



LINCOLN UNIVERSITY

DI 125 – Introduction to Echocardiography

Course Syllabus

Spring 2019

Instructor: Dr. Alena Pershay, RDCS

Lecture Schedule: Wednesday, 6:30 pm – 9:15 pm (Lecture) 01/14/2019 – 05/04/2019

Credits: 4 units: 3-unit lecture and 1-unit lab
(75 total hours: 45 hours of lectures and 30 hours of lab)

Level: Developed (D)

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Lab Instructor: Mr. Delbert Davis 02/04/2019 – 04/15/2019

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TEXTBOOKS:

1. Textbook of Clinical Echocardiography, 5th Edition. Catherine M.Otto, 2013
ISBN-10: :1416055592, ISBN-13: 978-1416055594
2. Echocardiography Review Guide: Companion to the Textbook of Clinical Echocardiography. Catherine M.Otto and Rebecca G. Schwaegler, 2011
ISBN-10:1437720218, ISBN-13: 978-1437720211
3. Echocardiographer's Pocket Reference, 3rd Edition {Spiral-Bound}, 2008 Terry Reynolds, ISBN-10:001405101X, ISBN-13: 978-0014051014

Additional recommended textbooks and instructional materials will be given during the classes.

Last Revision: 12/12/2018

NOTE: Instructor may change this syllabus and course schedule at any time according to the judgment as to what is best for the class. Any changes will be declared ahead of time in class.

CATALOG DESCRIPTION

This introductory course focuses on normal heart anatomy, scanning techniques, modes of echocardiographic examination and cardiac hemodynamics. (4 units).

Prerequisites: DI 110, DI 115

EDUCATIONAL OBJECTIVES

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

- Utilize Two-dimensional echocardiography, identify and assess the normal anatomical structures of the heart and great vessels.
- 2D/M-mode Anatomy – identify basic two-dimensional and M-mode anatomy and the structures contained within each image displayed.
- Spectral and Color Doppler – identify direction and velocity information given in the color and spectral Doppler images/waveforms.
- Cardiac Physiology – explain the electrical and mechanical events within the cardiac cycle.
- Cardiac Hemodynamics – explain normal hemodynamic parameters, including intracardiac pressure and oxygen saturation.
- Basic EKG and Auscultation – describe the normal EKG and commonly encountered abnormal EKG findings. Explain normal and abnormal heart sounds and their relationship to the cardiac cycle.
- Systolic Function – describe basic echocardiographic measurement parameters to assess LV and RV systolic function.
- LA, RA, and RV Function – explain and describe the basic echocardiographic measurement parameters that assess LA, RA and RV normal and abnormal function.
- Normal Examination – describe the ASE recommended views and measurements in the complete normal transthoracic echocardiogram.

COURSE LEARNING OUTCOMES¹

	Course Learning Outcome	Program Learning Outcomes	Institutional Learning Outcomes	Assessment activities
1	Understand the anatomy and physiology of the cardiovascular system and the cardiac conduction system.	PLO 1	ILO 1a, ILO 2a	In-class activities
2	Complete a systematic survey of the heart with 2-D and M-Mode ultrasound imaging;	PLO 2	ILO 1a,	In-class activities, lab

¹ Detailed description of learning outcomes and information about the assessment procedure are available at the [Center for Teaching and Learning](http://ctl.lincolnuca.edu) website (ctl.lincolnuca.edu).

	document and measure all structures in all standard views and expand the protocol as required to document ambiguous findings or suspected pathology.	PLO 5		activities, quizzes
3	Relate 2-D image anatomy to its correlate M-mode pattern, compare and contrast each method of display.	PLO 3 PLO 5	ILO 6a, ILO3 a	In-class activities, lab activities, quizzes, midterm and final exams
4	Properly judge the quality of acquired data and communicate any limitations. State the normal range measurement values for each principal cardiac structure and physiologic function.	PLO 1 PLO7	ILO 3a	In-class activities, quizzes, midterm and final exams
5	Identify each anatomic region and segment of the heart from any given echocardiographic view; relate it to its usual coronary distribution. Identify abnormalities of resting cardiac wall motion and thickening using standard terminology; classify each according to its clinical significance.	PLO 4 PLO 5	ILO 7a,	In-class activities, lab activities, quizzes, midterm and final exams

INSTRUCTIONAL METHODS

- Lectures and assigned reading material
- Internet resources

Assignments and projects require students to actively use resources of the library. A detailed guide to business resources of the library as well as the description of Lincoln University approach to information literacy are available at the [Center for Teaching and Learning](http://ctl.lincolnuca.edu) website (ctl.lincolnuca.edu).

REQUIREMENTS

Ultrasound Hands-on Laboratory Training

Practical experience students will gain under the guidance of a lab instructor. Students are expected to arrive at class on time and stay through the end of the ultrasound laboratory class.

ATTENDANCE AND PARTICIPATION

- Class attendance is required.
- Absences, late arrival, poor participation in class discussions, early leaves will result in failing grade.
- It is the responsibility of the student to make arrangements for all course work missed, and to notify the instructor about the reason the absence in advance.
- Excessive absence or tardiness may result in loss of credit, lowering of grade, or dismissal from the university.
- USING OF CELL PHONES IS PROHIBITED DURING THE CLASSES.

EVALUATION**Quizzes:**

- The student will take 3-4 quizzes during the semester.
- These quizzes will address the detailed content and major concepts presented in the lectures, lecture outlines, text readings, and study guide activities.
- Late assignments will not be collected or graded.
- All quizzes and exams may include a video portion to assess identification and recognition of echocardiographic structures, views, and or measurements.

Midterm & Final Examinations:

- The written examinations are proctored and will be closed-book exams.
- A student MUST take the exam during the scheduled time period.
- A student missing an exam because of an illness or legitimate emergency may take a make-up exam as soon as possible after the student returns from the illness and as determined by the instructor. Absences covering such emergencies as serious illness or similar may be excused by the Dean provided the absence is properly documented.

Ultrasound Hands-on Laboratory Examination:

- In the final ultrasound hands-on examination, students have to demonstrate understanding of information presented during lectures and hands-on laboratory training.
- Students have to perform echocardiographic protocols and demonstrate scanning technique and images in B-, Color-Modes, and M-mode.
- Students will schedule the time and date 2-3 weeks ahead of the Ultrasound hands-on laboratory examination.

GRADING

All activities will be graded according to the points as shown below.

Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	F
Points	94-100	90-93	87-89	84-86	81-83	78-80	76-77	74-75	72-73	70-71	0-69

The final grade for the course will be given as the total weighted score for all activities according to the percentage shown in the table below.

Activity		Percent
Lecture	Class Attendance	10%
	Quizzes	10%
	Homework Oral Presentation	10%
	Midterm Exam	20%
	Final Exam	20%
Laboratory	Scanning Performance	20%
	Attendance	10%
TOTAL		100%

LECTURE SCHEDULE

WEEK 1

1/16/2019

- SETTING THE MACHINE. REVIEW OF INSTRUMENTATION. ERGONOMICS FOR A CARDIAC SONOGRAPHER. ENTERING THE PATIENT'S DATA FOR ECHO STUDY. PREPARATION THE PATIENT FOR SCANNING.
- CARDIAC ANATOMY AND PHYSIOLOGY REVIEW. IDENTIFICATION OF THE LEFT SIDE HEART STRUCTURES. PARASTERNAL VIEWS.

WEEK 2

1/23/2019

CARDIAC ANATOMY AND PHYSIOLOGY REVIEW. IDENTIFICATION OF THE RIGHT-SIDE HEART STRUCTURES. INSTRUMENTATION REVIEW. PARASTERNAL VIEWS.

PRACTICE PLAX, PROPER USE OF THE INSTRUMENTATION FUNCTIONS: FOCUS, DEPTH, ETC.

EKG TRACING OPTIMIZATION.

WEEK 3

1/30/2019

CARDIAC CONDUCTION SYSTEM. CARDIAC CYCLE. SYSTOLE AND DIASTOLE. ELECTRICAL AND MECHANICAL CORRELATION. CORONARY CIRCULATION. 2D - IMAGES OPTIMIZATION, ECG OPTIMIZATION.

IMAGE OPTIMIZATION, REVIEW “INSTRUMENTATION” AND PDF DOCUMENT “IMAGE OPTIMIZATION”, B-COLOR MAP. SYSTOLE AND DIASTOLE.

WEEK 4

2/6/2019

IMAGING INSTRUMENTATION. CARDIAC TRANSDUCERS. TRANSTHORACIC TOMOGRAPHIC VIEWS. TWO DIMENSIONAL ECHO VIEWS. PARASTERNAL LONG AXIS VIEW.

PRACTICE PLAX AND START PSAX. PRACTICE IMAGE OPTIMIZATION AND USE ZOOM ON VALVES. ELECTRICAL AND MECHANICAL EVENTS CORRELATION.

WEEK 5

2/13/2019

TRANSTHORACIC VIEWS. TWO DIMENSIONAL VIEWS. PARASTERNAL SHORT AXIS VIEWS. APICAL VIEWS.

CONTINUE PRACTICE 2D IMAGING BASED ON THE “BEGINNER PROTOCOL”. IDENTIFICATION LEFT HEART STRUCTURES.

WEEK 6

2/20/2019

TRANSTHORACIC VIEWS, SUBCOSTAL AND SUPRASTERNAL VIEWS.

TRANSTHORACIC IMAGING MODALITIES. M-MODE OF THE AORTIC ROOT. MIDTERM REVIEW.

CONTINUE PRACTICING 2D IMAGING OF PLAX, PSAX AND START APICAL ACCESS.

WEEK 7

2/27/2019

MIDTERM (LECTURES).

CONTINUE WORKING ON THE IMAGING. PRACTICE SUBCOSTAL AND SSN APPROACH. IDENTIFICATION RIGHT SIDE STRUCTURES.

WEEK 8

3/6/2019

DOPPLER BASICS. SPECTRAL DOPPLER. PULSE WAVE VS. CONTINUOUS WAVE. COMPARISON OF M-MODE AND PRESSURE CURVE. DOPPLER WAVE FORMS.

PRACTICE THE SEQUENCE OF THE IMAGES AND OPTIMIZATION.

WEEK 9

3/13/2019

BASIC HEMODYNAMICS, PRESSURES INSIDE THE HEART. HEART SOUNDS.

PRACTICE THE SEQUENCE OF THE IMAGES AND OPTIMIZATION.

WEEK 10

3/20/2019

CATHETERIZATION OF THE LEFT AND RIGHT HEART.

PRACTICE THE SEQUENCE OF THE IMAGES AND OPTIMIZATION.

WEEK 11

3/27/2019

DOPPLER BASICS. COLOR FLOW DOPPLER PRINCIPLES. NORMAL COOLOR FLOW PATTERNS.

PRACTICE THE SEQUENCE OF THE IMAGES AND OPTIMIZATION.

WEEK 12

4/3/2019

STENOSIS AND REGURGITATION FLOW PATTERNS. REVIEW FINAL EXAMINATION.

PRACTICE THE SEQUENCE OF THE IMAGES AND OPTIMIZATION.

WEEK 13

4/10/2019

TRANSTHORACIC IMAGING MODALITIES. M-MODE OF THE AORTIC ROOT. PRACTICE THE SEQUENCE OF THE IMAGES AND OPTIMIZATION.

WEEK 14

4/17/2019

TRANSTHORACIC IMAGING MODALITIES. M-MODE OF THE MITRAL VALVE. M-MODE OF THE PULMONIC VALVE. TRANSTHORACIC IMAGING. M-MODE OF LEFT VENTRICLE.

PRACTICE THE SEQUENCE OF THE IMAGES AND OPTIMIZATION.

WEEK 15

4/24/2019

FINAL EXAMINATION (LECTURE).

PERFORM THE ECHO PROTOCOL (2D IMAGES IN CORRECT SEQUENCE AND OPTIMIZED).