



# LINCOLN UNIVERSITY

## DI 114 – Vascular Anatomy and Hemodynamics

### Spring 2014 Course Syllabus

**DATES:** 01/22/2014 – 05/07/2014

**COURSE TITLE:** Vascular Anatomy and Hemodynamics

**COURSE CODE:** DI 114

**CREDIT HOURS:** 3 units, 45 lecture hours

**TIME:** Wednesday 3:30 pm – 6:15 pm

**INSTRUCTOR:** Marina Kay, RDMS, RVT

**CONTACT INFORMATION:** email: [kaymarina@yahoo.com](mailto:kaymarina@yahoo.com) or [mkay@lincolnuca.edu](mailto:mkay@lincolnuca.edu)

**CATALOG DESCRIPTION:**

The course provides basic knowledge of body vessels, physiology and hemodynamics of circulation.

**COURSE DESCRIPTION:**

This course provides the knowledge of gross anatomy of the central, peripheral and cerebrovascular systems, principles of the dynamics of blood circulation in the human body, the factors that influence blood flow, and hemodynamic consequences of occlusive disease.

**COURSE PREREQUISITES:** DI 10 and DI 30

**READING ASSIGNMENT:**

Introduction to Vascular Ultrasonography. William J. Zwiebel, John S. Pellerito. 5th Edition.  
ISBN-10: **0721606318**; ISBN-13: **978-0721606316**

**SUGGESTED TEXTBOOKS:**

Ultrasound Physics and Instrumentation. Frank R. Miele. 4th edition. Volume II  
ISBN-10: **1933250070**; ISBN-13: **978-1933250076**

Vascular Ultrasound: How, Why and When. Abigail Thrush, Tim Hartshorne. 3rd Edition.  
ISBN-10: **0443069182**; ISBN-13: **978-0443069185**

## **COURSE OBJECTIVES:**

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

- Demonstrate the basic understanding of the normal physiology and physical principles of the blood circulation
- Describe the anatomy, physiology and normal variations of central and peripheral arterial and venous systems
- Understand the use of color Doppler and pulsed wave Doppler in the process of vascular evaluation
- Be able to perform the Doppler waveform analysis
- Describe standard measurements for duplex vascular evaluation
- Recognize abnormalities that can occur in the presence of vascular obstruction
- Differentiate normal from abnormal blood flow patterns
- Know the different diagnostic criteria for peripheral arterial disease
- Apply the diagnostic criteria and link Doppler image information to the manifestations of cerebrovascular disease
- Understand normal venous physiology by the evaluation of Doppler imaging
- Recognize the significance of venous pathophysiology by the use of ultrasound imaging
- Apply the diagnostic criteria to determine the extent of venous insufficiency
- Determine the presence of thrombosis in deep and superficial venous systems

## **CLASSROOM PROTOCOL:**

- All students are expected to display professionalism, in preparation for hospital work. That means: arriving on time, remaining quiet when others are speaking, and paying attention to whoever has the floor in the classroom.
- Students are expected to attend and be prepared for all regularly scheduled classes.
- If a student knows in advance that he or she will need to leave early, the student should notify the instructor before the class period begins.
- Students are expected to treat faculty and fellow students with respect.
- Students engaging in disruptive behavior in class will be asked to leave and may be subject to other penalties if the behavior continues.
- No eating, sleeping or personal grooming is permitted in the classroom.
- ***Drinks are allowed only in closed containers.***
- The cell phones should be turned off.
- If you use a computer in class, please use it only to take notes, to access course materials from the course webpage, or to locate information relevant to the class discussion. Do not use your computer to surf the web, check emails, or send/receive text messages, as these activities are distracting to those around you (and decrease your chances of getting the most out of your time in class).
- Never leave your personal property unattended. Lincoln University is not responsible for lost or stolen items, though, Lincoln University does have a zero tolerance for theft; any students caught stealing will be prosecuted.

**STUDENT RESPONSIBILITIES:**

Students are expected to be prepared in advance before the class sessions. Being prepared includes the following: no cell phones in class, attend all classes, be on time to class, participate in the class activities, ask questions, bring appropriate materials to class (e.g. notebook, writing utensils, handouts) having read texted materials (e.g. textbooks, lectures & outlines), use class time effectively and efficiently.

**INSTRUCTIONAL METHODS:**

The topics will be presented through the aid of the following activities:

- 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;
- Students' in-class presentations and discussions.

**GRADING:**

<b>Attendance</b>	10%
<b>Homework</b>	10%
<b>Presentations</b>	10%
<b>Quizzes and Tests</b>	20%
<b>Mid-term Exam</b>	20%
<b>Final Exam</b>	30%
<b>Total</b>	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+
60-50	D
49≤	F

**LECTURES SCHEDULE:**

<b>Weeks</b>	<b>Lecture #</b>	<b>Dates</b>	<b>Topics</b>	<b>Quiz</b>
Week 1	1	22-Jan	Human Circulatory System. Systemic and Pulmonary Blood Circulation	
Week 3	2	29-Jan	Gross Anatomy of the Central and Peripheral Arterial System	1
Week 4	3	5-Feb	Physiology and Hemodynamics of the Arterial System. Stroke Volume. Types of Pressures. Blood Flow Characteristics	2
Week 5	3	12-Feb	Physical Principles of Fluid Dynamics. Poiseuille's Law, Bernoulli Equation, Reynolds Number	3
Week 6	4	19-Feb	Arterial Doppler Waveform Analysis. Steady and Pulsatile Flow. Peripheral Resistance. Effects of Stenosis and Exercise on the Arterial Flow	4
Week 7	5	26-Feb	Gross Anatomy of the Extracranial and Intracranial Cerebrovascular System	5
Week 8	5	5-Mar	Physiology and Hemodynamics of the Cerebrovascular System. Spectral and Color Doppler Analysis	6
Week 9	6	12-Mar	Anatomy of the Central and Peripheral Venous System	7
<b>Week 10</b>		<b>19-Mar</b>	<b>SPRING RECESS</b>	
<b>Week 11</b>		<b>26-Mar</b>	<b>Midterm Exam</b>	
Week 12	7	2-Apr	Venous Hemodynamics. Effect of Respiration on Venous Pressure. Muscle Pump Mechanism	
Week 13	7	9-Apr	Peripheral Venous System B-Scan, Spectral and Color Doppler Analysis	8
Week14	8	16-Apr	Abdominal Venous System Anatomy and Hemodynamics. Portal Venous System	9
Week 15	8	23-Apr	Abdominal Venous System B-scan, Spectral and Color Doppler Analysis	10
Week 15		30-Apr	Review and Presentations	
<b>Week16</b>		<b>7-May</b>	<b>FINAL EXAM MAKE-UPS</b>	

The syllabus updated: 01/02/2014

**Note:** Instructor may change this syllabus and course schedule at any time according to the needs of the class.