BISC 330L BIOCHEMISTRY – USC SPRING 2014
Lecture Syllabus

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 O_2 production by photosynthesis in plant chloroplasts. Ribose biosynthesis from glucose by pentose phosphate pathway. Mastery of these topics will provide students with a solid foundation in basic biochemical principles.

Prerequisites: BISC 320L (Molecular Biology) and CHEM 322A (Organic Chemistry)

Professors:

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Course Director: Dr. Matthew Michael, Tel: (213) 740-0553, Email: mattm@usc.edu
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Required Text: Berg, Tymocko & Stryer, BIOCHEMISTRY (7th ed., 2012)
BISC 330L Lab Manual (available in USC Bookstore)

TENTATIVE LECTURE SCHEDULE

LECTURER, DATE	SUBJECT	CHAPTER
Jan 13 (LC)	Introduction: chemistry of life process	1.1-1.2
15	Water, pH and acid/base equilibria	1.3
17	DNA discovery & genomic revolution	1.4
20	**NO LECTURE - Martin Luther King Day**	
22	Amino acid structures & properties	2.1
24	Primary structure of proteins	2.2
27	Secondary structure	2.3
29	Tertiary & quaternary structures	2.4-2.6
31	Protein purification methods	3.1
Feb 3	Amino acid analysis & sequencing	3.2
5	Protein structure determination	3.6
7	DNA & RNA structure & purification	4.1 – 4.2
10	DNA replication & gene expression	4.3 – 4.4
12 (FP)	Enzymes: Basics	8.1-8.2

14	Enzymes: Transition State	8.3
17	**NO LECTURE - Presidents Day**	
19	Enzymes: Michaelis-Menten; Inhibition	8.4-8.5
21	Enzymes: Catalytic Strategies	9
24	Enzymes: Regulatory Strategies	10
26	Carbohydrates	11
28	Lipids and Cell Membranes	12.1 - 12.3
Mar 3	Lipids and Cell Membranes	12.4 – 12.6
5	Membrane Channels & Pumps	13
7	Signal Transduction Pathways	14
10 (MM)	Introduction to Metabolism I	15.1 – 15.2
12	Introduction to Metabolism II	15.3 – 15.4
14	Glycolysis I	16.1
17-21	**NO LECTURES - SPRING RECESS!**	
24	Glycolysis II	16.1
26	Regulation of Glycolysis	16.2
28	Gluconeogenesis	16.3
31	Reciprocal Regulation of Glycolysis and Gluconeogenesis	16.4
Apr 2	The Citric Acid Cycle I	17.1
4	The Citric Acid Cycle II	17.2
7	Regulation of the Citric Acid Cycle	17.3 – 17.5
9	Oxidative Phosphorylation I	18.1 – 18.2
11	Oxidative Phosphorylation II	18.3
14	Oxidative Phosphorylation III	18.3 – 18.4
16	Oxidative Phosphorylation IV	18.4
18	Oxidative Phosphorylation V	18.5 – 18.6
21	Photosynthesis I	19.1 – 19.2
23	Photosynthesis II	19.2 – 19.3
25	Photosynthesis III	19.3 – 19.4
28	Photosynthesis IV	19.5 – 19.6
30	The Calvin Cycle	20.1 – 20.2
May 2	The Pentose Phosphate Pathway	20.3 – 20.4

Exam Dates

There will be 3 exams, including the final. Each exam is worth 250 points.

Exam 1 – TUE Feb 18 4:00 – 4:50pm. This exam covers lectures 1-12.
Exam 2 – TUE April 1 4:00 – 4:50pm. This exam covers lectures 14-28.
Exam 3 – WED May 14 11:00am – 1:00pm. This exam covers lectures 29-43.

Statement on Academic Integrity

USC depends on honesty, integrity, and ethical behavior among its members. For students, ethical behavior includes respecting the intellectual property of others, submitting individual work unless otherwise directed by the instructor, protecting one's own academic work from misuse by others, and avoiding the use of another's work as one's own.

We have reliable, time-tested methods for detecting cheating, plagiarism, and other violations of academic integrity. Please note that to protect the integrity of grades and the academic process, sanctions for violations are severe. The minimum sanction is usually an F for the course. Suspension or expulsion from the university is also possible.

Resources on academic integrity standards, policies, and expectations:
1. Trojan Integrity Guide: http://www.usc.edu/student-affairs/SJACS/forms/tio.pdf
2. Guide for Avoiding Plagiarism: http://www.usc.edu/student-affairs/SJACS/forms/tig.pdf
3. Overview of Academic Integrity: http://www.usc.edu/student-affairs/SJACS/forms/AcademicIntegrityOverview.pdf
4. Tutorial on Academic Integrity: http://www.usc.edu/libraries/about/reference/tutorials/academic_integrity/index.php
5. SCampus (University Governance, paragraph 11): http://web-app.usc.edu/scampus/1100-behavior-violating-university-standards-and-appropriate-sanctions/

Statement for Students with Disabilities

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to the Lab Director (or to a TA) 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