

LANCASTER GENERAL COLLEGE OF NURSING AND HEALTH SCIENCES
Cardiovascular Invasive Specialty

SYLLABUS
Fall Semester

- I. Title: CIS 200 Cardiovascular Anatomy & Physiology
- II. Course Description: The purpose of this course is to explore in detail the construction and dynamics of the cardiovascular system. Topics include fetal/embryonic development of the cardiovascular system, anatomical and physiological considerations, heart sounds, biophysics of the cardiac cell, cardiac pumping action and its regulation, basic hemodynamics, coronary blood flow, systemic and pulmonary circulation, and control of regional circulation. In addition, this course will prepare the cardiovascular student to recognize the pathological processes and congenital defects of the cardiovascular system as depicted in an invasive cardiovascular laboratory. The following topics will be discussed: Infective endocarditis and rheumatic heart disease, valvular heart disease, myocardial and pericardial diseases, coronary heart disease (atherosclerosis and myocardial infarction), heart failure and cardiogenic shock, systemic hypertension, pulmonary heart disease, murmurs, and congenital abnormalities. A thorough understanding of normal cardiovascular anatomy and physiology is mandatory in order to comprehend these advanced topics.
- III. Prerequisite: Anatomy & Physiology I and II
- IV. Placement: Fall Term
- V. Time Allotment: Theory 60 hours
- VI. Faculty: Richard Visco, RCIS
Office: LGCNHS Building Phone: 544-4700 ext.44700
Pager: 305-1271
- VII. Credits: Four (4)
- VIII. Evaluation:
- | <u>Instrument</u> | <u>Weight</u> | <u>Time/Date</u> |
|------------------------------|---------------|------------------------|
| Unit Exams | 50% | See last page |
| Comprehensive Final Exam | 25% | Final Exam Week |
| Quizzes | 15% | |
| Class Activity/Participation | 10% | Week 1 through week 15 |

***A grade of "C" (2.0) is required to pass the theory portion of the course.**

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IX. Textbooks: The CIBA Collection of Medical Illustrations(1992)
Volume 5: The Heart
Author: Frank Netter, M.D.
Publisher: CIBA

Cardiopulmonary Anatomy & Physiology(2000)
Authors: George H. Hicks
Publisher: Saunders

Pathophysiology of Heart Disease(2003)
Author: Medical Students and Faculty
Publisher: Lippincott Williams & Wilkins

X. Course Objectives:

By the conclusion of the course the student will:

1. Compare the normal and abnormal cardiac anatomy and physiological changes that impact the cardiovascular patient.
2. Identify therapeutic modalities in the treatment of cardiovascular disease.
3. Identify the functional significance of embryological development, fetal circulation and the changes that occur after birth.
4. Recognize the hemodynamic morphology of each cardiac chamber.
5. Apply the laws of cardiac function in the wellness of the cardiovascular client.

XI. Program Policies: Students are held accountable for all policies in the Student Handbook and any revisions made to those policies during the academic year.

XII. Class: A. Importance of Attending Class

Cardiovascular education comprises more than just private reading and passing of exams. Students should recognize that active and informed participation in class is essential to the development of their intellectual abilities and scholarly growth. Students must also recognize the importance of achieving an academic record that reflects their intellectual ability. Such records are seldom achieved without regular attendance and participation in class activities. Attendance will be taken.

B. Student Responsibility for Missed Material

Students are responsible for all material presented and announcements made in class, regardless of attendance. It is the student's responsibility to obtain materials and assignments if absent.

C. Unit Examinations

Examinations should only be missed in extenuating circumstances. A student who misses an examination will be required to make up the examination on the next day of lecture. Contact the instructor, prior to the next lecture day to make arrangements to take the exam.

A student who misses an examination, regardless of the reason, will have ten percent (10%) deducted from the grade achieved on the exam.

Example: The exam is worth sixty (60) points, the student takes the exam and achieves a grade of 52/60. The score of 52 is then decreased by ten percent (10%) or five (5) points, thus the grade on the exam will be 47/60.

An alternate examination may be given for the make-up examination.

D. Class Behavior

Once class has started, the instructor has the prerogative not to admit students into lecture. Students will be dismissed from class for any inappropriate behavior.

The student will comply with all general rules and procedures of both Lancaster General College of Nursing and Health Sciences (LGCNHS) and A demonstration of courteous, cooperative, and professional attitude throughout the course is essential. Any violation of procedure or positive attitude shall result in the student's immediate dismissal from the program.

E. Written Assignments

All submitted work must follow the *Publication Manual of the American Psychological Association (5th ed.)* unless directed otherwise by the course instructor.

XIII. Other: Academic Dishonesty and Plagiarism

Academic dishonesty violates the spirit and purpose of an academic community, and is therefore subject to disciplinary action. Academic dishonesty includes cheating on examinations and unauthorized duplication of work.

Plagiarism is an act of academic dishonesty. Any work submitted that is not your own is an act of plagiarism. In preparing assignments, you must acknowledge in writing, any use of outside sources or any assistance you received in preparing an assignment.

If an instructor believes that a student has committed an act of academic dishonesty or has plagiarized material, the instructor may award a failing grade for that assignment to the student. If the occurrence is during an examination, the student will receive a zero for that portion of their grade and must leave the room.

If the student disagrees with this decision, the student may follow the grievance procedure.

XIV. Revisions This syllabus is subject to revision by the faculty at any time.

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CONTENT	HOURS	STUDENT ACTIVITIES	COURSE OBJECTIVE
I. External Structure of the Heart and Great Vessels A. Location of the heart B. Function of the pericardium C. Cardiac borders D. External landmarks of the heart	2	REQUIRED READINGS: Netter. 5 pages 2-7 Hicks, Chapter 2, pp. 34-37 Classroom Activities: Lecture PowerPoint Presentation	1
II. Internal Structures of the Heart and Great Vessels A. Function of the cardiac chambers 1. Atria 2. Ventricles B. Function of the cardiac valves 1. Mitral 2. Tricuspid 3. Pulmonary 4. Aortic C. Internal structures of the heart as seen in various planes D. Coronary Circulation 1. Right coronary artery 2. Left coronary artery 3. Left anterior descending	4	REQUIRED READINGS: Netter. 5 pages 8-12 Hicks, Chapter 2, pp. 39-42 Classroom Activities: Lecture PowerPoint Presentation REQUIRED READINGS: Netter, pp.16,17 Section IV, pp. 32-33. Hicks, Chapter 2, pp. 43-46	1
Pig Heart Dissection	2	Classroom Activities: Pig Heart Dissection	1
III. <u>Embryologic Development of the Heart and Great Vessels</u>	4	Suggested Reading: CIBA Netter, pp. 112-126 Hicks, Chapter 2, pp. 32-33 Classroom Activities: Lecture PowerPoint Presentation	3
IV. <u>Fetal Circulation</u> A. Pathway of fetal circulation B. Function of embryonic structures in fetal circulation C. Hemodynamic findings associated with prenatal circulation D. Changes that occur in circulation after birth	2	REQUIRED READINGS: Review Lecture handouts Classroom Activities: Lecture PowerPoint Presentation	3

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CONTENT	HOURS	STUDENT ACTIVITIES	COURSE OBJECTIVE
V. Structure of Myocardial Cells A. Four types of myocardial cells B. Structure of the four types of cardiac cells C. Major functions of each of the four types of myocardial cells	4	REQUIRED READINGS: Review Lecture handouts Hicks, Chapter 2 pp. 38-39 Classroom Activities: Lecture PowerPoint Presentation	1
VI. Excitation-Contraction Mechanism A. Cellular changes occurring in systole and diastole B. Process of excitation-contraction coupling C. Effects of calcium, sodium and potassium ions on the myocardium D. Basic principles associated with excitation-contraction coupling	4	REQUIRED READINGS: Review Lecture handouts Hicks, Chapter 5 Classroom Activities: Lecture PowerPoint Presentation	1
VII. Left Ventricular Muscle Mechanics A. Factors regulating the basic mechanics of contraction B. Starling's Law and associated mechanisms C. Contractility and associated mechanisms D. Effects of changes in heart rate	2	REQUIRED READINGS: Review Lecture handouts Hicks, Chapter 5 Classroom Activities: Lecture PowerPoint Presentation	5
VIII. Factors Affecting Ventricular Contractility A. Terms associated with ventricular function B. Force-velocity-length relationships	1	REQUIRED READINGS: Review Lecture handouts Hicks, Chapter 5 Classroom Activities: Lecture PowerPoint Presentation	5
IX. Ventricular Systole and Diastole A. Order of events B. Pressure changes and associated mechanical changes.	2	REQUIRED READINGS: Review Lecture handouts Hicks, Chapter 5 Classroom Activities: Lecture PowerPoint Presentation	4,5
X. Timing of Right and Left Ventricular Events and A. Timing differences existing between the right left heart B. Effects of respiration on timing of ventricular events C. Pressure-volume loop	2	REQUIRED READINGS: Review Lecture handouts Classroom Activities: Lecture PowerPoint Presentation	4,5

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CONTENT	HOURS	STUDENT ACTIVITIES	COURSE OBJECTIVE
XI. Pressure Changes in the Atria A. Pressure changes occurring in the atria during systole and diastole B. Phases accompanying the pressure changes in the atria	2	REQUIRED READINGS: Review Lecture handouts Hicks, Chapter 6 Classroom Activities: Lecture PowerPoint Presentation	4
XII. Pressure Waveforms A. Waveforms associated with pressure changes B. Physiologic mechanisms behind pressure waveforms C. Phases associated with pressure waveforms.	2	REQUIRED READINGS: Review Lecture handouts Classroom Activities: Lecture Overhead transparencies	4
XIII. Wiggers Diagram A. Hemodynamic changes occurring in ventricular systole and diastole B. Relation of heart sounds	2	REQUIRED READINGS: Review Lecture handouts Classroom Activities: Lecture PowerPoint Presentation	4,5
XIV. Neural Control of Cardiac Activity A. Autonomic nervous system B. Sympathetic and parasympathetic pathways C. Reflexes occurring with changes in arterial blood pressure, venous return, respiration, oxygen concentrations and ventricular volumes	2	REQUIRED READINGS: Review Lecture handouts Hicks, Chapter 8 Classroom Activities: Lecture PowerPoint Presentation	5
XV. Hormonal and Chemical Influences A. Myocardial performance and heart rate B. Acid-base balance C. Renin-Angiotensin mechanism.	2	REQUIRED READINGS: Review Lecture handouts Hicks, Chapter 8 Classroom Activities: Lecture PowerPoint Presentation	5
XVI. Measurement and Control of Cardiac Output A. Factors affecting cardiac output B. Measuring cardiac output C. Various aspects of vascular and cardiac function curves C. Effect of physiologic states have on cardiac output D. Miscellaneous factors	2	REQUIRED READINGS: Review Lecture handouts Hicks, Chapter 5 p 120 Classroom Activities: Lecture PowerPoint Presentation	5

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CONTENT		HOURS	STUDENT ACTIVITIES	COURSE OBJECTIVE
XVII.	Myocardial Oxygen Consumption and Its Determinants A. Myocardial oxygen consumption B. Relationship between myocardial oxygen consumption and its determinants C. Mechanism of action	2	REQUIRED READINGS: Review Lecture handouts Classroom Activities: Lecture PowerPoint Presentation	5
XVIII.	Anatomical and Circulatory Overview A. Basic function B. Aortic arch and the associated vessels C. Anatomy of the cerebral circulation D. Categories of veins E. Microscopic anatomy	3	REQUIRED READINGS: Review Lecture handouts Classroom Activities: Lecture PowerPoint Presentation	1
XIX.	Valvular Disease A. Aortic valve 1. Stenosis 2. Reguritation B. Pulmonic valve 1. Stenosis 2. Reguritation C. Mitral valve 1. Stenosis 2. Reguritation D. Tricuspid valve 1. Stenosis 2. Reguritation	2	REQUIRED READINGS: Review Lecture handouts Read Medical students Chapter 8 Classroom Activities: Lecture PowerPoint Presentation	2
XX.	Cardiomyopathy and Pericardial disease. A. Etiology B. Pathophysiology C. Clinical Manifestations D. Treatment	2	REQUIRED READINGS: Review Lecture handouts Read Medical students, Chapter 10, 14 Classroom Activities: Lecture PowerPoint Presentation	2
XXI.	Coronary Artery Disease A. Etiology B. Pathophysiology C. Clinical Manifestations D. Treatment	2	REQUIRED READINGS: Review Lecture handouts Read Medical students, Chapter 5, 6 and 7 Classroom Activities: Lecture PowerPoint Presentation	2
XXII.	Systemic and Pulmonary Hypertension. A. Etiology B. Pathophysiology C. Clinical Manifestations D. Treatment	2	REQUIRED READINGS: Review Lecture handouts Read Medical students, Chapter 13 Classroom Activities: Lecture PowerPoint Presentation	2

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XXIII. Disease of the Peripheral Vasculature A. Etiology B. Pathophysiology C. Clinical Manifestations D. Treatment	1	REQUIRED READINGS: Review Lecture handouts Read Medical students ₂ Chapter 15 Classroom Activities: Lecture PowerPoint Presentation	2
XXIV. Cardiogenic shock/heart failure A. Etiology B. Pathophysiology C. Clinical Manifestations D. Treatment	2	REQUIRED READINGS: Review Lecture handouts Read Medical students Chapter 9 Classroom Activities: Lecture PowerPoint Presentation	2
XXV. Trauma and tumors A. Etiology B. Pathophysiology C. Clinical Manifestations D. Treatment	1	REQUIRED READINGS: Review Lecture handouts Classroom Activities: Lecture PowerPoint Presentation	2
XXVI. Congenital heart disease A. Etiology B. Pathophysiology C. Clinical Manifestations D. Treatment E. Corrective procedures for Congenital heart disease	4	REQUIRED READINGS: Review Lecture handouts Read Medical students Chapter 16 Classroom Activities: Lecture PowerPoint Presentation	2

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Tentative Course Schedule - 2007

Date	Topic	Location	Class
8/20	External Structures of the Heart	205	1
8/22	Internal Structures of the Heart	205	2
8/27	Coronary Anatomy	205	3
8/29	Pig Heart Dissection	205	4
9/3	No Class - Holiday		
9/5	Embryology	205	5
9/10	Embryology	205	6
9/12	Fetal Circulation	205	7
9/17	Exam 1	205	8
9/19	Myocardial Cell Structure	205	9
9/24	Action Potential	205	10
9/26	Frank-Starling Law	205	11
10/01	Wiggers Diagram	205	12
10/03	Wiggers Diagram	205	13
10/8	Cardiac Output	205	14
10/10	Regulation of Cardiac Output – Neural/Hormonal	205	15
10/15	No Class – Fall Recess		
10/17	Exam 2	205	16
10/22	Valve Disease	205	17
10/24	Cardiomyopathies	205	18
10/29	Coronary Artery Disease	205	19
10/31	Congenital Heart Disease	205	20
11/05	Corrective Surgeries	205	21
11/07	Heart Failure/ Cardiogenic Shock	205	22
11/12	Exam 3	205	23
11/14	System and Pulmonary Hypertension	205	24
11/19	Pericardial Disease	205	25
11/21	Peripheral Vascular Disease	205	26
11/26	Cardiac Tumors	205	27
11/28	Instructional Activity	205	28
12/03	Group Review	205	29