Chemistry 135: Chemical Biology (Fall 2017)

Course Information

LECTURE SCHEDULE: Monday, Wednesday, and Friday 9:10-10:00 am in 100 GPBB

INSTRUCTOR

Matthew B. Francis (Office Hours: 3-5pm Thursdays)
724 Latimer Hall
mbfrancis@berkeley.edu (NOT francis@berkeley.edu!)
Office Hours: Thursday 3-5 pm in 724 Latimer Hall

GRADUATE STUDENT INSTRUCTORS

Jing Dai (jdai@berkeley.edu); Office Hours: Tues 3:45-4:45pm
Sarah Klass (sklass@berkeley.edu); Office Hours: Wed 10-11am
Marco Lobba (mlobba@berkeley.edu); Office Hours: Tues 10-11am

TEXTBOOK AND REQUIRED SOFTWARE

- Lehninger Principles of Biochemistry, 7th Edition
  David Nelson and Michael Cox (the 4th, 5th, and 6th Editions are also OK, and much cheaper)
- PyMol software from Schrödinger. This program is available for PCs, Macs, and Linux-based computers, and can be downloaded for free at http://pymol.org/ep. The username and password will be distributed in class.

ADDITIONAL READING

- The Molecules of Life: Physical and Chemical Principles (Boyana Konforti, John Kuriyan, and David Wemmer)
- The Organic Chemistry of Biological Pathways (John McMurry and Tadhg Begley)
- Physical Biology of the Cell (Julie Theriot and Rob Phillips)
- Molecular Biology of the Cell (Bruce Alberts et al.)

COURSE WEBSITE: Go to https://bcourses.berkeley.edu/ and search for the "CHEM 135-F17" page. This webpage will be used to distribute handouts, lecture notes, problem sets, study guides, etc. It will also be used to distribute the protein structure files that are used in class.

PROBLEM SETS: There will be about six problem sets for the course. They will be distributed approximately every two to three weeks.

IN-CLASS EXAMS: There will be three in-class exams for the course, scheduled for Sept. 20th, Oct. 18th, and Nov. 17th.

FINAL EXAM: The final exam is scheduled for Dec. 11th, 7:00-10:00 pm. This date cannot be changed.

GRADING

Problem Sets	15%
Exam I	20%
Exam II	20%
Exam III	20%
Final Exam	25%

For each student, grades will also be calculated by taking the worst midterm score as 5% and the final as 40%. The best overall score will be used.

CHEM 135 Fall 2017: LECTURE SCHEDULE (ALL DATES ARE APPROXIMATE)

Lecture	Date	Topic	Chapter
1	Aug 23	Course Introduction and the Central Dogma of Biology	Review 1,2
2	Aug 25	Protein Structure I	3
3	Aug 28	Protein Structure II	3,4
4	Aug 30	Protein Bioconjugation	4
5	Sept 1	Examples of Enzyme Function I: RNAse	6.4
6	Sept 6	Computational Biochemistry	–
7	Sept 8	Examples of Enzyme Function II: Proteases	6.4
8	Sept 11	Basic Enzyme Kinetics I - TS Theory and MM Kinetics	6
9	Sept 13	Basic Enzyme Kinetics II - Saturation Behavior	6
10	Sept 15	Inhibition and Enzyme Regulation – Acetylcholine Esterase	6, 12.6
11	Sept 18	General Principles of Bioenergetics and Metabolism	13
	Sept 20	**EXAM I: in class**	–
12	Sept 22	Glucose Metabolism I	14
13	Sept 25	Glucose Metabolism II	14
14	Sept 27	Citric Acid Cycle	16
15	Sept 29	Oxidative Phosphorylation I	19
16	Oct 2	Oxidative Phosphorylation II	19
17	Oct 4	Photosynthesis I	19
18	Oct 6	Biosynthesis and Synthetic Biology	–
19	Oct 9	Photosynthesis II	20
20	Oct 11	Lipid Metabolism I	17
21	Oct 13	Lipid Metabolism II	21
22	Oct 16	Terpene and Steroid Biosynthesis	21
	Oct 18	**Exam II: in class**	–
23	Oct 20	Amino Acid Metabolism	22
24	Oct 23	Oligonucleotide Structure	8
25	Oct 25	Oligonucleotide Structure	8
26	Oct 27	DNA Replication	25
27	Oct 30	DNA-Based Technologies	25,9
28	Nov 1	Plasmids and Protein Expression	9
29	Nov 3	The Cell Cycle and Cancer	12.11, 12.12
30	Nov 6	Transcription - Mechanisms	26
31	Nov 8	Transcription - Regulation	28
32	Nov 13	Protein Biosynthesis I	27
33	Nov 15	Protein Biosynthesis II	27
	Nov 17	**EXAM III: in class**	–
34	Nov 20	Artificial Amino Acids and Designer Proteins	27.2
35	Nov 27	Carbohydrate Structure and Metabolism I	7
36	Nov 29	Carbohydrate Structure and Metabolism II	7
37	Dec 1	Chemical Biology and the Environment	–
	Dec 11	**FINAL EXAM: 7-10 pm**	–