Amino Acids</i>	23:32	<i>Chapter 4.1a</i>
3 D2Q-03 SW-03	M3T1	<i>Amino Acid Functional Groups</i>	16:56	<i>Chapter 4.1a</i>
	M3T2	<i>Peptide Bonds Link Amino Acids Together</i>	16:58	<i>Chapter 4.1bc</i>
	M3T3	<i>Protein Structure: Primary and Secondary</i>	25:59	<i>Chapter 4.2a</i>
	M3T4	<i>Protein Structure: Tertiary and Quaternary</i>	21:47	<i>Chapter 4.2bc</i>
	M3T5	<i>Principles of Protein Folding</i>	26:02	<i>Chapter 4.3</i>
	M3T6	<i>Protein Purification: Column Chromatography</i>	25:24	<i>Chapter 5.1ab</i>
		EXAM 1 covers Modules 1-3 (18 topics)		
4	M4T1	<i>Protein Purification: Electrophoresis Methods</i>	13:42	<i>Chapter 5.1c</i>
	M4T2	<i>Protein Sequencing Methods</i>	13:22	<i>Chapter 5.2ab</i>
	M4T3	<i>Methods for Determining 3-D Protein Structures</i>	18:46	<i>Chapter 5.3</i>
	M4T4	<i>Five Major Protein Classes</i>	10:21	<i>Chapter 6.1</i>
D2Q-04 SW-04	M4T5	<i>Mechanism of O₂ Binding to Globin Proteins</i>	28:58	<i>Chapter 6.2ab</i>
	M4T6	<i>Allosteric Control of O₂ Transport by Hemoglobin</i>	22:05	<i>Chapter 6.2c</i>

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5	M5T1	<i>Hemoglobin Gene Mutations</i>	17:27	<i>Chapter 6.3</i>
D2Q-05 SW-05	M5T2	<i>The Actin-Myosin Motor</i>	15:28	<i>Chapter 6.4</i>
	M5T3	<i>Introduction to Enzymes</i>	23:03	<i>Chapter 7.1ab</i>
	M5T4	<i>Enzyme Active Sites Mediate Chemical Catalysis</i>	18:08	<i>Chapter 7.2a</i>
	M5T5	<i>Enzyme-Mediated Chemical Reactions in Cells</i>	12:06	<i>Chapter 7.2b</i>
	M5T6	<i>Enzyme Mechanisms: Chymotrypsin and Enolase</i>	16:52	<i>Chapter 7.3ab</i>
D2Q-06 SW-06	M6T1	<i>Enzyme Kinetics: Michaelis-Menten Kinetics</i>	19:52	<i>Chapter 8.1ab</i>
	M6T2	<i>Enzyme Kinetics: Comparing Enzyme Properties</i>	13:08	<i>Chapter 8.1c</i>
	M6T3	<i>Mechanisms of Enzyme Inhibition</i>	23:31	<i>Chapter 8.2</i>
	M6T4	<i>Regulation of Enzyme Activity</i>	24:09	<i>Chapter 8.3</i>
	M6T5	<i>Cell Membranes Function as Selective Barriers</i>	15:14	<i>Chapter 9.1</i>
	M6T6	<i>Membrane Transport Proteins Control Homeostasis</i>	17:16	<i>Chapter 9.2</i>
		EXAM 2 covers Modules 4-6 (18 topics)		
D2Q-07 SW-07	M7T1	<i>Structure and Function of Passive Transporters</i>	15:01	<i>Chapter 9.3</i>
	M7T2	<i>Active Transport Proteins Require Energy Input</i>	25:10	<i>Chapter 9.4</i>
	M7T3	<i>Active Transport Proteins as Drug Targets</i>	14:56	<i>Chapter 9.5</i>
	M7T4	<i>Adaptive Immunity: Structure of Antibody Proteins</i>	16:19	<i>Chapter 10.1</i>
	M7T5	<i>Overview of Cell Signaling Pathways</i>	29:34	<i>Chapter 11.1ab</i>
	M7T6	<i>Nicotinic Acetylcholine Receptors: Gated Ion Channels</i>	7:19	<i>Chapter 11.1c</i>
D2Q-08 SW-08	M8T1	<i>Mechanism of G Protein-Coupled Receptor Signaling</i>	17:50	<i>Chapter 11.2a</i>
	M8T2	<i>G Protein-Coupled Receptor Signaling in Metabolism</i>	24:15	<i>Chapter 11.2bc</i>
	M8T3	<i>Receptor Tyrosine Kinases: Cell Growth and Cancer</i>	29:48	<i>Chapter 11.3ab</i>
	M8T4	<i>Receptor Tyrosine Kinases: Insulin Signaling</i>	17:33	<i>Chapter 11.3c</i>
	M8T5	<i>Tumor Necrosis Factor Receptor: Cell Death Pathway</i>	18:38	<i>Chapter 11.4</i>
	M8T6	<i>Nuclear Receptor Signaling: Glucocorticoid Receptors</i>	22:44	<i>Chapter 11.5</i>
9	M9T1	<i>Overview of Metabolism: Control of Metabolic Flux</i>	25:45	<i>Chapter 12.1</i>

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	M9T2	<i>Structure of Monosaccharide and Disaccharide Sugars</i>	26:30	<i>Chapter 12.2ab</i>
	M9T3	<i>Overview of the Glycolytic Pathway</i>	21:15	<i>Chapter 12.3a</i>
D2Q-09 SW-09	M9T4	<i>Glycolytic Reactions: Stage 1</i>	10:20	<i>Chapter 12.3b</i>
	M9T5	<i>Glycolytic Reactions: Stage 2</i>	12:09	<i>Chapter 12.3c</i>
	M9T6	<i>Regulation of Metabolic Flux in Glycolysis</i>	17:32	<i>Chapter 12.4ab</i>
		EXAM 3 covers Modules 7-9 (18 topics)		
10 D2Q-10 SW-10	M10T1	<i>Supply and Demand of Glycolytic Intermediates</i>	15:14	<i>Chapter 12.4c</i>
	M10T2	<i>Metabolic Fate of Pyruvate</i>	17:17	<i>Chapter 12.5</i>
	M10T3	<i>Overview of the Citrate Cycle</i>	12:21	<i>Chapter 13.1a</i>
	M10T4	<i>Calculating Redox Energies</i>	26:37	<i>Chapter 13.1bc</i>
	M10T5	<i>Pyruvate Dehydrogenase Requires Five Coenzymes</i>	21:03	<i>Chapter 13.2a</i>
	M10T6	<i>Pyruvate Dehydrogenase is a Metabolic Machine</i>	23:08	<i>Chapter 13.2bc</i>
11 D2Q-11 SW-11	M11T1	<i>The Citrate Cycle: Reactions 1-4</i>	16:33	<i>Chapter 13.3a</i>
	M11T2	<i>The Citrate Cycle: Reactions 5-8</i>	5:24	<i>Chapter 13.3b</i>
	M11T3	<i>Citrate Cycle: Regulation of Metabolic Flux</i>	14:12	<i>Chapter 13.4</i>
	M11T4	<i>Metabolism of Citrate Cycle Intermediates</i>	10:51	<i>Chapter 13.5</i>
	M11T5	<i>The Chemiosmotic Theory: An Unconventional Idea</i>	23:44	<i>Chapter 14.1</i>
	M11T6	<i>Electron Transport System: NADH/FADH₂ Oxidation</i>	11:31	<i>Chapter 14.2a</i>
12 D2Q-12 SW-12	M12T1	<i>Protein Components of the Electron Transport System</i>	22:38	<i>Chapter 14.2b</i>
	M12T2	<i>Proton Motive Force: Energy Conversion Calculations</i>	12:17	<i>Chapter 14.2c</i>
	M12T3	<i>Structure and Function of the ATP Synthase Complex</i>	26:27	<i>Chapter 14.3</i>
	M12T4	<i>Mitochondrial Transport Proteins and Shuttle Systems</i>	16:39	<i>Chapter 14.4</i>
	M12T5	<i>Inhibitors and Uncouplers of Oxidative Phosphorylation</i>	21:31	<i>Chapter 14.5ab</i>
	M12T6	<i>Inherited Mitochondrial Diseases in Humans</i>	10:56	<i>Chapter 14.5c</i>
		EXAM 4 covers Modules 10-12 (18 topics)		
			ONLINE - FINAL EXAM: Based on a Set of 250 Questions (Final Exam Question Set is available in the D2L Quiz tab)	