Spring 2007

California State University, Northridge
Department of Kinesiology

KIN 646 - Seminar in Exercise Physiology
T 4:00 – 6:50PM

Dr. Ben B. Yaspelkis, III
Office: KIN 282
Office Hours: T and Th 10-11AM, and by appointment
Phone: 818-677-7509
e-mail: ben.yaspelkis@csun.edu
http://www.csun.edu/~bby44411

Prerequisite: KIN 446 or consent of instructor.

Textbooks: **1.** Brooks, G.A., T.D. Fahey, T.P. White and K.M. Baldwin. ***Exercise Physiology, Fourth Edition***, Mayfield, Mountain View, CA, 2000. ISBN: 0072985402
2. Maughan, R. and M. Gleeson. ***The Biochemical Basis of Sports Performance***, Oxford University Press, New York, 2004. ISBN: 0-19-926924-6
3. Research Article Packets, availability to be discussed

Course Schedule

Date	Topic
SECTION I	
1/30	**Introduction** • Brooks et al. Chapter 1 – Introduction: The limits of human performance • Maughan and Gleeson. Chapter 1 – Introduction: The biochemical basis of exercise and sport • 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.
2/6	**Exercise Metabolism I** • Brooks et al. Chapter 2 - Bioenergetics Chapter 3 - Energetics and Human Movement Chapter 4 - Basics of Metabolism Chapter 5 - Glycogenolysis and Glycolysis in Muscle
2/13	**Exercise Metabolism II** • Brooks et al. Chapter 6 - Cellular Oxidation of Pyruvate and Lactate Chapter 7 - Lipid Metabolism Chapter 8 - Metabolism of Proteins and Amino Acids • Conley, K.E., W.F. Kemper and G.J. Crowther. Limits to sustainable muscle performance: interaction between glycolysis and oxidative phosphorylation. *J. Exp. Biol*. 204: 3189-3194, 2001.

2/20 **Endocrinology**

- Brooks et al. Chapter 9 - Neural-endocrine Control of Metabolism
- Galbo, H. Endocrinology and metabolism in exercise. Int. J. Sports Med. 2: 203-211, 1981.

2/27 **No Class**

3/6 **Metabolic Adaptations to Aerobic Exercise Training in Skeletal Muscle**

- Brooks et al
  Chapter 10 - Metabolic Response to Exercise
- Tonkonogi, M, and K. Shalin. Physical exercise and mitochondrial function in human skeletal muscle. *Exerc. Sport Sci. Rev.* 30: 129-137, 2002.
- Hawley, J.A., Adaptations of skeletal muscle to prolonged, intense endurance training. *Clin. Exp. Pharm. Physiol.* 29: 218-222, 2002.
- Spriet, L.L. and M.J. Watt. Regulatory mechanisms in the interaction between carbohydrate and lipid oxidation during exercise. Acta. Physiol. Scand. 178: 443-452, 2003.

3/13 **The Biochemical Basis of Exercise and Sport I**

- Maughan and Gleeson
  Chapter 3 – The Sprinter
  Chapter 4 – Middle Distance Events
  Chapter 5 – The Endurance Athlete

3/20 **The Biochemical Basis of Exercise and Sport II**

- Maughan and Gleeson
  Chapter 6 – The Games Player
  Chapter 7 – Sporting Talent
  Chapter 8 – Adaptations to Training

3/27 **Mid-Term Exam Due**

4/2 - 4/6 ***SPRING BREAK***

SECTION II

4/10 **Skeletal Muscle and Resistance Training**

- Brooks et al.
  Chapter 17 - Skeletal Muscle Structure and Contractile Properties
  Chapter 18 - Neurons and Motor Unit Recruitment
  Chapter 19 - Principals of Skeletal Muscle Adaptations
  Chapter 20 - Muscle Strength Power and Flexibility
- Maughan and Gleeson
  Chapter 2 – The Weightlifter
- Tarnopolsky, M.A. Protein metabolism in strength and endurance activities. *The Metabolic Basis of Performance in Exercise and Sport.* D.L. Lamb and R. Murray, eds. Cooper, Carmel, IN, 1999. pp.125-157.

4/17 **Cardiovascular Physiology**

- Brooks et al.
  Chapter 14 - The Heart
  Chapter 15 - Circulation and its Control
  Chapter 16 - Cardiovascular Dynamics During Exercise
- Hopper, M.K., A.R. Coggan and E.F. Coyle. Exercise stroke volume relative to plasma-volume expansion. *J. Appl. Physiol.* 404-408, 1988.

• Sawka, M.N., V.A. Convertino, E.R. Eichner, S.M. Schnieder and A. J. Young. Blood volume: importance and adaptations to exercise training, environmental stresses, and trauma/sickness. *Med. Sci. Sport Exerc*. 32: 332-348, 2000.

4/24 **Limitations to Human Performance**

• Coyle, E.F., A.R. Coggan, M.K. Hopper and T.J. Walters. Determinants of endurance in well trained cyclists, *J. Appl. Physiol.* 64: 2622-2630, 1988

• Coyle, E.F., L.S. Sidossis, J.F. Horowitz and J.D. Beltz. 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.

5/1 **Ventilatory Regulation during Exercise**

• Brooks et al.
Chapter 11 - The Why of Pulmonary Ventilation
Chapter 12 - The How of Ventilation
Chapter 13 - Ventilation as a Limiting Factor in Aerobic Performance

5/8 **Nutrition and Athletic Performance**

• Brooks, Chapter 28

• Hargreaves, M. Interactions between muscle glycogen and blood glucose during exercise. *Exerc. Sport Sci. Rev*. 25: 21-39, 1997.

• Ivy, J.L. and C-H. Kuo. Regulation of GLUT4 protein and glycogen synthesis during muscle glycogen synthesis after exercise. *Acta Physiol. Scand.* 162: 295-304, 1998.

• Burke, L.M., B. Kiens and J.L. Ivy. Carbohydrates and fat for training and recovery. *J. Sport Sci.* 22: 15-30, 2004.

• Hawley, J.A. Effect of increased fat availability on metabolism and exercise capacity. *Med. Sci. Sports Exerc.* 34: 1485-1491, 2002.

5/15 **Obesity, Body Composition and Exercise**

• Brooks et al.
Chapter 25

• American College of Sports Medicine Position Stand: Appropriate intervention strategies for weight loss and prevention of weight regain for adults. *Med. Sci. Sports Exerc.* 33: 145-156, 2001.

• Mokdad, A.H., J.S. Marks, D.F. Stroup amd J.L. Gerberding. Actual causes of death in the United States, 2000. *JAMA* 291: 1238-1245, 2004.

Exercise as Preventative Medicine

• Brooks et al.
Chapter 24
Chapter 26

• Booth, F.W., S.E. Gordon, C.J. Carlson and M.T. Hamilton. Waging war on modern chronic diseases: primary prevention through exercise biology. *J. Appl. Physiol.* 88: 774-787, 2000.

•Chakravarthy, M.V. and F.W. Booth. Eating, exercise and “thrifty” genotypes: connecting the dots toward an evolutionary understanding of modern chronic diseases. *J. Appl. Physiol.* 96: 3-10, 2004.

5/22 **Final Exam Due (5:30PM)**

Grading

Mid-Term Exam	45%
Final Exam	45%
Participation in Class Discussion	10%
Total	100%

Grade Scale

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:
Students will be required to conceptualize the information provided 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.

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.