Spring 2001

California State University, Northridge
Department of Kinesiology

KIN 446/446L - Research in Exercise Physiology

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Prerequisite: KIN 346 or equivalent and certification in cardiopulmonary resuscitation (CPR). CPR certification must be obtained by the announced date.

Course Objectives: This course will expose the student to advanced topics, theories and laboratory techniques in exercise physiology. Concurrent enrollment in KIN 446 and KIN 446L is required.

Textbooks:
1. Brooks, G.A., T.D. Fahey, T.P. White and K.M. Baldwin. ***Exercise Physiology, Third Edition***, Mayfield, Mountain View, CA, 2000. ISBN: 0767410246
2. **Research Article Packet,** availability to be discussed

Course Schedule

Date	Topic
1/29	Introduction • Brooks, [Ch 1], [Ch 27, pp. 670-677] • American College of Sports Medicine. Position Stand: The recommended quantity and quality of exercise for developing and maintaining cardiorespiratory and muscular fitness, and flexibility in healthy adults. *Med. Sci. Sports Exerc.* 30: 975-991, 1998.
2/5	Exercise Metabolism • Brooks, [Ch 2, pp. 24-27], [Ch 3], [Ch 4], [Ch 5, pp. 55-82], [Ch 6, pp. 93-104], [Ch 7, pp. 115-132]
2/12	Metabolic Adaptations to Exercise Training in Skeletal Muscle • Brooks, [Ch 5, pp. 83-88], [Ch 6, pp. 105-112], [Ch 7, pp. 132-141], [Ch 33, pp. 812-814] • Holloszy, J.O. Adaptation of skeletal muscle to endurance exercise. *Med. Sci. Sport Exerc.* 7: 155-164, 1975 • Dudley, G.A. et al. Influence of exercise intensity and duration on biochemical adaptations in skeletal muscle. *J. Appl. Physiol.* 53: 844-850, 1982 • Baldwin, K.M. et al. Time course adaptations in cardiac and skeletal muscle to different running programs. *J. Appl. Physiol.* 42: 267-272, 1982.

2/19 Adaptations to Anaerobic Training
- Brooks, [Ch 17], [Ch. 18], [Ch 19], [Ch 20]
- Costill, D.L., et al. Adaptations in skeletal muscle following strength training. *J. Appl. Physiol.* 46: 96-99, 1979

2/26 Body Composition
- Brooks, [Ch 25]

3/5 EXAM I (Includes Labs 1-6)

3/12 Cardiovascular Responses to Exercise
- Brooks, [Ch 14, pp.279-288], [Ch 15], [Ch 16]
- Hopper, M.K., et al. Exercise stroke volume relative to plasma-volume expansion. *J. Appl. Physiol.* 404-408, 1988.

3/19 Limitations to Human Performance
- Coyle, E.F., et al.. Determinants of endurance in well trained cyclists, *J. Appl. Physiol.* 64: 2622-2630, 1988
- Coyle, E.F., et al.. Cycling efficiency is related to the percentage of Type I muscle fibers, *Med. Sci. Sports Exerc.* 24: 782-788, 1992
- Coyle, E.F. Integration of the Physiological Factors Determining Endurance Performance Ability. *Exercise and Sport Science Reviews,* J.O. Holloszy, ed. Williams & Wilkins, Baltimore, 1995, pp. 25-63.

3/26 Cardiovascular Effects of Detraining
- Coyle, E.F., Detraining and retention of training induced adaptations: A review, *Resource Manual for Guidelines for Exercise Testing and Prescription.* American College of Sports Medicine, Lea and Fibeger, Philadelphia, 1988, pp. 83-89.
- Coyle, E.F., et al. Effects of detraining on cardiovascular responses to exercise: role of blood volume. *J. Appl. Physiol.* 60: 95-99, 1986.
- . Coyle, E.F., et al. Effects of detraining on responses to submaximal exercise. *J. Appl. Physiol.* 59: 853-859, 1985.

4/2 Ventilatory Regulation during Exercise
- Brooks, [Ch 10, pp. 202-208], [Ch 11], [Ch 12]
- Mahler, M. Neural and humoral signals for pulmonary ventilation arising in exercising muscle, *Med. Sci. Sports.* 11: 191-197, 1979
- Farrell, S.W. and J.L. Ivy. Lactate acidosis and the increase in V_E/V_{O2} during incremental exercise, *J. Appl. Physiol.* 62: 1551-1555, 1987
- Yaspelkis, B.B., et al. Ventilation parallels plasma potassium during incremental and continuous variable intensity exercise, *Int. J. Sports Med.* 15: 460-465, 1994.

4/9 – 4/13 SPRING BREAK

***4/23 EXAM II (Includes Labs 7-10)**

*4/16 Hormonal Responses to Exercise
- Brooks, [Ch 9]

* Note dates due to Spring Break

4/30 Carbohydrate feeding prior to, during and following exercise

- Brooks, [Ch 28]
- Sherman, W.M. Carbohydrate feedings before and after exercise, Perspectives in Exercise Science and Sports Medicine, Vol. 4, Brown and Benchmark, Ann Arbor, MI, 1991, pp. 1-34
- Coyle E.F., et al. Muscle glycogen utilization during prolonged strenuous exercise when fed carbohydrate, *J. Appl. Physiol.* 61: 165-172, 1986
- Yaspelkis, B.B., et al. Carbohydrate supplementation spares muscle glycogen during variable-intensity exercise, *J. Appl. Physiol.* 75: 1477-1485, 1993

5/7 Exercise and Aging

- Brooks, [Ch 32]
- American College of Sports Medicine. Position Stand: Exercise and physical activity for older adults. *Med. Sci. Sports Exerc.* 30: 992-1008, 1998.
- Cartee, G.D. Aging skeletal muscle: Response to exercise. *Exercise and Sport Science Reviews*, Williams & Wilkins, Baltimore, 1994, pp. 91-120.
- Heath, G.W., et al. A physiological comparison of young and older endurance athletes. *J. Appl. Physiol.* 51: 634-640, 1981.

5/14 Thinking On Your Feet
CPR Certification Due

5/21 Final Exam - Comprehensive (12:45p-2:45p)

Grading for 446/446L

Exam I	100 points (18.2% of final grade)
Exam II	100 points (18.2% of final grade)
446L Grade	100 points (18.2% of final grade)
Oral Presentation	50 points (9.1% of final grade)
Final Exam	200 points (36.3% of final grade)
Total	550 points (100%)
No CPR	-10

Grade Scale for 446/446L

A	94-100%	C	70-73
A-	89-93	C-	67-69
B+	84-88	D+	64-66
B	80-83	D	60-63
B-	77-79	D-	57-59
C+	74-76	F	<56

Exams:

Exams will cover material that is from lectures, labs and readings. Exams will consist of short answer and problem type questions. Students will be required to conceptualize the information provided in labs/lectures in order to solve problems. Exam answers will be evaluated on the quality of writing (i.e., complete sentences and thoughts), support of answer from reading material/class discussion and content as related to question.

Laboratory Grade

Although the laboratory section of this course is listed as independent from the lecture, the laboratory grade will be scaled to 100 points and included in the point total as indicated above. For example, if you receive 90% of the total points in the laboratory, this will be scaled to 90 out of 100 points and added to your total points for 446/446L. You will receive the same grade for 446 and 446L

Exam Review Policy:

Possession or use of a previous student's exam notes, laboratory assignments or term papers will constitute an ethics violation. Course examinations will NOT be returned to the student. Students may review previous exams during office hours, or at other specially announced times. Extra exam review times will NOT be added prior to the final examination. You should review your exams immediately after they are graded (i.e., when they are returned in class).

When you review a previously completed exam, you may NOT take notes or use any type of device to record or document the exam material. Violation of this rule will constitute an ethics violation on the exam.

Make Up Exams/Laboratories:

In the case of a medical or family emergency, a make-up exam or laboratory can be scheduled ONLY if I am notified prior to the class/laboratory in which the exam/laboratory is scheduled. This requires that we meet and discuss the issue, I agree that your reason for missing the assignment is valid, **AND** I excuse you from the exam/laboratory. You will receive a 0 (ZERO) for the exam/laboratory if this procedure is not followed.

Oral Presentation: Thinking on Your Feet.

The objective of this presentation is to provide you with the opportunity to answer (with some stress) questions about topics you should be familiar with by the end of the semester. It's like a technically oriented interview. This opportunity will also encourage you to review your text and notes. This exercise will help prepare you for the final and reduce your study time during finals week.

Topics will be selected from material covered in class. Before we begin, you will randomly draw numbers to identify your speaking order. During the other students presentations you will have your notes put away which will allow you to give your undivided attention to the speaker.

The presentation will consist of: 1. Randomly drawing two numbers and then choosing one of these for your topic 2. Write the topic heading on the board 3. Take 2 minutes to organize your thoughts (jot down notes if necessary - from your mind, not your notes) 4. Speak for 2 minutes about the topic. Scoring: 50 points total

0 points if you decline to participate

10 points for trying but unable to rationally provide a discussion for up to a minute.

25 points for speaking in a reasonably rational fashion on the topic for 1 minute. The material you present must be factually correct to receive 25 points. Incorrect material or babbling on will cost 10 points resulting in a score of 15.

50 points for speaking in a reasonably rational fashion on the topic for 1:45 - 2 minutes. The material you present must be factually correct to receive 50 points. Incorrect material or babbling on will cost 15 points resulting in a score of 35.

You will be corrected in class for any errors. This is done to promote the dissemination of accurate knowledge and is not meant to embarrass you.

Personal Communication Devices:

All personal communications devices (i.e., pagers, cell phones, etc.) will be turned off while in class. Five (5) points will be deducted from the final grade on each occasion that a communications device is activated in class. This policy may be modified on an individual basis if the need is warranted.

Cheating:

Any student caught cheating will automatically fail the course and may be subject to more severe University discipline. I expect all students to know, understand, adhere to and enforce the California Code of Regulations, Section 41301, Title 5 as found in the university catalog. If you cannot abide by the policies stated in the code, you should not be here.