

**MISSISSIPPI STATE UNIVERSITY
COLLEGE OF EDUCATION**

**DEPARTMENT of KINESIOLOGY
COURSE SYLLABUS**

Course Prefix & Number: EP 3623

Course Title: Exercise Physiology II

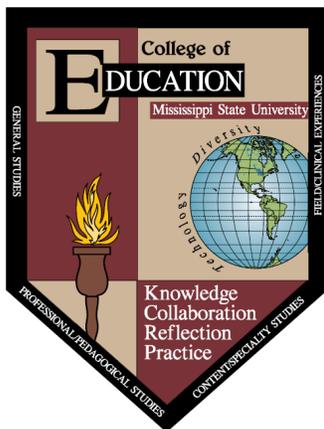
Credit Hours: 3 semester hours

Type of Course: Lecture

Prerequisite: PE 3303

Catalog Description: Three hours lecture. This course examines the cardiovascular, respiratory, endocrine, immunologic, and osteogenic aspects of physiology and their application to acute and chronic exercise throughout the lifespan.

College of Education Conceptual Framework:



The faculty in the College of Education at Mississippi State University are committed to assuring the success of students and graduates by providing superior learning opportunities that are continually improved as society, schools, and technology change. The organizing theme for the conceptual framework for the College of Education at Mississippi State University is educational professionals - dedicated to continual improvement of all students' educational experiences. The beliefs that guide program development are as follows:

1. **KNOWLEDGE** - Educational professionals must have a deep understanding of the organizing concepts, processes, and attitudes that comprise their chosen disciplinary knowledge base, the pedagogical knowledge base, and the pedagogical content knowledge base. They must also know how to complement these knowledge bases with the appropriate use of technology.
2. **COLLABORATION** - Educational professionals must continually seek opportunities to work together, learn from one another, forge partnerships, and assume positions of responsibility.
3. **REFLECTION** - Educational professionals must be willing to assess their own strengths and weaknesses through reflection. They must also possess the skills, behaviors, and attitudes necessary to learn, change, and grow as life-long learners.

4. **PRACTICE** - Educational professionals must have a rich repertoire of research-based strategies for instruction, assessment, and the use of technologies. They must be able to focus that array of skills on promoting authentic learning by all students or clients, while exhibiting an appreciation and commitment to the value and role of diversity.

Course Instructional Objectives:

1. Discuss neuromuscular adaptations to exercise.

CFPO # 3

2. Discuss muscle metabolic adaptations to exercise.

CFPO # 3

3. Discuss cardiovascular function and adaptations to exercise.

CFPO # 3

4. Discuss pulmonary function and adaptations to exercise.

CFPO # 3

5. Discuss neuroendocrine system and adaptations to exercise.

CFPO # 3

6. Discuss bone function and adaptations to exercise.

CFPO # 3

7. Discuss immune function adaptations to exercise.

CFPO # 3

8. Identify and define principles of training for specific performance improvement.

CFPO # 3

9. Describe how to optimize nutrition for exercise and training.

CFPO # 3

10. Discuss ergogenic aids in sports and athletics.

CFPO # 3

11. Demonstrate how to measure endurance, anaerobic capacity, and strength.

CFPO # 4, 10

12. Demonstrate how to measure pulmonary function and ventilatory control.

CFPO # 4, 10

13. Describe factors contributing to fatigue during exercise.

CFPO # 3

14. Discuss gender and exercise performance.

CFPO # 3

15. Discuss exercise and aging.

CFPO # 3

16. Discuss various aspects of pediatric exercise science.

CFPO # 3

17. Discuss training programs for health and fitness.

CFPO # 3

Topics to Be Covered:

1. Neuromuscular adaptations to exercise. (3 hours)

CFPO # 3

- a. Metabolic contribution of muscle fiber types during exercise.
- b. Fiber type determinants of exercise performance.
- c. Training adaptations.
- d. Disuse atrophy.

2. Muscle metabolic adaptations to exercise. (3 hours)

CFPO # 3

- a. Exercise duration and intensity.
- b. Acute adaptations.
- c. Chronic adaptations.

3. Cardiovascular function and adaptation to exercise. (3 hours)

CFPO # 3

- a. Acute and chronic adaptations during exercise.

4. Pulmonary function and adaptations to exercise. (3 hours)

CFPO # 3

- a. Lung volumes and capacities.
- b. Acute and chronic adaptations during exercise.

5. Neuroendocrine function and adaptations to exercise. (3 hours)

CFPO # 3

- a. Acute and chronic adaptations of the neuroendocrine system to exercise.

6. Bone function and adaptations to exercise. (2 hours)

CFPO # 3

- a. Bone growth and remodeling.
- b. Changes in bone remodeling during the life cycle.

7. Immune function adaptations to exercise. (2 hours)
CFPO # 3
 - a. Exercise and changes in the immune system.
8. Training for sport and performance. (2 hours)
CFPO # 3
 - a. Principles of training.
 - b. Training for specific performance improvement.
9. Nutrition and exercise. (2 hours)
CFPO # 3
 - a. Optimizing nutrition for exercise.
10. Ergogenic aids to exercise performance. (2 hours)
CFPO # 3
 - a. Ergogenic aids in sports and athletics.
11. Measuring endurance, anaerobic capacity, and strength. (3 hours)
CFPO # 4, 10
 - a. Metabolic determinants of physiologic capacities.
 - b. Measuring cardiorespiratory and muscular endurance.
 - c. Predicting cardiorespiratory and muscular endurance.
 - d. Measuring maximal muscle power and anaerobic capacity.
12. Measuring pulmonary function and ventilatory control. (2 hours)
CFPO # 4, 10
 - a. Pulmonary function testing.
13. Factors contributing to fatigue during exercise. (3 hours)
CFPO # 3
 - a. Types of fatigue during exercise.
 - b. Limitations to maximal oxygen consumption.
14. Gender and exercise performance. (3 hours)
CFPO # 3
 - a. Comparison of male and female structure and function.
 - b. Special concerns for women who exercise.
15. Exercise and aging. (3 hours)
CFPO # 3
 - a. Theories of aging.
 - b. Chronologic age versus biologic age.
 - c. Normal physiologic changes with aging.
 - d. Exercise prescription for the elderly.

16. Pediatric exercise science. (3 hours)

CFPO # 3

- a. Limitations of research in pediatric exercise physiology.
- b. Fitness and health status of American children.
- c. Coronary artery disease and children.
- d. Preventive heart disease in children.
- e. Growth and development and exercise.
- f. Age-appropriate fitness activities.
- g. Trainability of children.
- h. Aerobic capacity of children.
- i. Anaerobic capacity in children.
- j. Muscular strength and endurance in children.

17. Training for health and fitness. (3 hours)

CFPO # 3

- a. Health-related fitness.
- b. Programs for apparently healthy individuals.

Required Text:

Wilmore, J.H. & Costill, D.L. (2004). *Physiology of Sport and Exercise* (3rd ed.). Champaign, IL: Human Kinetics.

Methods of Instruction:

Lecture and class discussion

Suggested Student Activities:

Several laboratory experiences are incorporated throughout the class on topics such as resting and exercise metabolic rate, VO₂ max, and pulmonary function.

Students will complete at least 1 research review during the course of the semester.

MSU Honor Code:

Mississippi State University has an approved Honor Code that applies to all students. The code is as follows:

“As a Mississippi State University student I will conduct myself with honor and integrity at all times. I will not lie, cheat, or steal, nor will I accept the actions of those who do.”

Upon accepting admission to Mississippi State University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor Code. Students will be required to

state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the MSU community from the requirements or the processes of the Honor Code. For additional information visit:

<http://students.msstate.edu/honorcode>

Technology:

Technology is not a specific aspect of this course.

Diversity:

Diversity will not be formally/specifically addressed in this course.

Students with Disabilities:

In accordance with section 504 of the 1973 Rehabilitation Act and the Americans with Disabilities Act, Mississippi State University reasonably accommodates students who demonstrate, through appropriate documentation, a qualified disability. The Department of Student Support Services (SSS) is the designated unit on campus that assists students requesting academic accommodations based on a disability. For additional information contact SSS at 662-325-3335

Evaluation of Student Progress/Assessment of Concepts and Skills:

Written exams (4)	70%
Comprehensive final exam	20%
Research reviews, labs, quizzes, etc.	10%

Exams: Four regular written exams will be given during the semester. A comprehensive final exam will be given during exams week. All regular written exams will count equally toward your class grade.

Research Reviews: At least 1 research review will be completed during the semester on a topic to be assigned at a later date. All references are expected to come from peer-reviewed research journals.

Labs: At several points during the semester, laboratory experiences will be completed in the Exercise Physiology Laboratory in McCarthy Gymnasium. The lab report will consist of calculations that will be completed and questions that will be answered based on the data obtained in the laboratory.

Late and Missed Exams/Assignments: Any student late for an exam will not be allowed to take the exam after the first person has finished. Any student missing an exam must submit an acceptable written excuse to the instructor the first day of return. Failure to submit a written excuse with proper documentation or failure to make up the exam will result in a zero for the exam. Acceptable excuses are

discussed in the *Academic Operating Policy and Procedures Manual*. Acceptable excuses include, but are not limited to: participation in an activity appearing on the university's authorized activity list; death or major illness within the student's immediate family, religious observance; and personal sickness that is too severe or contagious for the student to attend class as determined by the Health Center or off-campus physician. Failure to submit an assignment on time will result in a zero for that assignment, unless an acceptable written excuse is submitted (as per the policy stated above).

Grading Scale:

A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, F = 0-59%

Bibliography:

Antonio, J. & Stout, J.R. (2001). *Sports Supplements*. Baltimore: Williams & Wilkins.

American College of Sports Medicine. (2006). *ACSM's Guidelines for Exercise Testing and Prescription, 7th Edition*. Baltimore: Williams & Wilkins.

Brooks, G.A., Fahey, T.D., & Baldwin, K.M. (2005). *Exercise Physiology: Human Bioenergetics and Its Applications, 4th Edition*. McGraw Hill: New York.

Guyton, A.C. & Hall, J.E. (2000). *Textbook of Medical Physiology, 10th Edition*. Philadelphia: W.B. Saunders Company.

McArdle, W.D., Katch, F.I. & Katch, V.L. (2005). *Sports & Exercise Nutrition. (2nd ed.)* Baltimore: Williams & Wilkins.

McArdle, W.D., Katch, F.I. & Katch, V.L. (2001). *Exercise Physiology, (5th ed.)* Baltimore: Williams & Wilkins.

Moore, K.L. & Dalley, A.F. (1999). *Clinically Oriented Anatomy, 4th Edition*. Baltimore: Lippincott, Williams, & Wilkins.

Powers, S.K. & Howley, E.T. (2004). *Exercise Physiology: Theory and Applications to Fitness and Performance for Fitness Performance (4th ed.)* Dubuque, IA: Times Mirror Higher Education Group, Inc.

Robergs, R.A. & Robert, S.O. (1997). *Exercise Physiology*. St. Louis: Mosby-Year Book, Inc.

Robergs, R.A. & Keteyian, S.J. (2003). *Fundamental Principles of Exercise Physiology: For Fitness, Performance, and Health* (2nd ed.). McGraw Hill, Inc.: New York.

Williams, M.H. (2002). *Nutrition for Health, Fitness, & Sport*. New York: McGraw Hill.