

COURSE SYLLABUS

Department: Health, Human Performance, and Recreation

Course: HL 603 – Cardiovascular Exercise Physiology

I. Catalog Description: A systems approach to the cardiovascular responses to acute and chronic exercise. Emphasis on the myocardial and circulatory adaptations associated with physical training and the impact of the environment on pertinent parameters. (3)

II. Prerequisites: Graduate Standing

III. Course Objectives:

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

- A. Describe the structure and function of the heart including the electrical activity involved in the normal and abnormal cardiac cycle
- B. Describe the structure and function of the myocytes
- C. Interpret a basic electrocardiogram
- D. Discuss the function of the peripheral and coronary circulatory systems at rest and during physical activity
- E. Analyze the factors which impact the cardiac output and identify those factors impacted by physical activity and environmental factors
- F. Analyze cardiovascular adaptations to chronic physical activity and appreciate the physiological stressors which factor into the adaptations

IV. Expectations of the Student:

- A. Each student will complete all examinations and assignments
- B. Each student will complete all laboratory exercises
- C. Each student will complete a research paper on a topic approved by the instructor

V. Course Content:

	<u>HRS</u>
A. The Cardiovascular System	2
1. Heart	
2. Heart volumes	
3. Vascular system	
4. Blood	
5. Basic cardiovascular responses to physical activity	
B. The Heart	14
1. Myocytes	
a. Cell structure	
b. Excitation-contraction coupling	
c. Metabolic activity	
2. Electrical activity of the heart	
a. Intrinsic and extrinsic control of cardiac cycle rate	
b. Pacemaker	

	<ul style="list-style-type: none"> c. Normal and abnormal electrical flow d. Introduction to axis 	
	<ul style="list-style-type: none"> 3. Electrocardiography <ul style="list-style-type: none"> a. Determination of rate and rhythm b. Measures of ventricular hypertrophy c. ST segment changes d. Common ECG changes in athletes 	
C.	Circulatory System	11
	<ul style="list-style-type: none"> 1. Hemodynamics <ul style="list-style-type: none"> a. Determinants of flow and flow velocity b. Determinants of laminar and turbulent flow 2. The Arterial system <ul style="list-style-type: none"> a. Arterial structure b. Endothelial regulation of vascular tone c. Measuring endothelial and vascular function 3. Microcirculation and lymphatics <ul style="list-style-type: none"> a. Functional anatomy b. Transcapillary exchange of water, solutes and lipid-soluble molecules c. Role of lymphatic system 4. Peripheral circulation <ul style="list-style-type: none"> a. Regulation of arteriole blood flow b. Role of sympathetic nervous system in control of blood flow 5. Hemostasis <ul style="list-style-type: none"> a. Coagulation and fibrinolysis b. Injury hypothesis of atherogenesis 	
D.	Control of Cardiac Output	4
	<ul style="list-style-type: none"> 1. Factors controlling cardiac output <ul style="list-style-type: none"> a. Central venous pressure and cardiac output b. Venous return and cardiac output c. Myocardial contractility d. Peripheral resistance e. Blood volume <ul style="list-style-type: none"> i. Relationship to venous return ii. Cardiovascular drift 	
E.	Coronary Circulation	3
	<ul style="list-style-type: none"> 1. Functional anatomy of coronary vessels 2. Factors determining coronary blood flow 3. Myocardial oxygen demand 4. Cardiac efficiency 	
F.	Cardiovascular Responses to Acute Aerobic Exercise	2
	<ul style="list-style-type: none"> 1. Cardiac responses 	

2.	Vascular responses	
3.	Hemostatic responses	
4.	Effects of environmental factors	
G.	Cardiovascular Adaptations to Chronic Aerobic Exercise	5
1.	Cardiac adaptations	
2.	Vascular adaptations	
3.	Hemostatic adaptations	
H.	Cardiovascular Responses to Acute and Chronic Pressure Overload	4
1.	Cardiac responses and adaptations	
2.	Vascular responses and adaptations	
3.	Hemostatic responses and adaptations	
	Total Hours	45

VI. Textbook:

Smith, D.L. and Fernhall, B. (2011). *Advanced Cardiovascular Exercise Physiology*. Champaign, IL: Human Kinetics.

VII. Basis for Student Evaluation:

Examinations	60%
Research Paper	30%
Assignments	10%

The weight of the evaluation criteria may vary according to each instructor and will be communicated at the beginning of the course.

VIII. Grading Scale:

91-100%	=A
81-90%	=B
71-80%	=C
<71	=F

IX. Academic Honesty Statement:

Students are expected to abide by the University Policy for Academic Honesty
<http://www6.semo.edu/judaffairs/code.html>

X. Students with Disabilities Statement:

If a student has a special need addressed by the Americans With Disabilities Act and requires materials in an alternative format, please notify the instructor at the beginning of the course. Reasonable efforts will be made to accommodate those with special needs.