

CORE Class: BCHM 5770 Fundamentals of Biochemistry I (3cr), Fall 2024 and BCHM 5772 Quantitative Reasoning in Biochemistry (1cr)

Times: Monday & Wednesday BCHM 5770, Fridays BCHM 5772, 9:30-10:50am, JSCBB B331.

Teachers: Debbie Wuttke (M/W) & Rob Batey (F)

Overarching Goal: The goal of this first-year curriculum is to facilitate the transition from an undergraduate coursework-based, prescriptive learning to active critical thinking-based learning.

These courses will incorporate strategies to develop critical thinking and problem-solving skills, implementation of robust experimental design through incorporation of appropriate controls and understanding of statistical significance, and quantitative problem solving. Scientific communication skills, including both oral and written presentation, are developed through practice and peer assessment.

Schedule: Monday

Wednesday

Friday

<i>Week 1</i>	Intro to Core Intermolecular Forces	Intermolecular Forces 1	Intro and Quantitative Lab Skills I: pKas and Buffers
<i>Week 2</i>	<i>Labor Day</i> No Class	Intermolecular Forces 2	Quantitative Lab Skills II: UV spectroscopy of proteins and nucleic acids
<i>Week 3</i>	Protein Thermodynamics and Folding 1 PS #1 due	Protein Thermodynamics and Folding 2/pKa	<i>Biochem Department Retreat</i> No Class
<i>Week 4</i>	Protein Thermodynamics and Folding 3	Protein Structure <i>Tool: ChimeraX/Pymol</i> PS #2 due	Quantitative Skills: Bioenergetics I (Free Energy, Enthalpy, etc.)
<i>Week 5</i>	Protein Structure	Nucleic Acid Structure (needs 2) PS #3 due	Quantitative Lab Skills: Statistical Treatment I
<i>Week 6</i>	Paper Discussion PS #4 due	Paper Discussion	Quantitative Skills: Statistical Treatment II
<i>Week 7</i>	Rigor and Reproducibility	In class Midterm Exam	Quantitative Lab Skills: Modeling data with Excel <i>Tool: Excel with Solver</i>
<i>Week 8</i>	Biostatistics	Sequence Alignments	Quantitative Skills: Binding analysis I <i>Tool: Excel with Solver</i>
<i>Week 9</i>	Rotation Talks	Quantitative Skills: Binding analysis II/Data modeling PS #5 due	Rotation Talks
<i>Week 10</i>	Protein structure prediction	Binding Theory	Quantitative Skills: Binding analysis III (Equilibrium vs. non-equilibrium approaches) Kinetics features of binding analysis.
<i>Week 11</i>	Fitting Data/Methods	Marv Caruthers Lecture PS #6 due	Quantitative Lab Skills: Measuring Enzymatic Activity and Radioisotopes
<i>Week 12</i>	Johannes Rudolph Lecture Kinetics	Enzyme kinetics PS #7 due	Quantitative Skills: M.-M. kinetics
<i>Week 13</i>	Binding Methods	Fluorescence Tools/FRET PS #8 due	Quantitative Skills: M.-M. kinetics (Inhibition)
<i>Week 14</i>	Paper discussion PS #9 due	Rotation Talks	Quantitative Skills: Fluorescence and FRET
<i>Week 15</i>	Rotation Talks	In Class Final Exam	<i>No class: Reading Day</i>