LINCOLN UNIVERSITY

DI/UT 125 – Introduction to Echocardiography
Fall 2012 Course Syllabus

Dates: 08/22/2012 – 12/06/2012

Course Number: DI 125 / UT 125

Course Title: Introduction to Echocardiography

Credit Hours: 3 units of lectures (45 hours in total)

1 unit of laboratories (30 hours in total)

Lectures: Wednesday 5:30 pm – 8:15 pm

Laboratories: Thursday 5:30 pm – 8:15 pm (09/27 – 12/06)

INSTRUCTOR: Oxana Ostanina, MD, RDCS

CONTACT INFORMATION: (415) 646-5456

OFFICE HOURS: By appointment through e-mail:
ostanina@lincolnuca.edu

RESOURCE OF MATERIALS:

Anatomy and Physiology by I. Edward Alcamo

ISBN-10**: 0764144685**; ISBN-13: **978-0764144684**

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**

Additional recommended text books and instructional materials will be given during classes.

COURSE DESCRIPTION:

This introductory course focuses on normal anatomy, scan techniques, cardiac measurement, and new dynamics. (4 units)

Prerequisite: DI 115 / UT 115

LEARNING OBJECTIVES:

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

Utilizing 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.

2D and M-mode Measurements – perform basic two dimensional and M-mode measurements for each structure. Perform basic LV linear measurements and calculations.

Spectral and Color Doppler – identify direction of and velocity information given in the color and spectral Doppler images/waveforms.

Basic Doppler Calculations – perform basic Doppler calculations, i.e., stroke volume, cardiac output and valve areas.

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.

Pharmacology – Name basic cardiac medications and their affect on the heart. Cite medications given for the most commonly encountered cardiac abnormalities, i.e., CHF, arrhythmias, etc.

Normal Examination – Describe the ASE recommended views and measurements in the complete normal transthoracic echocardiogram.

INSTRUCTIONAL METHODS:

The previously described topics will be presented through the following:

- Assigned text readings and lecture outlines (handouts)
- Demonstration of lectures by using the Power Point
- Recommended study guide activities
- Internet resources
- Group discussions and ultrasound case analyses
- Quizzes & examinations
- Working with ultrasound machines
- Hands-on ultrasound laboratory trainings (protocols-handouts)
- Ultrasound laboratory live and video demonstration
- Students' Ultrasound Hands-on self study trainings

REQUIREMENTS:

- This is a lecture-lab course in which lecture topics are presented by the Instructor (teacher) and the ultrasound hands-on lab practice is explained and demonstrated by the Lab Instructor (explaining and demonstrations by lab instructor).

- The student is expected to be prepared in advance before the class sessions.

- Being prepared includes the following: having read text materials (e.g., textbook readings, and lecture outlines) assigned for that day's activities and bringing required work materials (e.g., textbook, handouts, writing supplies, etc.) to the session.

- Home works will include reading the topic (s) one week ahead of time.

- The student is expected to attend and participate in all course lectures and activities, and complete all quizzes, examinations and course assignments on time. Therefore an attendance and being on time are crucial to your final grade.

- The student must budget time efficiently and be realistic about all personal and professional commitments that consume time.

❖ Academic Honesty

The University maintains a strict policy concerning academic dishonesty, which includes cheating, plagiarism, giving assistance on an examination or paper when expressly forbidden by the instructor, and any other practices which demonstrate a lack of academic integrity. It is the responsibility of the student to know and to adhere to principles of academic honesty. A student found guilty of academic dishonesty will be subject to academic sanctions ranging from failure on the assignment to failure in the course too.

❖ Ultrasound hands-on laboratory training

Ultrasound hands-on laboratory will involve primarily students' demonstration of the knowledge presented during lectures. Practical experience will gain under the guidance of a supervisor or teacher. The syllabus set out includes a competency assessment sheet for training. This should be completed the course of training, as it will help to determine in which area(s) the student can practice independently. Students are expected to arrive to class on time, and stay through the end of Ultrasound laboratory class.

ATTENDANCE AND PARTICIPATION:

- Students who are tardy, who arrive after roll is taken or leave before the end of class will receive only half-credit for attendance.

- Students are not allowed being late more than 15 min!

- If you are late or absent, a valid excuse such as illness, family emergency, unforeseen heavy traffic or natural disaster is expected. Oversleeping, and working on films are not considered valid excuses.

- No requirements to make up any work missed as a result of an absence. However, it is your responsibility to obtain class notes; you may have missed, from other class members.

IN-CLASS PRESENTATION (PROJECT): Each student prepares a power-point presentation on ultrasound vascular diagnostic topic of his/her choice. The presentation should be approximately 10 minutes long, 5 minutes discussion. The topics and format for the presentation will be discussed in class. A final draft of the presentation must be submitted for review one week prior to the presentation. An article related to the presentation for students to review must also be submitted one week prior to the presentation. For the grading of students will be to prepare 3 questions from the topic submitted for the student presentation. The questions will be due on the day of each of the presentations and will be used to help guide class discussions of the presentation topics.

Evaluation Criteria for Presentation:

- Clinical statement
- Background information
- Slide content
- Slide design
- Resolution of the problem
- Written presentation

TESTING:

- **Quizzes:**

The student will take 7 tests 10-15 questions each. These quizzes will address the detailed content and major concepts presented in the lectures, lecture outlines, text readings, and study guide activities. If the student takes more than seven quizzes, only the best seven quiz scores will be used in calculating the student's total points. Each quiz will be timed, 72 seconds for every question to complete. No make-up quizzes for missed quizzes will be administered (the student will receive no score for missed quizzes).

- **Midterm & Final examination**

  - The student will take written midterm of 50 questions and final examination of 100 questions.
  - The written examinations are proctored and will be closed-book exams.
  - Students will not be allowed to refer to texts, notes, nor other

materials while taking the exams.

- The Scranton machine will be used in grading multiple-choice tests.
- **Student will be allowed to re-take one time final exam only.**
- 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. In such a circumstance, the student should make every reasonable attempt to contact the instructor before the exam period is over (or as soon as possible).
- While make-up exams will cover the same content area as a missed exam, the exam format and specific questions may be different.

❖ **Ultrasound Hands-on Laboratory Examination:**

- Final ultrasound hands-on examination student have to demonstrate understanding of information presented primarily during lectures and hands-on laboratory trainings.
- Students have to perform echocardiographic protocols and demonstrate scanning technique and images in B-, Color-Modes, and M-mode.
- Student will schedule the time and date 2-3 weeks ahead of Ultrasound hands-on laboratory examination.
- Student(s) need to be at the Ultrasound Lab – ready to start scanning at the exact time you scheduled your exam for. (It is recommended that you arrive about 15 minutes prior to your scheduled exam time.)
- If a student is late for his/ her scheduled exam time – Your time CANNOT be changed and you will NOT get a full hour! If student late, he/she will only have the remaining time left in your hour. On exam days, you may come to class, but it is not mandatory until your scheduled exam time.
- **Only one time RETESTS will be given students with a valid excuse such as illness, family emergency, unforeseen heavy traffic or natural disaster.**

GRADING

GRADING		%
LECTURE	Final Exam	20
	Midterm	20
	Tests/Quizzes	10
	Attendance lecture classes	10
	Presentation	10
LABORATORY	Performing of scanning protocol	20
	Attendance lab classes	10
TOTAL		100

100-93	A
92-89	A-
88-85	B+
84-81	B
80-77	B-
76-73	C+

72-69	C
68-65	C-
64-61	D+
60-55	D
≤ 54	F

SCHEDULE

WEEKS	DATE	TOPICS	TESTS
WEEK 1	08/22	CARDIAC ANATOMY AND PHYSIOLOGY REVIEW. IDENTIFICATION OF THE LEFT SIDE HEART STRUCTURES. BASIC TOMOGRAPHYC IMAGING.	
WEEK 2	08/29	CARDIAC ANATOMY AND PHYSIOLOGY REVIEW. IDENTIFICATION OF THE RIGHT SIDE HEART STRUCTURES. BASIC IMAGING PRINCIPLES AND NOMENCLATURE OF STANDARD VIEWS.	
WEEK 3	09/05	CARDIAC CONDUCTION SYSTEM. CARDIAC CYCLE. SYSTOLE AND DIASTOLE. ELECTRICAL AND MECHANICAL CORRELATION. CORONARY CIRCULATION.	
WEEK 4	09/12	IMAGING INSTRUMENTATION. CARDIAC TRANSDUCERS. TRANSTHORACIC TOMOGRAPHIC VIEWS. TWO DIMENTIONAL ECHO VIEWS. PARASTERNAL LONG AXIS VIEW.	
WEEK 5	09/19	TRANSTHORACIC VIEWS. TWO DIMENTIONAL VIEWS. PARASTERNAL SHORT AXIS VIEWS. APICAL VIEWS.	

WEEK 6	09/26	TRANSTHORACIC VIEWS, SUBCOSTAL AND SUPRASERNAL VIEWS. BASIC MEASUREMENTS. MIDTERM REVIEW.	
WEEK 7	10/03	MIDTERM. TRANSTHORACIC IMAGING MODALITIES/ M-MODE OF THE AORTIC ROOT.	
WEEK 8	10/10	TRANSTHORACIC IMAGING MODALITIES. M-MODE OF THE MITRAL VALVE, MEASUREMENTS. M-MODE OF THE PULMONIC VALVE.	
WEEK 9	10/17	TRANSTHORACIC IMAGING. M-MODE OF LEFT VENTRICLE. LEFT VENTRICLE SYSTOLIC FUNCTION.	
WEEK 10	10/24	BASIC CARDIO-VASCULAR PHYSIOLOGY AND HEMODYNAMICS. SYSTEMIC AND PULMONARY CIRCULATION.	
WEEK 11	10/31	BASIC HEMODINAMICS PRESSURES INSIDE THE HEART. OXYGEN SATURATION. HEART SOUNDS. CATHETERIZATION OF THE LEFT AND RIGHT HEAT.	
WEEK 12	11/07	DOPPLER BASICS. SPECTRAL DOPPLER. PULSE WAVE VS. CONTINUOUS WAVE. COMPARISON OF M-MODE AND PRESSURE CURVE. DOPPLER WAVE FORMS. BASIC DOPPLER CALCULATIONS AND FORMULAS.	
WEEK 13	11/14	DOPPLER BASICS. COLOR FLOW DOPPLER PRINCIPLES. NORMAL COOLOR FLOW PATTERNS.STENOSIS AND REGURGITATION FLOW PATTERNS.	
WEEK 14	11/28	REVIEW FINAL EXAMINATION.	
WEEK 15	12/05	FINAL EXAMINATION	

Syllabus updated: 8/15/2012