

L1 T 8/23	<p><u>Lecture 1. General Chemistry Review</u></p> <p><i>Electronegativity, Electron Configuration, Lewis Structures, Molecular Geometry, Hybridization, Double Bond Energy Molecular Distribution, and Vapor Pressure</i></p>
L2 R 8/25	<p><u>Lecture 2. Intermolecular Forces (Noncovalent Interactions)</u></p> <p><i>Ionic Interactions, Hydrogen Bonds, Van der Waals Interactions, Dipole-Dipole and Ion-Dipole Interactions, F Solvation, and Hydrophobic Interactions</i></p> <p><u>Text Assignment:</u> MedChem – 1.3 (Intermolecular Bonding Forces); Atkins – 5.1-5.5 (Intermolecular Forces)</p>
L3 T 8/30	<p><u>Lecture 3. Solubility and Lipids</u></p> <p><i>Thermodynamics of Liquid-Liquid Solubility, Octanol-Water Distribution Equilibrium Constants [Partition Coef Components and Structure, Cell Membrane Structure and Properties</i></p> <p><u>Text Assignment:</u> Atkins – 8.9 (The Like-Dissolves-Like Rule); MedChem – 18.2.1 (Hydrophobicity), 1.2.1 (C</p> <p><u>PS1 Due</u></p> <p><u>Link:</u> UCSF Membrane Tutorial (Great resource!!)</p> <p><u>Reading:</u> The Components and Properties of Cell Membranes</p> <p><u>Link:</u> Kimball's Biology Pages: Fats (Unsaturated Fats, Trans and Omega Fatty Acids, Phospholipids</p>
L4 R 9/1	<p><u>Lecture 4. Condensation and Hydrolysis Reactions</u></p> <p><u>PS2 Due</u></p> <p><i>Alcohols and Carboxylic Acids, Triglyceride Formation, Polyphosphate and Phospholipid Formation</i></p> <p>Quiz1 <u>Handout:</u> Condensation and Hydrolysis Reactions</p>
L5 T 9/6	<p><u>Lecture 5. Amino Acids</u></p> <p><u>PS3 Due</u></p> <p><i>Structure, Chirality, Side Chain Polarity, Peptide Bond, Peptide Condensation and Hydrolysis, Henderson-Hassel Solubility and pH</i></p> <p>Quiz 2 <u>Text Assignment:</u> MedChem – Chapter 2 and Appendix 1</p>
L6 R 9/8	<p><u>Lecture 6. Protein Structure</u></p> <p><u>PS4 Due</u></p> <p><i>Primary Structure, Disulfide Bonds, Secondary Structure - Alpha Helices and Beta Sheets, Tertiary/Quaternary Noncovalent Interactions, Prions, PostTranslational Protein Modifications</i></p> <p>Quiz 3 <u>Text Assignment:</u> MedChem – Chapter 2</p>
L7 T 9/13	<p><u>Lecture 7. Enzymes: Structure and Function</u></p> <p><i>Enzyme Catalysis, Mechanism of Action, Active Site, Substrate Binding, Catalytic Roles, Michaelis-Menton Km and Vmax Determination, Turnover Numbers, Km and Substrate-Enzyme Affinity</i></p> <p>Quiz 4 <u>Text Assignment:</u> MedChem – Chapter 3 (Enzymes: Structure and Function)</p> <p><u>Text Assignment:</u> Kimball's Biology Pages: Enzymes</p>

	<i>Text Assignment: Kimball's Biology Pages: Enzyme Kinetics</i>
L8 R 9/15 PS5 Due	<u>Lecture 8. Enzymes as Drug Targets</u> <i>Active Site Inhibitors, Allosteric Inhibition, Competitive / Uncompetitive / Non-Competitive Inhibitors, Suicidal</i> <i>Text Assignment: MedChem – Chapter 7 (Enzymes as Drug Targets)</i>
L9 T 9/20 PS6 Due Quiz 5	<u>Lecture 9. Medical Approaches to Inflammation I</u> <i>Cyclooxygenase Case Study</i> <i>Reading: Protein Function – Section III Cyclooxygenase (COX): An Example of How Enzymes Function</i> <i>Reading: Molecular Basis of Inflammation</i>
L10 R 9/22 PS7 Due	<u>Lecture 10. Medical Approaches to Inflammation II</u> <i>Steroids - Structure, Intracellular Receptors, Anti-Inflammatory MOA</i> <i>Reading: Molecular Basis of Inflammation</i> <i>Reading: Protein Function – Section II Nuclear Receptors: An Example of How Proteins Function</i> <i>Reading: Kimball's Biology Pages: Steroid Hormone Receptors and their Response Elements</i>
L11 T 9/27	<u>Lecture 11. Receptors as Drug Targets I</u> <i>Neurotransmitters & Hormones, Agonists, Antagonists, Partial Agonists, Inverse Agonists, Treatment of Hormone Cancers</i> <i>Text Assignment: MedChem – Chapter 8, Sections 8.1-8.5</i>
L12 R 9/29	<u>Lecture 12. Receptors as Drug Targets II</u> <i>Desensitization & Sensitization; Tolerance & Dependence; Receptor Types & Subtypes; Affinity, Efficacy, & Inactivation Dissociation Equilibria, EC50, IC 50, Scatchard Plots</i> <i>Text Assignment: MedChem – Chapter 8, Sections 8.6-8.9</i>
L13 T 10/4 Quiz 6	<u>Lecture 13. Nucleic Acids as Drug Targets</u> <i>Structure of DNA, Central Dogma, Intercalating Drugs, Alkylating & Metallating Agents, Cisplatin, 5-FU</i> <i>Text Assignment: MedChem – Chapter 6, Section 6.1 (Structure of DNA)</i> <i>Text Assignment: MedChem – Appendix 2 (The Standard Genetic Code)</i> <i>Text Assignment: MedChem – Chapter 9, Sections 9.1, 9.3 (Intercalating Drugs, Alkylating & Metallating Agents)</i> <i>Text Assignment: MedChem – Chapter 21, Section 21.2.3 (Alkylating & Metallating Agents)</i>
L14 R 10/6	<u>Lecture 14. Receptor Structure and Signal Transduction I – Overview of Ion Channel Receptors</u>

	<p><i>Ion Concentration Gradients, Ion Channel Structure and Mechanisms of Action, Ligand-Gated and Voltage-Gated Membrane Potentials, Nernst Equation and Membrane Equilibrium Potentials, Ion Movements and Resulting Changes,</i></p> <p><u>Text Assignment:</u> MedChem – Chapter 4, Section 4.6 (Ion Channel Receptors)</p> <p><u>Text Assignment:</u> MedChem – Appendix 4 (The Action of Nerves)</p> <p><u>UCSF Reading:</u> “Diffusion and Transport Across Membranes” Section on Ion Channels (pages 80-86)</p>
T1 T 10/11	Mid-Term Examination on Material from Lectures 1-13
Midterm	<u>A Few Practice Problems....</u>
L15 R 10/13	<p><u>Lecture 15. Receptor Structure and Signal Transduction II – Thermodynamics of Ion Channels</u></p> <p><i>Sodium-Potassium-ATP Pump Mechanism, Cell Membrane Potentials, Nernst Equation and Membrane Equilibrium Potentials, Movement across Voltage and Concentration Gradients, Ion Movements and Resulting Inhibitory/Excitatory Potential Changes</i></p> <p><u>Text Assignment:</u> MedChem – Chapter 4, Section 4.6 (Ion Channel Receptors)</p> <p><u>Text Assignment:</u> MedChem – Appendix 4 (The Action of Nerves)</p> <p><u>UCSF Reading:</u> “Diffusion and Transport Across Membranes” Section on ATP-Driven Ion Pumps (pages 73-86)</p>
L16 R 10/20	<p><u>Lecture 16. Receptor Structure and Signal Transduction III – G-Protein Coupled Receptors (GPCRs)</u></p> <p><i>G-Protein Coupled Receptor Structure, Evolutionary Tree of GPCRs, GPCR Signaling Mechanism of Action</i></p> <p><u>Text Assignment:</u> MedChem – Section 4.7 (G-Protein Coupled Receptors)</p> <p><u>Text Assignment:</u> MedChem – Section 5.1 (Signal Transduction Pathways for G-Protein Coupled Receptors)</p> <p><u>Text Assignment:</u> MedChem – Section 5.2 (Signal Transduction Involving G-Proteins and Adenylate Cyclase)</p>
L17 T 10/25	<p><u>Lecture 17. Cholinergics I</u></p> <p><i>Nervous System, Cholinergic System, Acetylcholine Structure & Receptor Binding</i></p> <p><u>Text Assignment:</u> MedChem – Chapter 19 and Appendix 4 (The action of nerves)</p>
L18 R 10/27	<p><u>Lecture 18. Cholinergics II</u></p> <p><i>Cholinergic Antagonists, Acetylcholinesterase Inhibitors</i></p> <p><u>Text Assignment:</u> MedChem – Chapter 19 and Appendix 4 (The Action of Nerves)</p>
L19 T 11/1	<p><u>Lecture 19. Adrenergics</u></p> <p><i>Geometry of Adrenergic Receptors, Main Types of Norepinephrine Receptors, Interaction of Adrenergic Receptors, MOA of Activated Receptors</i></p> <p><u>Text Assignment:</u> MedChem – Chapter 20</p>
Quiz 7	

C1 R 11/3	Compensatory Time for <i>Review Paper</i> Preparation
L20 T 11/8	<u>Lecture 20. Psychoactive Drugs I: Stimulants and Tranquilizers</u> <i>Handout:</i>
L21 R 11/10	<u>Lecture 21. Psychoactive Drugs II: Anti-Depressants</u> <i>Handout:</i>
L22 T 11/15	<u>Lecture 22. Psychoactive Drugs III: Anti-Psychotics and Hallucinogens</u> <i>Handout</i>
L23 T 11/17	<u>Lecture 23. Psychoactive Drugs IV: Cannabinoids, Opium & Opioid Analgesics</u> Cannabinoids, Source and History of Opiates, Structure of Opioids and Opioid Receptors, Endogenous Opioids <i>Text Assignment: MedChem – Chapter 21</i>
L24 T 11/22	<u>Lecture 24. Chemistry of Local & General Anesthetics</u> MOA for Local Anesthetics, pKa Relevance, History of Cocaine Use by Humans, MOA for General Anesthetics Widely Used General Anesthetics <i>Handout: Local and General Anesthetics</i>
T2 T 11/29	Test 2
R1 R 12/1	Review
<u>Rev Paper</u> <u>Due</u>	