

**BISC 330L: Biochemistry
Lecture Syllabus, USC Spring 2019**

Course Topics: Biochemical bonds and reactions. Interactions with water molecules. Structure/function of DNA, RNA, proteins, lipids and carbohydrates. Enzyme kinetics and mechanisms. Enzyme cofactors and vitamins. Enzyme regulatory strategies. Glucose oxidation and ATP production: glycolysis, citric acid cycle & oxidative phosphorylation. Glucose and O₂ production by photosynthesis in plant chloroplasts. Ribose biosynthesis from glucose by pentose phosphate pathway. Lipid catabolism by beta-oxidation. Mastery of these topics will provide students with a solid foundation in basic biochemical principles. Techniques used to study biochemical pathways will be presented in the context of these major biological mechanisms.

Lectures:

Monday, Wednesday and Friday 11:00-11:50 a.m. (Section 13023)
Monday, Wednesday and Friday 12:00-12:50 p.m. (Section 13024)
Room THH 101

Instructors:

Dr. Nancy Castro
Email: ncastro@usc.edu, Office: ZHS 256, Office Hours: Tuesday and Thursday 8:30-9:30am

Dr. Fabien Pinaud
Tel: (213) 740-2262, Email: pinaud@usc.edu Office: RRI 204A, Office Hours: RRI 204A Tuesday 1-2 pm

Dr. Grayson Jagers
Email: jagers@usc.edu Office: ZHS 256, Office Hours: Tuesdays 12-1pm, Fridays 1-2pm

Prerequisite: CHEM 322A (Organic Chemistry)

Textbook: Berg, Tymocko & Stryer, BIOCHEMISTRY (8th, 2015)
BISC 330L Lab Manual (Provided for you online)

Course Grades:

The course grade will be based upon **1000** possible points:
250 pts. Midterm 1
250 pts. Midterm 2
250 pts. Final Exam
250 pts. Laboratory (see lab syllabus for specific assignments)

Exam Dates:

Midterm 1: Tuesday, February 12, 4:00-4:50pm
Midterm 2: Tuesday, March 26, 4:00-4:50pm
Final Exam: Wednesday, May 8, 8:00 – 10:00am

Wk.	Date	Lecture Topic	Reading
1	Jan. 7 (NC)	Introduction: chemistry of life process	1.1-1.2
	Jan. 9	Water, pH and acid/base equilibria	1.3
	Jan. 11	DNA discovery & genomic revolution	1.4
2	Jan. 14	Amino acid structures & properties	
	Jan. 16	Primary structure of proteins	2.1
	Jan. 18	Primary structure of proteins	2.2
3	Jan. 21	No Lecture – MLK Day	2.3
	Jan. 23	Tertiary & quaternary structures	2.4 - 2.6
	Jan. 25	Protein purification methods	3.1
4	Jan. 28	Amino acid analysis & sequencing	3.2
	Jan. 30	Protein structure determination	3.6
	Feb. 1	Protein structure determination	4.1 - 4.2
5	Feb. 4	DNA replication & gene expression	4.3 - 4.4
	Feb. 6 (FP)	Enzymes: Basics	8.1 - 8.2
	Feb. 8	Enzymes: Transition State	8.3
6	Feb. 11	Enzymes: Michaelis-Menten; Inhibition	8.4 – 8.5
	Feb. 13	Enzymes: Catalytic Strategies	9
	Feb. 15	Enzymes: Regulatory Strategies	10
7	Feb. 18	No Lecture – President's Day	
	Feb. 20	Carbohydrates	11
	Feb. 22	Lipids and Cell Membranes	12.1 – 12.3
8	Feb. 25	Lipids and Cell Membranes	12.4 – 12.6
	Feb. 27	Membrane Channels & Pumps	13
	Mar. 1	Signal Transduction Pathways	14
9	Mar. 4 (GJ)	Introduction to Metabolism	15
	Mar. 6	Introduction to Metabolism	15
	Mar. 8	Glycolysis	16
		Spring Recess	
10	Mar. 18	Regulation of Glycolysis	16
	Mar. 20	Gluconeogenesis	16
	Mar. 22	Glycolysis and Review	16
11	Mar. 25	The Citric Acid Cycle	17
	Mar. 27	The Citric Acid Cycle	17
	Mar. 29	Oxidative Phosphorylation	18
12	Apr. 1	Oxidative Phosphorylation	18
	Apr. 3	Oxidative Phosphorylation	18
	Apr. 5	Oxidative Phosphorylation	18
13	Apr. 8	Photosynthesis	19
	Apr. 10	Photosynthesis	19
	Apr. 12	Photosynthesis	19
14	Apr. 15	The Calvin Cycle	20
	Apr. 17	The Calvin Cycle	20
	Apr. 19	The Pentose Phosphate Pathway	20
15	Apr. 22	Glycogen	21
	Apr. 24	Fatty Acid Metabolism	22
	Apr. 26	Review for Final Exam	
	May 8th	Final Exam 8 – 10am	

In case a midterm exam must be missed for legitimate reasons, discuss the situation with the course instructor **prior** to the exam, if possible. If an exam is missed for an emergency or for a valid health reason (with written documentation), the scores of the other two exams will be prorated to comprise your total point score. Rules governing exams are given in more detail in your Student Contract, which is also posted on the class website: <https://blackboard.usc.edu>.

In the event an error is made in the grading of your exam, written submittal of a description of the error with the exam should be returned to Dr. Bancroft within a week after receiving your graded exam. After this time period, exams will not be regraded.

Lectures: It is important to attend all of the lectures during the course and to take good notes for study. Prior to attending each lecture, it is important to have read the appropriate portions of the textbook. However, many of the lectures will contain new and additional information that is not in the textbook. Examinations will be based mainly on information given in the lectures. In studying for examinations, complete and accurate lecture notes are of prime importance.

The lecture slides posted on the course Blackboard internet site (<https://blackboard.usc.edu>), may contain material that is not in the lectures—and the lectures may contain information that is not conveyed in the Blackboard lecture summaries. The lecture slides, as posted on Blackboard, and the textbook are intended to be helpful, but auxiliary to the lectures. All course material, information, announcements and grades will be posted on Blackboard until the end of the semester.

Email Communication:

To ensure privacy, only student's USC email accounts may be used for email communications. Students are responsible for understanding the content of email messages that the instructor sends to their USC accounts. Therefore, each student must check their USC email regularly and make sure their account is not over quota, so new messages can be received.

Statement on Academic Conduct and Support Systems

Academic Conduct

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Section 11, *Behavior Violating University Standards* <https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions/>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct/>.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* <http://equity.usc.edu/> or to the *Department of Public Safety* <http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us>. This is important for the safety whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage sarc@usc.edu describes reporting options and other resources.

Support Systems

A number of USC's schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html provides certification for students with disabilities and helps arrange the relevant accommodations. If an

officially declared emergency makes travel to campus infeasible, *USC Emergency Information* <http://emergency.usc.edu> will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.

Statement For Students With Disabilities:

Students requesting academic accommodations based on a disability are required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP when adequate documentation is filed. Please be sure the letter is delivered to Dr. Bancroft as early in the semester as possible. DSP is located in STU 301 and is open 8:30am–5:00pm, Monday through Friday. The phone number for DSP is (213) 740-0776. For more information, please visit the following link:
http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html