

Welcome to Fall 2023 GU4506 – Biochemistry I in XR: Mixed Reality

Thursdays 4:30pm-5:30pm

502 NWC

1 point

Course Description

In this course, we will use augmented reality to explore the basic 3D aspects of biochemistry of living systems and how this knowledge can be harnessed to create new medicines. Students may register for this course alongside of GU4501 or independent of GU4501. Professor Stockwell will meet each week with a group of 4 students to discuss protein structures using Oculus Quest Pro Mixed Reality headsets in the XR app Nanome. Students will rotate through in person meetings. We will examine 3D spatial concepts relevant to biochemistry, where you will be able to examine molecular structures in an immersive format in real time with other students and with the instructor.

Tech Support

Canvas/Courseworks Tech Support: If you have any tech support needs, please submit a ticket with CUIT: <https://cuit.columbia.edu/service-desk-support>

Required Headset

A group of 4 students will meet each week with Professor Stockwell to analyze protein structures using Oculus Quest Pro headsets in mixed reality (we have 5 headsets currently). The students participating in the analysis group will rotate each week. At the end of the course, students will take an assessment to determine their understanding of 3D spatial concepts in biochemistry, as well as their engagement with the course materials.

Outline

Class #	Date	Topic	Learning Goals
1	9/7	Course overview and discussion about prior experiences	Describe the goals and structure of the course and expected roles and activities for students
2-4	9/14	Amino acids, peptides and proteins – the building blocks of life	Identify different types of amino acids and secondary structural elements in a protein structure using 3IBC (Crystal structure of caspase-7 in complex with acetyl-YVAD-CHO)
	9/21		
	9/28		
5-7	10/5	Enzyme and protein function	Identify active site residues associated with catalysis and with small molecule inhibitor binding to enzymes using 6LU7 – the crystal structure of COVID-19 main protease in complex with an inhibitor N3
	10/12		
	10/19		
8-10	10/26	Discussion of protein function	Identify different parts and functions of 6VXX SARC-Cov-2 spike glycoprotein (closed state)
	11/2		
	11/9		
13-14	11/16		Debrief and discuss AR technology experiences
	11/30		
	12/7		