

CHEM 3785 - Biochemistry 1

Summer 2026 Syllabus, Section 01, CRN 30488,

Credit hours: 3

Instructor

Dr. Michael Serra

Professional Qualifications:

Ph. D., Molecular, Cellular, and Developmental Biology, Iowa State University, Ames, IA

Bachelor of Science Biology, Bachelor of Arts Mathematics, Adrian College, Adrian, MI Office

Professor of Chemistry

Email: maserra@ysu.edu

Office: Ward Beecher, room 5033

Office Phone: (330)941-3667

Communication Expectations:

I review my e-mail several times a day so the best way to contact me is through my e-mail. I will respond within 24 hours during week days and within 48 hours during weekends.

Course Description

3785. Biochemistry 1. Structure and function of proteins, nucleic acids, and carbohydrates. Includes techniques of protein purification and analysis, the study of enzyme catalysis and kinetics. Study of the organization and regulation of metabolic pathways: glycolysis, the citric acid cycle, and oxidative phosphorylation. Prereq.: "C" or better in CHEM 3720. 3 s.h.

Course Readings

Group	Title	Author	ISBN
Required	Fundamentals of Biochemistry 5th edition	Voet, Voet, and Pratt	

The course readings are subject to change in the event of extenuating circumstances, research developments, current events, and/or to ensure better learning.

Schedule of Topics and Assignments

Day	Date	Reading(s)	Proposed Topic	Due/To Prepare for Class
Mon	6/29	2.1A,B 2.1C, 2.2A,B	Physical Properties of Water Hydrophobic Effect, Chemical Properties of Water	
Wed	7/1	2.2C, 3.1, 3.2A,B, 3.3A 3.3B, 4.1A,C,D,E	Buffers Nucleotides, Nucleic Acid Structure Genes Direct Protein Synthesis Amino Acid Structure	Online Quiz 1: Ch. 2 and 3.1 – 3.2A,B
Fri	7/3	University Holiday, no classes Independence Day (Happy 250th!)		
Mon	7/6	4.1B, 4.2 5.1 6.1A 6.1B,D, 6.2B,C	The Peptide Bond, Stereochemistry Polypeptide Diversity Peptide group Secondary and Tertiary Structure	
Wed	7/8	6.3, 6.4A, 6.4B, 5.2B, 5.2C, 5.2D	Quaternary Structure, Protein Stability, Denaturation, Salting Out, Chromatography, Electrophoresis	Online Quiz 2: Ch. 4, 5.1, 6.1 and 6.2
Fri	7/10	5.3A,B,C 7.1A 7.1B,C,D	Protein Sequencing, Myoglobin, Hemoglobin and Cooperativity	

Mon	7/13			Exam 1: Ch. 2, 3, 4, 5.1 – 5.2C, 6
Wed	7/15	7.1D, 7.1E, 8.1A	Hb: An Allosteric Protein, Sickle Cell Anemia, Monosaccharides	
Fri	7/17	8.1B,C, 8.2A,C, 11.1A,B,C	Glycosidic bonds, Polysaccharides, Properties of Enzymes	Online Quiz 3: Ch. 5.2D, 5.3, 7
Mon	7/20	11.2, 11.3A-E 11.4A,B, 11.5A,B,C	Transition State Theory, Catalytic Mechanisms, Lysozyme: acid-base catalysis, Serine Proteases: covalent catalysis	
Wed	7/22			Exam 2: Ch. 5.2D-5.3C, 7, 8, 11
Fri	7/24	12.1B 12.1C, 12.2A, B, 12.3A	Enzyme Kinetics: The Michaelis-Menten Eqn. Finding Vmax and KM, Enzyme Inhibition ATCase: An Allosteric Enzyme	
Mon	7/27	1.3C,D, 14.1A,B, 14.1C,D,E, 14.2A	Free Energy Review, Overview of Metabolism, ATP	Online Quiz 4: Ch. 1 and Ch. 12
Wed	7/29	14.2B,C,D, 14.3A, B, C, 15.1, 15.2A	Coupled Rxns., Other "High-Energy" Cmpds., Reduction Potential and Free Energy, Overview of Glycolysis, Rxns. of Glycolysis	
Fri	7/31	15.2B-J, 15.3A-C, 15.4A, 15.5A,B,C	Reactions of Glycolysis, Fermentation, Control of Glycolysis, Metabolism of Hexoses Other than Glucose	Online Quiz 5: Ch. 14, Ch. 15.1 and 15.2
Mon	8/3	17.1, 17.2A,B 17.3A-H 17.4A,B, 17.5A,B	Overview of the Citric Acid Cycle, Synthesis of acetyl-CoA, Rxns. of the CAC, Regulation of the CAC, Rxns. Related to the CAC	
Wed	8/5			Exam 3: Ch. 1, 12, 14, 15
Fri	8/7	18.1A, 18.2A,B 18.2C,D,E,F 18.3A,B,C,D	The Mitochondrion, Electron Transport Electron Transport, Chemiosmotic theory, ATP synthase, P/O ratio, Uncoupling agents	
Mon	8/10	18.4A,B	Control of Oxidative Metabolism	Online Quiz 6: Ch. 17
Wed	8/12		Review	
Fri	8/14			Comprehensive Final Exam

The course schedule, policies, procedures, and assignments in this course are subject to change in the event of extenuating circumstances, by mutual agreement, and/or to ensure better learning.