LINCOLN UNIVERSITY

DI 244 – Vascular Scanning (Lab)

Course Syllabus

Fall 2019

Instructor:	Dr. Olesya Smolyarchuk
Lecture Schedule:	Wednesday and Thursday, 3:30 pm - 6:15 pm
Credits:	3 units (90 lab hours)
Pre-requisites:	*DI 234*
Level:	Advanced (A)
Office Hours:	Tuesday, Wednesday and Thursday by appointment **E-mail:** osmolyarchuk@lincolucasf.edu **Diagnostic Imaging Lab Telephone:** (510) 238-9744

TEXTBOOKS:

1. **Introduction to Vascular Ultrasonography.** William J. Zwiebel, John S. Pellerito. 6th Edition (2012). ISBN-13: 978-1437714173, ISBN-10: 143771417X.
2. **Peripheral Vascular Sonography,** by Joseph F. Polak . 1st Edition (2004) ISBN-13: 978-0781748711; ISBN-10: 0781748712
3. **Vascular Technology: An illustrated Review,** by Claudia Rumwell, Michalene McPharlin, 5th Edition (2014) ISBN-13: 978-0941022859; ISBN-10: 0941022854

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

Last Revision:	August 8, 2019
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

The focus of this course is Peripheral and Abdominal Doppler scanning. Laboratory sessions are provided to acquire intermediate scanning skills necessary to succeed in the clinical setting. (3 units)

COURSE OBJECTIVES

Upon completion, students should be able to:

- Demonstrate knowledge and understanding of the anatomy, physiology and normal variations of the abdomen, abdominal vascular systems and small parts.
- Understand and expand the routine ultrasound protocols and presenting sonographic images in a logical sequence.
- Describe the proper scanning technique and commonly used sonographic acoustic windows.
- Utilize the principles of instrumentation to set up the ultrasound equipment for acquiring optimal quality of diagnostic images.
- Demonstrate an increased knowledge of the applications of the ultrasound Doppler.
- Be familiar with the standard measurements and diagnostic criteria for duplex evaluation of the abdomen.
- Recognize sonographic signs of abdominal pathological findings.
- Correlate sonographic and laboratory data.
- Recognize and be able to compensate for common pitfalls in the diagnosis of abdominal and small parts pathologies.

COURSE LEARNING OUTCOMES[1]

	Course Learning Outcome	Program LO	Institutional LO	Assessment Activities
1	Employ proper hands-on techniques to master and expand the routine ultrasound protocols.	PLO 5	ILO 1a ILO 3a	In-class hands-on scanning; laboratory live & video demonstrations; self-study scanning training; midterm/final exams.
2	Utilize the principles of instrumentation, related to field size, TGC, focal zones, color scale, gain, depth, etc. for image interpretation.	PLO 4 PLO 5	ILO 1a, ILO 7a	In-class hands-on scanning; laboratory live & video demonstrations
3	Recognize sonographic signs of vascular pathological findings and differential diagnosis.	PLO 5	ILO 6a	Ultrasound case analysis and group discussions; quizzes
4	Explain the significance of clinical tests relevant to	PLO 3 PLO 4 PLO 7	ILO 6a ILO 7a	Case studies; presentations and discussions of students' projects.

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

	pathology. Correlate sonographic and laboratory data.			
5	Demonstrate knowledge of diagnostic criteria for duplex evaluation of the vascular system.	PLO 5 PLO 7	ILO 7a	Case studies and group discussions.

INSTRUCTIONAL METHODS

Instructional methods will include:

- In-class hands-on scanning, using ultrasound machines and other lab equipment
- Live demonstration of vascular ultrasound imaging
- The instructor's guidance to developing students' scanning skills.
- Students' ultrasound hands-on self-study training: ***20 lab hours*** minimum of independent scanning throughout the semester
- Group work, discussions and ultrasound case analysis
- Quizzes based on the relevant topics
- Ultrasound lab video demonstrations
- Presentations and discussions of students' projects.

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 website (ctl.lincolnuca.edu).

Homework:

The goal of the homework is to help students achieve the course learning objectives. Homework consists of two parts. The first part is to read the textbooks and printed materials to review the topic of the previous class session. Students' knowledge is graded through the short quizzes given at the beginning of the following class session. The second part of the homework consists of a project presented at the end of the course.

Project Presentation:

Students will acquire, record and analyze ultrasound images during each lab session.
Images containing anomalies should be selected and kept for the future presentation to others.
Each student will perform library research on a selected topic in the field of Vascular Scanning and present the findings along with their own images during a lab class orally, using Power Point.
A 10-minute presentation will be followed by a 5-minute question period.
Students should include enough background information, ultrasound images received during classes, pictures and references, for their peers to be able to understand the topic.
Each student will choose the topic of his/her presentation with the instructor's approval.

Evaluation Criteria for Presentation:

- Clinical statement: 2%
- Background information: 2%
- Slide content: 2%

- Slide design: 1%
- Resolution of the problem: 2%
- Oral presentation: 1%

Total: 10% of all the course grading elements

Hands-On Lab Examination:

During the final ultrasound hands-on examination, students have to demonstrate the understanding of the information presented during the course laboratory training.

1. The knowledge of the anatomy, physiology, normal variations, and pathology of the human vascular system.
2. In-depth knowledge of the ultrasound scanning protocols and the ability to present images in a logical sequence.
3. The knowledge of the ultrasound machine capabilities for the optimal quality of diagnostic images (frequency, TGC, B-mode, focal zones, color scale, gain, depth, etc.).
4. Ability to demonstrate the optimal scanning technique and proper images acquisition in B-, Color-Modes, and M-mode.
5. The utilization of different acoustic windows to achieve the best picture quality possible.
6. The knowledge of the elements of the proper image labeling.
7. The explanation of the sonographic findings and differential diagnosis of vascular pathology.

Since the intent of the lab examination is for students to demonstrate the knowledge of the scanning protocol, students are not allowed to ask questions and discuss the scanning procedures with classmates.

Reference materials are not allowed.

Only one time RETEST will be given to students with a valid excuse such as illness, family emergency, unforeseen traffic conditions or natural disaster.

Midterm/Final Exam Grading System

Midterm and Final Exams will be performed on the scheduled days in the presence of the lab instructor.

The length of the examination will depend on the type of the ultrasound protocol. The type of the protocol for the exam will be chosen by the instructor for each student individually.

The score (%) will be determined by acquiring the ratio of the correct / incorrect images recorded by the student.

Depending on the quantity of the required images of the particular protocol, each image will be valued at certain amount of points.

The points for missed (or completely incorrect) ultrasound images will be subtracted from the total 100% score.

The added score of the correct ultrasound images (according to the protocol requirements) will represent the total examination grade.

To successfully complete this exam, the student must pass it with a total score 70% or better.

Quizzes:

- Students will take 12 quizzes throughout the course. These quizzes will address the material presented in the previous lectures, discussions and text readings to evaluate students' work inside and outside the classroom.
- A quiz will consist of 10-15 questions, some combination of true/false, multiple choice, and "fill-in" questions.
- Each quiz will be timed, 1 minute for every question to complete.
- The correct answers of the quiz and a relevant topic will be discussed and reviewed.
- No make-up quizzes for missed quizzes will be administered (students will receive no score for missed quizzes).
- The primary purpose of these quizzes is to encourage and reward the students' progress through the course materials.

Attendance and Participation:

Efficient use of the lab time, demonstration of the development of the scanning skills, effective use of ultrasound machines, active participation during the class meetings is expected.

Students are encouraged to use open lab time as needed. Minimum 20 lab hours of the independent scanning throughout the semester should be recorded in a log sheet as a part of each student's hands-on self-study training.

Students are expected to arrive to class on time and stay through the end of the laboratory class. Absence, late arrival, poor use of class time, early leave will result in a lower grade.

Instructor may dismiss a student from the course after missing 3 consecutive class meetings.

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	95-100	90-94	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
Class Attendance and Participation	10%
Quizzes	20%
Homework and Presentation	10%
Scanning Performance: Midterm Exam	30%
Scanning Performance: Final Exam	30%
TOTAL	100%

CLASS TOPICS SCHEDULE:

8/21/2019 - Vascular System Anatomy and Physiology. Arterial Physiology and Hemodynamics. Extracranial Cerebrovascular (Carotid) System

8/22/2019 - Extracranial Cerebrovascular System: Vascular Anatomy and Anatomical Variations. Scanning Techniques and Image Optimization Quiz 1

9/4-5/2019 - Carotid Arteries Duplex Ultrasound Protocol. Various Scanning Approaches

9/11/2019 - Carotid Arteries Plaque Assessment and Waveform Analysis. Quiz 2

9/12/2019 - Carotid Arteries Duplex Ultrasound Protocol: Measurements and Utilization of the Diagnostic Criteria

9/18/2019 - Bilateral Carotid Arteries Ultrasound Protocol Quiz 3

9/19/2019 - Upper Extremity Arterial Duplex Ultrasound

9/25/2019 - Bilateral Upper Extremity Arterial Duplex Ultrasound

9/26/2019 - Lower Extremity Arterial Duplex Ultrasound Protocol

10/2/2019 - Lower Extremity Arteries Diagnostic Criteria Quiz 4

10/3/2019 - Bilateral Lower Extremity Arterial Duplex Ultrasound Protocol

10/9/2019 - Lower Extremity Physiological Testing. Ankle-Brachial Index Quiz 5

10/10/2019 - Lower Extremity Segmental Pressures

10/16/2019 - Venous System Hemodynamics. Upper Extremity Venous Duplex Ultrasound: DVT, Superficial Veins Quiz 6

10/17/2019 - Lower Extremity Duplex Ultrasound: Deep Venous Thrombosis. Diagnostic Criteria.

10/23/2019 - Lower Extremity DVT Protocol: Calf Veins Quiz 7

10/24/2019 - Bilateral Lower Extremity DVT Protocol

10/30/2019 - MIDTERM EXAM

10/31/2019 - Lower Extremity Venous Insufficiency. Reflux Study

11/6/2019 - Abdominal Arterial Duplex Ultrasound. Aorta and Its Branches Quiz 8

11/7/2019 - Mesenteric Duplex Ultrasound

11/13/2019 - Renal Duplex Ultrasound Quiz 9

11/14/2019 - Abdominal Venous System. IVC and Its Tributaries Quiz 10

11/20/2019 - Liver Vascular System Duplex Ultrasound Quiz 11

11/21/2019 - Portal Venous System Ultrasound. Diagnostic Criteria Quiz 12

11/27/2017 - 11/28/2019 Fall Recess

12/4/2017 – Final Exam Review and Practice. Presentations.

12/5/2017 - FINAL EXAM

Syllabus Revised: August 2019