

# **LINCOLN UNIVERSITY**

## **DI 125 – Introduction to Echocardiography**

### **Fall 2017 Course Syllabus**

**Dates: 08/23/2017 – 12/06/2017**

**Course Number: DI 125**

**Course Title: Introduction to Echocardiography**

**Credit Hours: 4 units = 3 units of lectures + 1 unit of laboratories**  
(75 total contact hours = 45 hours of lectures + 30 hours of lab work)

**Lectures: Wednesdays 9:00 am – 11:45 am**

**INSTRUCTOR: Oxana Ostanina, MD, RDCS**

**Laboratories: Thursdays 6:30 pm – 9:15 pm**

**INSTRUCTOR: Mr. Solovey**

**CONTACT INFORMATION: [ostanina@lincolnuca.edu](mailto:ostanina@lincolnuca.edu)**

**OFFICE HOURS: By arrangement**

**RESOURCE OF MATERIALS:**

Echocardiography:

The textbook is optional.

Textbook of Clinical Echocardiography, 5th edition, Catherine M. Otto, MD, 2013

ISBN-10: 0323227589

ISBN-13: 978-0323227582

Textbook of Clinical Echocardiography, 4th edition, Catherine M. Otto, MD, 2009

ISBN-10: **1416055592**, ISBN-13: **978-1416055594**

Echocardiography Review Guide: Companion to the Textbook of Clinical Echocardiography 2nd edition, Catherine M. Otto and Rebecca G. Schwaegler, 2011

ISBN-10: **1437720218**, ISBN-13: **978-1437720211**

Echocardiographer's Pocket Reference, 3rd edition [Spiral-Bound], 2008, Terry Reynolds

ISBN-10: **001405101X**, ISBN-13: **978-0014051014**

The Normal Examination and Echocardiographic Measurements, 2nd revised edition, Bonita Anderson, 2007

ISBN-10: **0646468634**, ISBN-13: **978-0646468631**

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

**COURSE 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

**LEARNING OUTCOMES:**

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.

### **INSTRUCTIONAL METHODS:**

- Lectures and assigned reading material
- Internet resources

### **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, beginning with the first class meeting, and students are expected to attend all class sessions for which they are registered.
- ★ Promptness is required.
- ★ It is the responsibility of the student to make arrangements for all course work missed because of legitimate class absences and to notify the instructor when an absence will occur.
- ★ Excessive absence or tardiness may result in loss of credit, lowering of grade, or dismissal from the university.
- ★ Cell phones **MUST** be turned off before class begins. Students are not allowed to use cell phones during the class.

### **EVALUATION:**

#### **⌘ Quizzes:**

- ★ The student will take 3-4 quizzes 10-15 questions each at the beginning of the class.
- These quizzes will address the detailed content and major concepts presented in the lectures, lecture outlines, text readings, and study guide activities.
- Each quiz will be timed, 72 seconds for every question to complete.
- Late assignments will not be collected or graded.
- No make-up quizzes for missed quizzes will be administered (the student will receive no score for missed quizzes).
- All quizzes and exams may include a video portion to assess identification and recognition of echocardiographic structures, views, and or measurements

∞ **Midterm & Final Examinations:**

- ★ Midterm consists of 30 questions and final examination of 50 questions.
- ★ The written examinations are proctored and will be closed-book exams.
- ★ The Scranton machine will be used in grading multiple-choice tests.
- ★ 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.
- ★ If no excuse is received by the Records Office, the student will be considered as having no excuse.

∞ **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:**

**GRADING**  
%

**LECTURE**

Final Exam

30

Midterm

20

Quizzes/ Homework

10

Attendance lecture classes

10

**LABORATORY**

Performing of scanning protocol

20

Attendance lab classes

10

**TOTAL**

100

90-100%

A

80 - 89 %

B

70 - 79

C

60 - 69 %

D

< 59 %

F

## **SCHEDULE:**

### **WEEK 1**

08/23

- 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**

08/30

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**

09/06

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**

09/13

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**

09/20

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**

09/27

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**

10/04

MIDTERM (LECTURES)

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

**WEEK 8**

10/11

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**

10/18

BASIC HEMODYNAMICS, PRESSURES INSIDE THE HEART. HEART SOUNDS. PRACTICE THE SEQUENCE OF THE IMAGES AND OPTIMIZATION.

**WEEK 10**

10/25

CATHETERIZATION OF THE LEFT AND RIGHT HEART. PRACTICE THE SEQUENCE OF THE IMAGES AND OPTIMIZATION.

**WEEK 11**

11/01

DOPPLER BASICS. COLOR FLOW DOPPLER PRINCIPLES. NORMAL COLOR FLOW PATTERNS. PRACTICE THE SEQUENCE OF THE IMAGES AND OPTIMIZATION.

**WEEK 12**

11/08

STENOSIS AND REGURGITATION FLOW PATTERNS. REVIEW FINAL EXAMINATION. PRACTICE THE SEQUENCE OF THE IMAGES AND OPTIMIZATION.

**WEEK 13**

11/15

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

**WEEK 14**

11/29

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**

12/0

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

Syllabus Revised on 08/15/2017 (the syllabus is subject to change at any time)

**Appendix. Program and Institutional Learning Outcomes.**

<b>Institutional Learning Outcomes (ILOs)</b>	
<i>Graduates of the BS program of Lincoln University should be able to:</i>	
<b>1a</b>	Develop the habits and skills necessary for processing information based on intellectual commitment, and using these skills to guide behavior.
<b>2a</b>	Raise important questions and problems, and formulate them clearly and precisely in oral or written communication
<b>3a</b>	Act with dignity and follow the principles concerning the quality of life of all people, recognizing an obligation to protect fundamental human rights and to respect the diversity of all cultures.
<b>4a</b>	Focus on individual and organizational benefits; communicate to co-workers and company's leadership in facilitation of collaborative environment; to be honest and transparent with regard to their work, and to be respectful of the work of others.
<b>5a</b>	Display sincerity and integrity in all their actions, which should be based on reason and moral principles; to inspire others by showing mental and spiritual endurance
<b>6a</b>	Show creativity by thinking of new and better goals, ideas, and solutions to problems; to be resourceful problem solvers.
<b>7a</b>	Define and explain the boundaries, divisions, styles and practices of the field, and define and properly use the principal terms in the field

<b>Program Level Outcomes (PLOs)</b>	
<i>Students graduating our BS in Diagnostic Imaging program will be able to:</i>	
<b>1</b>	Develop and demonstrate knowledge in principles of UT, medical terminology, physiology, sonography, and echocardiography.
<b>2</b>	Demonstrate ability of accurate patient positioning techniques, and use of imaging technology
<b>3</b>	Adapt imaging procedures based on patient's needs and clinical limitations.
<b>4</b>	Practice effective oral and written communication skills in the clinical setting