MISSISSIPPI STATE UNIVERSITY
COLLEGE OF EDUCATION

DEPARTMENT of KINESIOLOGY
COURSE SYLLABUS

Course Prefix and Number: EP 8323

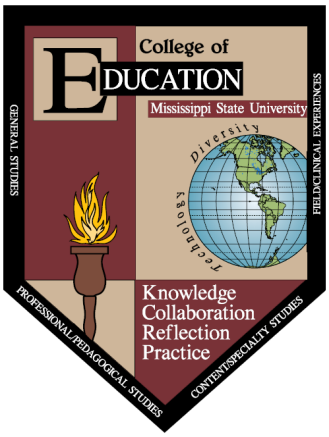
Course Title: Science and Practice of Cardiopulmonary Rehabilitation

Credit Hours: Three (3) semester hours

Course Type: Lecture

Catalogue Description: An examination of concepts, design, and implementation of cardiopulmonary rehabilitation programs that focuses on disease treatment and management, patient education, and lifestyle modification.

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 Objectives:

Upon completion of this course, the student will be able to:

1. Describe normal anatomy and physiology of the cardiovascular and pulmonary systems. **(CFPO 1,3,4,5,7,13,14)**
2. Describe risk factors and pathophysiology of coronary artery disease and pulmonary disease. **(CFPO 1, 3,4,5,7,13,14)**
3. Demonstrate an understanding of the methodology and interpretation of various tests used in the
4. Describe symptoms, complications, and changes to cardiac structure and function as a result of myocardial infarction. **(CFPO 1,3,4,5,7,13,14)**
5. Demonstrate an understanding of the various phases of cardiopulmonary rehabilitation. **(CFPO 1,3,4,5,7,13,14)**
6. Demonstrate an understanding of exercise prescription for rehabilitation of cardiopulmonary patients based on assessment and individual needs. **(CFPO 1,3,4,5,7,13,14)**
7. Describe the role of physical activity in the prevention and management of cardiovascular and pulmonary diseases. **(CFPO 1,3,4,5,7,13,14)**
8. Demonstrate an understanding of the administrative issues associated with cardiopulmonary rehabilitation. **(CFPO 1,3,4,5,7,13,14)**
9. Demonstrate an understanding of other issues related to health enhancement including patient education programs, nutrition, and stress management. **(CFPO 1,3,4,5,7,13,14)**
10. Demonstrate an understanding of the procedures for implementing cardiopulmonary rehab programs, as well as the management and operation of a cardiopulmonary rehabilitation program. **(CFPO 1,3,4,5,7,13,14)**

Topics to Be Covered:

Unit 1: Cardiopulmonary anatomy and physiology (15 hours)

Cardiovascular system anatomy and physiology (heart, vasculature, blood) (1 hr)
Systolic / diastolic / pulse / mean arterial pressure (1 hr)
Cardiac output (1 hr)
Regulation of heart rate (1 hr)
Frank-Starling law/ Preload vs. afterload (1 hr)
Cardiovascular response to exercise (1 hr)
Respiratory system anatomy and physiology (conduction and respiratory zones) (1 hr)
Inspiration and expiration at rest (30 min)
Active/forced inspiration and expiration (30 min)
Gas transport and exchange (1 hrs)
Lung volumes / capacities (1 hr)
Dalton's law (1 hr)
Fick's law of diffusion (30 min)
O_2 / CO_2 transport in the blood (percent of each form) (30 min)
Effects of pH / temperature on the O_2-Hb dissociation curve (1 hr)

Unit Exam (1 hr)
Presentations (1 hr)

Unit 2: Diseases/Diagnostic testing and interpretation (20 hours)

Role of prevention and rehabilitation programs (3 hrs)
Descriptive epidemiology CAD/CVD and related co-morbidities
Different types of cardiomyopathy
Describe heart failure
Heart valve disorders
Describe the development of atherosclerosis
Assessment and diagnosis of coronary artery disease
Describe the non-invasive techniques used to identify myocardial ischemia

Related medical conditions within coronary artery disease (3 hrs)
Describe heart failure
Systolic dysfunction
Diastolic dysfunction
Hypertension
Peripheral arterial disease

Types of diabetes (3 hrs)
Criteria for the diagnosis of diabetes
Benefits of exercise for patients with diabetes
Risk of exercise for patients with diabetes

Prevention and treatment of coronary artery disease (3 hrs)
Effectiveness of treatments for lowering the risk for CAD
Category I Risk Factors
Category II Risk Factors
Category III Risk Factors
Category IV Risk Factors
Surgical and interventional procedures for CAD

Overview of electrocardiography (2 hrs)
Normal cardiac cycle as indicated on the ECG
List and describe the different types of arrhythmias
ST-segment depression/elevation
Premature ventricular contraction

Pulmonary diseases (3 hrs)
Lung volumes / capacities
Pulmonary rehabilitation programs
Goals in COPD management
Smoking cessation
Exercise prescription in COPD patients
Pharmacological therapy in COPD

Unit Exam (2 hrs)
Presentations (1 hr)

Unit 3: Rehabilitation application and logistics (10 hours)

Exercise prescription in prevention and rehabilitation programs (3 hrs)
Training principles
Exercise prescription principles
Dose-response curve
Progression of exercise activities
Factors related to exercise program adherence
Strategies to increase exercise program adherence
Phases in cardiac rehabilitation programs (2 hrs)
Inpatient rehabilitation guidelines
Outpatient rehabilitation guidelines
Adaptations to chronic exercise training in coronary artery disease
Exercise recommendations in patients with peripheral arterial disease
Core components and models: prevention and rehabilitation programs
Documentation of outcomes (outcome domains) for rehabilitation programs (3 hrs)
Goals of primary/secondary prevention programs
Home-based rehabilitation programs
Management of medical emergencies

Unit Exam (1 hr)
Presentations (1 hr)

Required Text:

Brown, S.P., Miller, W.C., and Eason, J.M. (2006) *Exercise Physiology: Basis of human movement in health and disease*. Baltimore: Lippincott Williams & Wilkins.

Methods of Instruction:

Face-to-face lecture

Suggested Student Activities:

In addition to general lecture over course material, students will also participate in journal article presentations and critiques (review articles covering Objectives 1-10)

MSU Honor Code:

"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 please visit: http://www.msstate.edu/dept/audit/PDF/1207.pdf

Cellular Phones: It is expected that students will show respect for the instructor as well as their peers by turning off their cellular phones before entering the classroom.

Technology:

All course information (i.e., lectures and assignments) will be made available on myCourses. Likewise, PowerPoint will be used for lecture material. When possible, other modes of technology (e.g., skype sessions with various experts in the field) will be used to enhance course material.

Diversity:

This issue will not specifically be discussed within the scope of this course.

Disability:

Students requiring accommodation for a disability should inform the instructor as early in the semester as possible to discuss needs and an accommodation strategy. All possible accommodations will be made in accordance with university policy. It is the policy of Mississippi State University to accommodate students with special needs and learning disabilities as per the MSU Student Support Services policy. Students seeking accommodations on the basis of a disability or special need must identify themselves to the Office of Student Support Services (325-3335) to verify eligibility. Additional documentation guidelines may be obtained by contacting the Office of Student Support Services directly, or via the web at http://www.msstate.edu/dept/audit/91130.html. Academic accommodations and services are based upon an individual's needs. All documentation is confidential.

Field Component: None

Evaluation of Student Progress:

The grade for each student is based upon:

A. Written exams (3)	300 points
B. Article presentations and critiques (2)	100 points
	400 total points

Exams**:** There will be three exams during the semester. The final exam is scheduled for Tuesday, December 6th at 6:00pm. Format of exams may include multiple choice, matching, fill-in-the-blank, and short answer questions.

Missed Exams**:**

- Any student missing an exam must inform the instructor in advance and 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 Procedure Manual*. Acceptable absences 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.

Article presentations and critiques: Each student will complete two critiques and presentations of peer reviewed journal articles. Articles must be on topics related to the course and approved by the instructor in advance. Presentation dates will be determined and critiques are due on the day the student presents. Additional information about this assignment will be available on myCourses.

Late Assignments: Late assignments will not be accepted.

Attendance: Class attendance and participation is expected for all classes. Students who will be representing the University in an official documented capacity should see the professor at the beginning of the semester.

Grading Scale:

A = 90 – 100%
B = 80 – 89%
C = 70 – 79%
D = 60 – 69%
F = 59% or less

This scale will not be curved.

Bibliography:

Brown, S.P., Miller, W.C., and Eason, J.M. (2006). *Exercise Physiology: Basis of human movement in health and disease*. Baltimore: Lippincott Williams & Wilkins.

Ehrman, J., Gordon, P., Visich, P., Keteyian, S. (2013).*Clinical exercise physiology*. Champaign, IL: Human Kinetics.

Frontera, W. (2006). *Exercise in rehabilitation medicine*. Champaign, IL: Human Kinetics.

Niebauer, J. (2011). *Cardiac rehabilitation manual*. New York: Springer.

Thow, M., Graham, K., & Lee, C. (2013). The Healthy Heart Book. Champaign, IL: Human Kinetics.

Whyte, G. & Sharma, S. (2010). Practical ECG for Exercise Science and Sports Medicine. Champaign, IL: Human Kinetics.