Schedule/Syllabus Intro Struct Biol – Semester A 5784, 2023-24

Lectures:
Sunday 12-13, hall 06, UK Building
Wednesday 10-12, hall 06, UK Building
Tutorial:
Sunday 13-14, room 06, UK Building (PC room, Sherman lobby in the first weeks)
Teaching Assistant: Gabriel Axel
Grade: The course is 4 credit hours (3 lecture + 1 exercise). The date of the final exam we set as based on the students. The exam is take-home. Generally, we give the students about 10 days to do it. In the past 3 years, the students have opted for a submission date very close to the beginning of Semester B. The final grade for the course is comprised of 60% based on the exam and 40% based on problem sets, which are graded by the TA. There are 5 problem sets.

	Date	Lecturer	Topic	Supplemental reading material
Week 1	Lesson 1 (Oct. 15)	Nir	Introduction (1): protein roles, physico-chemical principles	Kessel & Ben-Tal, Ch.1
		Nir	Protein Structure (1): introduction, primary structure	Kessel & Ben-Tal, Ch.2 (2.1-2.2) or Branden and Tooze Ch.1-5
	Lesson 2 (Oct. 18)	Nir	Protein Structure (2): primary structure	Kessel & Ben-Tal, Ch.2 (2.2)
		Nir	Protein Structure (3): secondary structure	Kessel & Ben-Tal, Ch.2 (2.3)
Week 2	Lesson 3 (Oct. 22)	Nir	Protein Structure (4): tertiary structure	Kessel & Ben-Tal, Ch.2 (2.4)
		Gabi	Biological databases and molecular visualization tutorial I – PDB and PyMOL	
	Lesson 4 (Oct. 25)	Nir	Protein Structure (5): quaternary structure, PTM,	Kessel & Ben-Tal, Ch.2 (2.5-2.6); Branden and Tooze Ch.14
		Nir	Protein Structure (6): fibrous proteins	Kessel & Ben-Tal, Ch.6 (6.2)
Week 3	Lesson 5 (Oct. 29)	Nir	Structure prediction methods	Kessel & Ben-Tal, Ch.3 (3.1-3.3); Branden & Tooze Ch.18 Kessel & Ben-Tal, Ch.3 (3.4-3.5) ; Branden and Tooze Ch.17
	Lesson 6 (Nov. 1)	Joel	Experimental methods	
		Joel	Experimental methods	

Week 4	Lesson 7 (Nov. 5)	Joel	Experimental methods	
		Gabi	Molecular visualization tutorial II – PyMOL	
	Lesson 8 (Nov. 8)	Nir	Energetics and stability	Kessel & Ben-Tal, Ch.4
		Nir	Dynamics	Kessel & Ben-Tal, Ch.5 (5.3.1-2)
Week 5	Lesson 9 (Nov. 12)	Nir	Dynamics	
		Gabi	Experimental methods + Coot tutorial	
	Lesson 10 (Nov. 15)	Nir	Dynamics	
		Nir	Unstructured proteins	Kessel & Ben-Tal, Ch.6
Week 6	Lesson 11 (Nov. 19)	Nir	Membrane Proteins (1): introduction, primary structure	Kessel & Ben-Tal, Ch.7 (7.1-7.3.2); Branden and Tooze Ch.12
		Gabi	Protein energetics Symmetry	
	Lesson 12 (Nov. 22)	Nir	Membrane Proteins (1): secondary & tertiary structure Membrane Proteins (2): peripheral proteins, membrane-protein interactions	Kessel & Ben-Tal, Ch.7 (7.3.2-7.3.3) Kessel & Ben-Tal, Ch.7 (7.33-7.4)
		Nir	GPCRs	
Week 7	Lesson 13 (Nov. 26)	Nir	Multi-GPCRs	
		Gabi	Working with sequences Homology modeling	
	Lesson 14 (Nov. 29)	Joel	Channels	Kessel & Ben-Tal, Ch.8 (8.1-8.4); Branden and Tooze Ch.15
		Joel	Channels	
Week 8	Lesson 15 (Dec. 3)	Joel	Channels	

		Gabi	Water channels Structure of AQP1 The pathway through the channel Selectivity mechanisms Structure prediction in TM proteins	
	Lesson 16 (Dec. 6)	Joel	Channels	
		Nir	Protein-Ligand Interactions (1): models and energetics Protein-Ligand Interactions	
Week 9	Lesson 17 (Dec. 10) Hanuka vacation			
	Lesson 17 (Dec. 13)	Nir	(2): AChE inhibitors, drug design	
		Nir	Protein-Ligand Interactions	Kessel & Ben-Tal, Ch.8 (8.4; 8.6)
Week 10	(Dec. 17)	Joel	Nucleic Acids	Brandon & Tooze Ch.7
		Gabi	Surface area and superposition	
	Lesson 18 (Dec. 20)	Joel	Nucleic Acids	
		Joel	Nucleic Acids	
Week 11	Lesson 19 (Dec. 24)	Joel	Nucleic Acids	
		Gabi	RTKs and the ErbB family Ligand-induced dimerization of EGFR and ErbB2 + ChimeraX tutorial	
	Lesson 20 (Dec. 27)	Joel	Nucleic Acids	
		Joel	Nucleic Acids	
Week 12	Lesson 21 (Dec. 31)	Joel	Nucleic Acids or Protein/Nucleic Acid Recognition	
		Gabi	Fiber diffraction	
		Joel	Protein/ Nucleic Acid Recognition	

	Lesson 22 (Jan. 3)	Joel	Protein/ Nucleic Acid Recognition	
Week 13	Lesson 23 (Jan. 7)	Joel	Protein/ Nucleic Acid Recognition	
		Joel	Protein/ Nucleic Acid Recognition	
	Lesson 24 (Jan. 10)	Joel	Protein/ Nucleic Acid Recognition	
		Joel	Protein/ Nucleic Acid Recognition	
Week 14	Lesson 25 (Jan. 14)	Gabi	DNA binding Proteins + limited diffusion	
		Joel/Nir ?		