Chem 450 CRN 77770
Information Storage and Transfer - Molecules and Pathways
Fall 2020

Instructor: Dr. Maegan Weltzin, Murie 113E, 474-6527, mmweltzin@alaska.edu

- Use of concepts to formulate hypotheses and interpret experimental data to benefit the understanding of current research through paper discussion.

Learning Outcomes

1. Understand structure-function relationship determining macromolecular interactions
2. Aspects of synergism, cooperativity, and reciprocity relevant to macromolecular dynamics
3. Gene regulation – interplay among macromolecules and expression of phenotypes
4. Biomedical/disease-related aspects of topics
5. Critical reading of primary research literature
6. Understanding of principal methods and techniques

Instructional Methods:

The teaching methods employed in this course will consist of short content videos, lecture notes, groupwork, and class discussions. Primary research papers allow to explore distinct topics more in depth through discussions and to translate science knowledge. Blackboard (https://classes.uaf.edu) will be utilized as the main

A+	97-100
A	90-96
A-	88-89
B+	86-87
B	80-85
B-	78-79
C+	76-77
C	70-75
C-	68-69
D+	66-67
D	60-65
D-	58-59
F	0-57

Course Policies

Participation: Regular

Students will not collaborate on any quizzes, in-class exams, or take-home exams that will contribute to their grade in a course, unless permission is granted by the instructor of the course. Only those materials permitted by the instructor may be used to assist in quizzes and examinations. Students will

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	○ Video 1.1: Nucleotide basics ○ Video 1.2: Do novo purine nucleotide synthesis ○ Video 1.3: De novo pyrimidine nucleotide synthesis and Salvage pathway ○ Thymidylate Synthase Mechanism • **Simulations and Exercises:** ○ Sapling Nucleotide Structure simulation ○ Groupwork: Nucleotide structure concept map (short video explanation)		
Unit 2 (Part of 8, 22 & 24) [8-31]	**Nucleotide Degradation & Associated Diseases; DNA Structure; DNA lab techniques** • **Reading:** ○ Parts of 8, 22, & 24 ○ Lecture Notes • **Watch:** ○ Video 2.1: Nucleotide degradation ○ Video 2.2: Degradation diseases ○ Video 2.3: DNA Structure ○ Video 2.4 DNA structure movie ○ Video 2.5: Forms of DNA Structure • **Simulations and Exercises:** ○ Sapling metabolism map ○ Groupwork: Metabolism pathway ○ DNA/RNA structure simulation ○ Lab techniques animations and simulations: Sanger Sequencing and PCR	899-903, 282-96	• HW #2 (due Monday, 9/7) • Groupwork: Metabolism map (due Thursday, 9/10) • **Perusall Discussion:** Who are you? (Introduce yourself to the class using the General Discussion chat area (Friday, 9/11) • Slack message metabolism map in group chat (due Thursday, 9/10) • Find a time for us to meet using this google sheet link: https://docs.google.com/spreadsheets/d/1nG4nuMeNvfW4fbF94VFKKdBjSRq6yAJR7J22MO1Q_Kk/edit?usp=sharing
Unit 3 (Ch 24) [9-7]	**DNA Topology and Chromosome Structure** • **Reading:** ○ Ch 24 ○ Lecture Notes • **Watch:** ○ Video 3.1: DNA Topology ○ Video 3.2: Topoisomerases ○ Video 3.3: 3D packing of nuclear chromosomes ○ Video 3.4: Chromatin, Histones, and Modifications	957-82	• HW #3 (due Monday, 9/14) • **Paper Discussion #1:** Topoisomerase (due Friday, 9/18) • **Exam 1 due next week! (Wed, 9/16) Start studying early.** • First Student-Instructor Meeting

	○ Video 3.5: DNA Gel electrophoresis video ○ *Optional:* 2 DNA topology videos • **Paper Discussion #1 (Topoisomerase)** • **Simulations and Exercises** ○ none		