



# LINCOLN UNIVERSITY

## DI 264

### Vascular and Transcranial Scanning (Lab) Fall 2016 Course Syllabus

**COURSE NUMBER:** DI 264

**COURSE TITLE:** Vascular and Transcranial Scanning (Lab)

**COURSE CREDIT:** 3 units (90 lab hours)

**BASIC INFORMATION:**

*Class Meeting Hours:* Thursday & Friday

11:45 am - 15:30 pm

*Instructors Name:* Marina Kay, RDMS, RVT

Dr. Zakasovskaya, MD, RDMS, RVT

*Office Hours:* by appointment

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**TEXTBOOKS:**

1. **The Vascular System (2012) by Ann Marie Kupinski**  
ISBN-13: 978-1608313501, ISBN-10: 1608313506
2. **A Practical Guide to Transcranial Doppler Examinations (2003) by Mira L. Katz and Andrei V. Alexandrov**  
ISBN-13: 978-0972065313, ISBN-10: 0972065318
3. **Introduction to Vascular Ultrasonography. William J. Zwiebel, John S. Pellerito.**  
6th Edition (2012). ISBN-13: 978-1437714173, ISBN-10: 143771417X.

**SUPPLEMENTAL TEXTBOOKS:**

1. **Transcranial Doppler Ultrasonography(2nd edition, 1999) by Viken L. Babikian**  
ISBN-13: 978-0750699693, ISBN-10: 0750699698
2. **Cerebrovascular Ultrasound in Stroke Prevention and Treatment (2nd edition, 2011) by Andrei V. Alexandrov**  
ISBN-13: 978-1405195768, ISBN-10: 1405195762

**COURSE DESCRIPTION:**

The focuses of this course are Intracranial and Extracranial Cerebrovascular, Peripheral and Abdominal Doppler scanning. Laboratory sessions are provided to acquire intermediate scanning skills necessary to succeed in the clinical setting.

**PREREQUISITE:** DI 254**COURSE OBJECTIVES:**

Upon completion, students should be able to:

- Demonstrate knowledge and understanding of the anatomy, physiology and normal variations of the cerebrovascular (extracranial and intracranial), peripheral and abdominal vascular systems.
- Understand and be familiarized with the routine ultrasound protocols and presenting sonographic images in a logical sequence.
- Describe and exercise the proper scanning technique and commonly used TCD sonographic acoustic windows.
- Utilize the principles of instrumentation to set up the ultrasound equipment for acquiring optimal quality of diagnostic images.
- Be familiar with the standard measurements and diagnostic criteria for duplex/color evaluation of the vascular system.
- Recognize sonographic signs of vascular obstruction.
- Correlate sonographic and laboratory data
- Recognize and be able to compensate for common pitfalls in the diagnosis of vascular pathologies.

**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.
- Group work, discussions and ultrasound case analysis
- Ultrasound lab video demonstrations
- Presentations and discussions of students' projects.

**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 and Transcranial Scanning, and present the findings 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.

The oral presentation must be completed **before the final hands-on lab examination** (see schedule).

**Evaluation Criteria for Presentation:**

- Clinical statement: 4%
- Background information: 4%
- Slide content: 4%
- Slide design: 2%
- Resolution of the problem: 4%
- Oral presentation: 2%

Total: 20% 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. Knowledge of the elements of the proper image labeling
7. Explanation of the sonographic findings and differential diagnosis of vascular pathology

**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.

**TERM GRADING:**

<b>Attendance</b>	10%
<b>Presentation</b>	20%
<b>Scanning Performance</b>	20%
<b>Midterm Exam</b>	25%
<b>Final Exam</b>	25%
<b>Total</b>	100%

100-95	A
94-90	A-
89-87	B+
86-84	B
83-81	B-
80-78	C+

77-76	C
75-74	C-
73-72	D+
70-71	D
69≤	F

**SCHEDULE OF TOPICS:**

- 8/25/2016-Vascular System Anatomy and Physiology. Cerebrovascular system (Extracranial and Intracranial)
- 8/26/2016- Arterial Physiology and Hymodynamics. Extracranial Cerebrovascular System: Vascular Anatomy and Anatomical Variations. Scanning Techniques and Image Optimization
- 9/01/2016- Carotid Arteries Duplex Ultrasound Protocol. Scanning Approaches
- 9/02/2016- Carotid Arteries Plaque Assessment and Waveform Analysis.
- 9/08/2016- Carotid Arteries Duplex Ultrasound Protocol: Measurements and Utilization of the Diagnostic Criteria
- 9/09/2016- Intracranial Cerebrovascular System: Anatomy and Physiology. Circle of Willis. TCD Acoustic Windows and Scanning Technique.
- 9/15/2016- Intracranial Duplex Ultrasound: Transtemporal, Transorbital and Transoccipital Approaches.
- 9/16/2016 - Intracranial Duplex Ultrasound: Benefits and Limitations of TCDI. Diagnostic Application
- 9/22/2016- Upper Extremity Arterial Duplex Ultrasound
- 9/23/2016- Upper Extremity Arterial Duplex Ultrasound Protocol
- 9/29/2016- Lower Extremity Arterial Duplex Ultrasound Protocol
- 9/30/2016- Lower Extremity Arteries Diagnostic Criteria
- 10/06/2016- Lower Extremity Physiological Testing. Ankle-Brachial Index
- 10/07/2016- Lower Extremity Segmental Pressures
- 10/13/2016- Abdominal Arterial Duplex Ultrasound. Aorta and Its Branches
- 10/14/2016- Mesenteric Duplex Ultrasound
- 10/20/2016- Renal Duplex Ultrasound
- 10/21/2016- MIDTERM EXAM

10/27/2016- Venous System Hemodynamics. Upper Extremity Venous Duplex Ultrasound: DVT, Superficial Veins  
10/28/2016- Lower Extremity Duplex Ultrasound: Deep Venous Thrombosis. Diagnostic Criteria.  
11/03/2016- Lower Extremity DVT Protocol.: Calf Veins  
11/04/2016- Lower Extremity Venous Insufficiency. Reflux Study  
11/10/2016- Abdominal Venous System. IVC and Its Tributaries  
11/11/2016- VETERANS DAY  
11/17/2016- Liver Vascular System Anatomy and Hemodynamics  
11/18/2016- Liver Vascular System Duplex Ultrasound Protocol  
11/24/2016- FALL RECESS  
11/25/2016- FALL RECESS  
12/01/2016 -Portal Venous System Ultrasound  
12/02/2016- Portal Venous System Diagnostic Criteria  
12/08/2016–Projects Presentations  
12/09/2016- FINAL EXAM

Syllabus Revised: September 10, 2016

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.