

University of Southern California – Human and Evolutionary Biology
HBIO 205Lxg – The Science of Human Performance (4 Units)
Summer 2015

Instructor: Bob Girandola, Ed.D.

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Lecture: M/T/W/Th: 8:00 AM – 9:50 AM

Laboratory: (TBA)

Course Description:

This course will deal with the physiological and nutritional basis of human performance. It will be a combination of lecture and laboratory exercises to better help students understand the factors that facilitate and limit optimal performance. It is not a course aimed solely at elite students, but also the typical individual who has the desire to exercise and wishes to better understand that factors that are involved in exercise tolerance. *Not available for major credit.*

Recommended Text (Optional):

1) **Physiology of Sport & Exercise by W.L.Kenney, J. Wilmore & D.L. Costill**

Required Lab Manual:

2) **Laboratory Manual for the Science of Human Performance by Kim Henige, Ed.D**

I. Objectives:

A. To understand the physiological and nutritional factors that facilitate and limit optimal performance.

B. To gain knowledge in health, exercise and nutrition related issues for healthy life-style decisions.

II. Class Schedule:

Week	Topic
1	Metabolism
2	Metabolism
2	Energy Demand
2	Energy Intake & Weight Control
2	Weight Control, Obesity – First Exam
3	Nutrition & Performance
3	Drugs & Ergogenic Aids
4	Pulmonary Function
4	Pulmonary Function & Cardiovascular
4	Cardiovascular – Second Exam

5	Oxygen Consumption
5	Muscular System
5	Environmental Physiology
6	Environmental Physiology
6	Environmental Physiology
	FINAL EXAM

III. Grading and Grading Scale:

1. First mid-term – 25% (after 2 weeks)
2. Second mid-term – 25% (after 4 weeks)
3. Final Exam – 25%
4. Laboratory Grade – 25%

***Exact** Dates for first two exams will be announced in class.

Grading Scale: Each exam will be curved and assigned a letter grade based upon the following criteria:

- Average score = C
- Average score + 1 Standard Deviation (SD) = B
- Average score + 2 SD = A
- Average score – 1 SD = D
- Average score – 2 SD = F

IV. Course Make-up Policy:

IF a student has a legitimate excuse for missing one of those exams, a make-up exam in ESSAY format will be given at a mutual date determined by the instructor and student.

V. Laboratory Component:

Lab Director: Emi Embler Ph.D. (eembler@usc.edu)

Lab Instructors:

Tamara Espinet (espinet@usc.edu)

Bara Floyd (gbfloyd@usc.edu)

Tentative Lecture Schedule:

Week	Lecture Topic	Reading
May 20	Metabolism: The production of ATP. How do muscle cells convert Carbohydrates, Fats, and Proteins into useable energy (ATP)? – Glycolysis; Aerobic metabolism: Krebs Cycle and Cytochrome Chain	Intro + Ch 2
May 25	Energy Demands: The caloric cost of both rest and activity. Principles related to resting and basal metabolic rate (RMR and BMR) – Resting metabolic rate;	Ch. 2,5

	Caloric cost of various activities; Individual variations. Monday, Jan 19 is holiday, MLK day.	
May 25	Energy Intake: Caloric cost of foods and beverages. Caloric balance. Caloric cost of carbohydrates, fats, proteins, and alcohol; Concepts of caloric balance	Ch. 5,22
June 1	Weight Control: How does an individual gain or lose weight? Separating fact from fiction. Concepts of weight loss with dietary restriction and exercise; Myths of weight control, especially weight loss; Drugs and other substances used for weight loss; Concepts of weight gain. How does fat-free mass increase?	Ch. 15,22
June 1	Obesity: The etiology of obesity – How do people get fat?; Genetic verses environment; Trends in the U.S. and the world; Possible solutions	Ch. 22
June 8	Obesity: The etiology of obesity – How do people get fat?; Genetic verses environment; Trends in the U.S. and the world; Possible solutions. Exam 1 this week.	
June 10	Nutrition: For optimal health and for human performance – What is an ideal diet; The caloric nutrients: Fat, Carbohydrate, Protein; The non-caloric nutrients: Vitamins and Minerals; Dietary programs that effect human athletic performance; Nutrient supplements and ergogenic aids	Ch. 15,16
June 15	Nutrition: For optimal health and for human performance – What is an ideal diet; The caloric nutrients: Fat, Carbohydrate, Protein; The non-caloric nutrients: Vitamins and Minerals; Dietary programs that effect human athletic performance; Nutrient supplements and ergogenic aids	Ch. 15,16
June 15	Pulmonary system as it is affected by exercise – Anatomy of the system; Lung volumes; Ventilation; Gas exchange; Hemoglobin	Ch. 7,8
June 15	The Cardiovascular system as it is affected by exercise – Discussion of the heart, blood vessels and blood; Cardiovascular dynamics during rest and exercise; The cardiovascular system as a limiting factor in aerobic exercise; Cardiovascular benefits of exercise: coronary heart disease	Ch. 6,8
June 22	The Cardiovascular system as it is affected by exercise – Discussion of the heart, blood vessels and blood; Cardiovascular dynamics during rest and exercise; The cardiovascular system as a limiting factor in aerobic exercise; Cardiovascular benefits of exercise: coronary heart disease. SECOND MIDTERM EXAM	Ch. 6,8
June 23	Oxygen consumption during exercise of various intensities – The use of oxygen consumption (VO_2) to determine metabolic cost, intensity, and type of fuel; The concept of VO_2 Max to determine athletic potential and the effects of training; The lactate threshold as an indicator of endurance potential or anaerobic power	Ch. 11
June 24	Oxygen consumption during exercise of various intensities – The use of oxygen consumption (VO_2) to determine metabolic cost, intensity, and type of fuel; The concept of VO_2 Max to determine athletic potential and the effects of training; The lactate threshold as an indicator of endurance potential or anaerobic power	Ch. 11
June 25	Environmental Physiology	Ch 12,13

June 25-29	The environment and its effect on human performance – Exercise at altitude; Exercise in a hot environment; Exercise in a cold environment; Exercise and air pollution.	Ch. 12,13
June 30	Last class date and FINAL EXAM	

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/departments/departments-public-safety/online-forms/contact-us>. This is important for the safety of the 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 <http://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.