

L1 T 1/14	<p>Lecture 1. General Chemistry Review Lewis Structures, Molecular Geometry, Arrhenius Equation, Second Law Text: Lewis Structures; Molecular Geometry; Chemical Kinetics; Acids & Bases, Chemical Thermodynamics Handout: Lewis Structure Methodology Wiki: Hybridization; Aromaticity; Arrhenius Equation; Second Law of Thermodynamics</p>
L2 R 1/16 PS 1 Due	<p>Lecture 2. Intermolecular Forces (Noncovalent Interactions) Coulomb's Law, Electronegativity, Hydrogen Bonds, Van der Waals Forces, Dipole-Dipole & Ion-Dipole Interactions, Hydrophobicity Wiki: Electronegativity; Intermolecular Forces; London Dispersion Forces; Hydrogen Bonds; Coulomb's Law; Hydrophobicity Text: Electronegativity, Intermolecular Forces (Hydrogen Bonding, Van Der Waals Forces, Dipole-Dipole & Ion-Dipole Interactions)</p>
L3 T 1/21 PS2 Due	<p>Lecture 3. Solubility and Lipids Thermodynamics of Liquid-Liquid Solubility, Octanol-Water Distribution Equilibrium Constants [Partition Coefficient], Components and Structure, Cell Membrane Structure and Properties. Wiki: Partition Coefficient; Link: UCSF Membrane Tutorial (Great resource!!) Reading: The Components and Properties of Cell Membranes Link: Kimball's Biology Pages: Fats (Unsaturated Fats, Trans and Omega Fatty Acids, Phospholipids)</p>
L4 R 1/23 PS3 Due Quiz 1	<p>Lecture 4. Condensation and Hydrolysis Reactions Alcohols and Carboxylic Acids, Triglyceride Formation, Polyphosphate and Phospholipid Formation. Handout: Condensation Reactions</p>
L5 T 1/28 PS4 Due Quiz 2	<p>Lecture 5. Amino Acids Structure, Chirality, Side Chain Polarity, Peptide Bond, Peptide Condensation and Hydrolysis, Henderson-Hasselbalch Equation, Solubility and pH Wiki: Amino Acids; Chirality; Peptide Bond; Henderson-Hasselbalch Equation; Link: Amino Acid Structures at pH=7.4 Amino Acid Chart with pKa Table</p>
L6 R 1/30 PS5 Due Quiz 3	<p>Lecture 6. Protein Structure Primary Structure, Disulfide Bonds, Secondary Structure - Alpha Helices and Beta Sheets, Tertiary/Quaternary Structure, Noncovalent Interactions, Prions, PostTranslational Protein Modifications. Wiki: Protein Structure Disulfide Bonds Kimball's Biology Pages: Proteins; Polypeptides; Kimball's Biology Pages: Protein Structure: Primary; Secondary; Tertiary; Quaternary</p>
7 T 2/4 Quiz 4	<p>Lecture 7. Enzymes: Structure and Function Enzyme Catalysis, Mechanism of Action, Active Site, Substrate Binding, Catalytic Roles, Michaelis-Menton Kinetics, Km and Vmax Determination, Turnover Numbers, Km and Substrate-Enzyme Affinity Text: Michaelis-Menten Model of Enzyme-Catalyzed Reactions Kimball's Biology Pages: Enzymes Kimball's Biology Pages: Enzyme Kinetics</p>
L8 R 2/6 PS6 Due	<p>Lecture 8. Enzymes as Drug Targets Active Site Inhibitors, Allosteric Inhibition, Competitive / Non-Competitive Inhibitors, Suicidal Substrates Wiki: Enzymes; Enzyme Inhibitors</p>
L9 T 2/11 Quiz 5	<p>Lecture 9. Medical Approaches to Inflammation I Cyclooxygenase Case Study Reading: Protein Function – Section III Cyclooxygenase (COX): An Example of How Enzymes Function Wiki: NSAIDs; COX-2 Inhibitors</p>

	Reading: <i>Molecular Basis of Inflammation</i>
L10 R 2/13 <u>PS7 Due</u>	Lecture 10. Medical Approaches to Inflammation II Steroids - Structure, Intracellular Receptors, Anti-Inflammatory MOA Reading: <i>Molecular Basis of Inflammation</i> Reading: <i>Protein Function – Section II Nuclear Receptors: An Example of How Proteins Function</i> Reading: <i>Kimball's Biology Pages: Steroid Hormone Receptors and their Response Elements</i> Wiki: Steroid ; Zinc Finger ; Complex Ion ; d-Orbitals
L11 T 2/18 Quiz 6	Lecture 11. Receptors as Drug Targets I Neurotransmitters & Hormones, Agonists, Antagonists, Partial Agonists, Inverse Agonists, Treatment of Hormone-Dependent Breast Cancers Wiki: Neurotransmitters ; Hormones ; Receptors ; Antagonists ; Agonists ; Partial Agonists ; Inverse Agonists ; Ligands ; Tamoxifen ; Aromatase Inhibitors ;
L12 R 2/20	Lecture 12. Receptors as Drug Targets II Desensitization & Sensitization; Tolerance & Dependence; Receptor Types & Subtypes; Affinity, Efficacy, & Pot Dissociation Equilibria, EC50, IC 50 Wiki: Efficacy ; Dose-Response Curve ; EC50 ; IC50 ; Therapeutic Index ; Scribd: Sensitization and Desensitization ;
L13 T 2/25 Quiz 7	Lecture 13. Nucleic Acids as Drug Targets Structure of DNA, Central Dogma, Intercalating Drugs, Alkylating & Metallating Agents, Cisplatin, 5-FU Wiki: Alkylating Agents ; Sulfur Mustard ; Cisplatin ;
C1 R 2/27	Compensatory Time for <i>Review Paper</i> Preparation
T1 T 3/4 Midterm	Mid-Term Examination on Material from Lectures 1-13 A Few Practice Problems....
L14 R 3/6	Lecture 14. Receptor Structure and Signal Transduction I – Overview of Ion Channel Receptors Ion Concentration Gradients, Ion Channel Structure and Mechanisms of Action, Ligand-Gated and Voltage-Gated Ion Channels, Cell Membrane Potentials, Nernst Equation and Membrane Equilibrium Potentials, Ion Movements and Resulting Inhibitory/Excitatory Potential Changes, Wiki: Ion Channels ; Nernst Equation ; Action Potential ; K+ Ion Channel Nobel Chemistry Lecture (Video) UCSF Reading: "Diffusion and Transport Across Membranes" Section on Ion Channels (pages 80-86)
L15 T 3/11 <u>PS8 Due</u>	Lecture 15. Receptor Structure and Signal Transduction II – Thermodynamics of Ion Channels Sodium-Potassium-ATP Pump Mechanism, Cell Membrane Potentials, Nernst Equation and Membrane Equilibrium Potentials, Free Energy Changes of Ion Movement across Voltage and Concentration Gradients, Ion Movements and Resulting Inhibitory/Excitatory Potential Changes UCSF Reading: "Diffusion and Transport Across Membranes" Section on ATP-Driven Ion Pumps (pages 73-77) Wiki: Neuron ; Membrane Potential ; Na+/K+-ATPase McGraw-Hill: Sodium-Potassium-ATP Pump
L16 R 3/13	Lecture 16. Receptor Structure and Signal Transduction III – G-Protein Coupled Receptors (GPCRs) G-Protein Coupled Receptor Structure, Evolutionary Tree of GPCRs, GPCR Signaling Mechanism of Action 2012 Nobel Chemistry - Nobel Lecture Rob Lefkowitz Nobel Lecture Brian Kobilka Wiki: G-Protein Coupled Receptors (GPCRs) ;
L17 T 3/25	Lecture 17. Cholinergics I

Quiz 7	<i>Nervous System, Cholinergic System, Acetylcholine Structure & Receptor Binding</i>
L18 R 3/27	Lecture 18. Cholinergics II <i>Cholinergic Antagonists, Acetylcholinesterase Inhibitors</i>
L19 T 4/1	Lecture 19. Adrenergics <i>Geometry of Adrenergic Receptors, Main Types of Norepinephrine Receptors, Interaction of Adrenergic Receptors, MOA of Activated Receptors</i>
L20 T 4/3	Lecture 20. Psychoactive Drugs I: Stimulants and Tranquilizers <i>Handout:</i>
L21 R 4/8	Lecture 21. Psychoactive Drugs II: Anti-Depressants <i>Handout:</i>
L22 T 4/10	Lecture 22. Psychoactive Drugs III: Anti-Psychotics and Hallucinogens <i>Handout</i>
L23 R 4/15	Lecture 23. Psychoactive Drugs IV: Cannabinoids, Opium & Opioid Analgesics <i>Cannabinoids, Source and History of Opiates, Structure of Opioids and Opioid Receptors, Endogenous Opioids, Side Effects of Opiates</i> <i>Text Assignment: MedChem – Chapter 21</i>
L24 T 4/17	Lecture 24. Chemistry of Local & General Anesthetics <i>MOA for Local Anesthetics, pKa Relevance, History of Cocaine Use by Humans, MOA for General Anesthetics, Widely Used General Anesthetics</i> <i>Handout: Local and General Anesthetics</i>
T2 R 4/22	<u>Test 2 Concepts</u>
R1 T 4/24 <u>Paper Due</u>	Review