Course Outline for Biology 115-02: Energy in Living Systems

Fall Semester 2009
MWF, Period 2 (9:10 am-10:00am)
Higley Auditorium
Office Phone: X5394

Instructor: H. Itagaki
Office: 108 Higley
Email: itagaki@kenyon.edu
Home Phone: 614-433-0165

Text: Freeman, Scott (2008) *Biological Science*, 3rd ed. Pearson/Prentice Hall, New York, NY. 1262pp.

Plus outside reading assignments linked to the course Moodle site.

Date		**Subject**	**Readings**
		Introduction	
Aug.	31	Introduction to the Class; What is Life?	Ch. 1
Sept.	2	Tree of Life: Eukaryotes and Prokaryotes, Prokaryote Diversity	Ch. 1, 28.1-28.3
		The Chemical Bases of Life	
	4	Energy	Ch. 2, 9.1
	7	Chemical Bonds	Ch. 2
	9	Amino Acids; Protein Structure and Function	Ch. 3
	11	Enzymes and Catalysis	Ch. 3
	14	Nucleic Acids and the RNA World	Ch. 4
	16	Lipids and Membranes	Ch. 6
		Cells: Structure and Function	
	18	Cell Structure	Ch. 7
	21	Cellular Transport	Ch. 7
	23	Exam #1	
	25	Multicellularity; Cellular Specialization; Protist Diversity	Ch. 7; pp. 603-609; 41.2-41.3

		Cellular Energetics	
Sept.	28	Carbohydrates	Ch. 5
	30	Overview of Energetics: Glycolysis	Ch. 9
Oct.	2	Glycolysis; The Krebs Cycle	Ch. 9
	5	Oxidative Phosphorylation	Ch. 9
	7	Photosynthesis: The Light Reactions	Ch. 10
	9	Photosynthesis: The Dark Reactions; C3 vs. C4 Plants	Ch. 10
	12-13	*October Break*	
	14	Summary of Metabolism; Nitrogen Fixation	pp. 572-573
		From Cell to Organism: Cells, Tissues, Organs and Organisms	
	16	Tissues and Organs; The Diversity of Animals	Ch. 41.2-41.3; 32
	19	Exam #2	
	21	Cellular Coordination: Cell Signaling and Hormones	Ch. 8.2-8.3; 47.3-47.4
	23	Coordination via the Nervous System	Ch. 6.4; 45.1-45.3
	26	Nerves and Muscles	Ch. 46.5
	28	Sensory Systems	Ch. 46
	30	Behavior	Ch. 51
		Organisms in Balance	
Nov.	2	Salt and Water Balance in Plants	Ch. 37
	4	Plant Diversity: The Effects of Water and Environmental Stresses	pp. 626-639; 648-661
	6	Salt and Water Balance in Animals	Ch. 42.1-42.3
	9	Homeostasis: The Mammalian Kidney	Ch. 41.4; 42.4
		Populations in Balance	
	11	Demography; Population Growth	Ch. 52
	13	Limits to Populations	Ch. 52

Nov.	16	Exam #3	
		<u>Community Ecology</u>	
	18	Species Interactions	Ch. 53
	20	Community Structure	Ch. 53
	21-29	Thanksgiving Break	
	30	Community Dynamics	Ch. 53
		<u>Ecosystems</u>	
Dec.	2	Energy Flow in Ecosystems	Ch. 54
	4	Global Biogeochemical Cycles	Ch. 54
	7	Human Impacts	Ch. 54
		<u>Species Richness and Conservation</u>	
	9	Biodiversity	Ch. 55
	11	Species Conservation	Ch. 55
	14	Make-Up Day	
Dec.	20	Exam #4 and Comprehensive Final Exam **(8:30am)**	

N.B. This is a tentative outline of the topics. The most up-to-date version of the syllabus can always be found on the course Moodle site.

BIOL 115-02: Energy in Living Systems
Fall Semester 2009

Instructor: Harry Itagaki
108 Higley Hall
PBX: x5394 (Office)/x5384 (Lab)
Home Phone 614-433-0165
Email: itagaki@kenyon.edu

Text: Freeman, Scott (2008) *Biological Science*, 3rd ed. Pearson/Prentice Hall, New York, NY. 1262pp.(This text is also used in BIOL 116). Additional readings on the course Moodle site.

About the Course: This course covers the study of life from the biochemical to the global levels, concentrating on the flow of energy and materials through organisms. The course is designed to introduce the students to the process of scientific thinking as well as to the principles of biochemistry, cell biology, physiology and ecology. We will discuss current research methods and approaches to unanswered questions.

This is one of the courses in Biology at the foundation level, the others being BIOL 109-110Y (Introduction to Experimental Biology) and BIOL116 (Information in Living Systems). There are NO prerequisites, and enrollment is open to both majors and non-majors.

NOTE: Although this section of BIOL 115 will cover the same materials as in Dr. Andrew Kerkhoff's BIOL 115-01 section, we may do the topics in a different order.

Additional Resources: The student website for the course at www.prenhall.com/freeman/biology may prove useful as it has self-assessment tools and additional information. As well, the CD that comes with the text has some good animations and assessment tools.

How to do well in this class:

- ATTEND CLASS. Come to class ready to pay attention and take thorough and detailed notes. Note that lecture material includes material ***not*** found in the reading, and the readings may not be covered completely in class. Review your notes and readings frequently.

- Learn the vocabulary.

- Read the assignments prior to class. My expectation is that you will do the reading before class. If it becomes evident that people are not doing the readings, unscheduled quizzes will be given.

- Be in contact with me. In class, during office hours, after class, or via email or phone, if you have a question, ask me. Note: I will not be reading email after working hours, so don't expect a quick answer to a question emailed late in the evening.

Attendance: Attendance is expected, and will be recorded. Excessive unexcused absences will not be allowed. Attendance and class participation will count toward the final grade. Please note that assignments and classes missed due to an absence must be made up. Look at your schedules (especially athletes!) and please see me immediately about conflicts due to sports events, performances, religious holidays, *etc.*

Assigned Readings: To participate fully in class, you must thoughtfully read the assigned material before each meeting.

Class Participation: Any time in class - ask for clarification; pose a question; link disparate ideas together; draw on your own experience. I will call on people who are not participating. Raise your hand; it's clear that students in all classes do better when they are engaged in the material.

Academic Honesty and Class Conduct: Plagiarism and other forms of academic dishonesty will not be tolerated. Please make sure that you have read carefully the Academic Honesty Guidelines in the 2009-2010 Course of Study, pp. 24-27. If you have any questions, please see me.

Grading: There will be four 50min. exams, each covering the material in that section of the course, including what is covered in the lecture just prior to the exam. Exam dates may be moved forward or back with the students' consensus. There will also be 4-6 short quizzes interspersed between the exams, given at the discretion of the instructor. A 50min.-long Comprehensive Final will be given during the Final Exam Period for this class: Sun., 18 Dec. at 8:30am. Class participation and attendance will also constitute a part of your grade.

4 Exams = 60% total
Comprehensive Final = 15%
4-6 Quizzes = 15% total
Class Participation/Attendance = 10%

Please note: You are in college now and numerical grades in the sciences typically fall short of those you may have experienced in high school. For example, the range of means on exams in this and other introductory biology courses over the last 10 years is 60-80%, typically around 70%. This does not mean that you are learning "nothing"... rather it means you have a ways to go to become familiar enough with the material and the concepts to write clearly and apply what you know to new situations. Don't let this discourage you, but those high school grades you may be used to are not going to come quite so easily. We do grade on the curve: the mean on an exam is taken generally as near the bottom of the "B" range.

Preliminary Exam Schedule
1st Exam - Wednesday, 23 September
2nd Exam - Monday, 19 October
3rd Exam - Monday, 16 November
4th Exam - Sunday, 20 December (8:30am)

Exam Reviews: Prior to each exam, I will be available at a review session during which you can ask questions about material you don't understand.

Weekly Reviews: We know that students coming into this course have a wide range of biology backgrounds, so I will hold weekly review sessions for those wishing more help.

Math and Science Skills Center (MSSC): The MSSC is there for your use concerning your problems in math and the sciences. It is in 207 Tomsich and is available for your use during the semester 7-10pm on Sunday, Tuesday and Thursday. A Lead Tutor for the class will be assigned early in the semester.

Learning Disabilities: If you have a hidden or visible disability that may require classroom or test accommodations, please see me **as soon as possible**. If you have not already done so, you must register with the Coordinator of Disability Services (Erin Salva, salvae@kenyon.edu, x5453), who is the individual responsible for coordinating accommodations and services for students with disabilities. All information and documentation of disability is strictly confidential. No accommodations will be granted in this course without notification from the Office of Disability Services.