LINCOLN UNIVERSITY

DI 115 – ECG and Arrhythmias Interpretation

Course Syllabus

Fall 2019

Instructor:	Dr. Khatia Mania (Lecture), Dr. Olesya Smolyarchuk (Lab)
Lecture Schedule:	Tuesday 12:30 pm – 3:15 pm (Lecture) 08/20/2019 – 10/22/2019 Tuesday 9:00 am – 11:45 am (Lab) 08/27/2019 – 10/29/2019
Credits:	3 units: 2-unit lecture and 1-unit lab (60 total hours: 30 hours of lectures and 30 hours of lab)
Pre-requisites:	DI 30
Level:	Developed (D)
Office Hours:	By appointment **E-mail:** mania@lincolnuca.edu (Lecture) osmolyarchuk@lincolnucasf.edu (Lab) **Telephone:** (510) 238-9744

TEXTBOOKS:

Required textbooks:

1. **Goldberger's Clinical Electrocardiography**, by Ary L. Goldberger, Zachary D. Goldberger, Alexei Shvilkin – 9th Edition
   ISBN-13: 978-0323401692
   ISBN-10: 0323401694
2. **Hartman's Complete Guide for the EKG Technician**, by Wilma Lynne Clarke, EdD, RN, Hartman Publishing, Inc.; 1 edition (April 4, 2019)
   ISBN-10: 1604251077
   ISBN-13: 978-1604251074

Suggested textbooks:

1. **EKG Interpretation: : 24 Hours or Less to EASILY PASS the ECG Portion of the NCLEX!**, by Chase Hassen, CreateSpace Independent Publishing Platform (June 17, 2015)
   ISBN-13: 978-1519248381
   ISBN-10: 1519248385
2. **ECG Interpretation Made Incredibly Easy**, by Lippincott Williams & Wilkins,
   ISBN-13: 978-1496306906
   ISBN-10: 9781496306906
3. **The Only EKG Book You'll Ever Need**, by Malcolm S. Thaler,

ISBN-13: 978-1496377234
ISBN-10: 9781496377234

Last Revision: August, 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

Students will learn the principles and procedures of 12-lead electrocardiography (ECG), arrhythmia interpretation and care, maintenance of equipment and exam area. (3 units)

COURSE DESCRIPTION

This course introduces Electrocardiography principles and instrumentation. Topics include Basic ECG waves, Normal ECG, Abnormal ECG, Arrhythmias, ECG interpretation. Related topics such as Patient preparation, Safety, Quality, Accuracy, and ECG Reporting are also covered.

COURSE OBJECTIVES

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

- Understand ECG principles and instrumentation
- Understand the Basic ECG waves, ECG leads, Normal ECG and Abnormal ECG
- Understand, Read and Interpret the following items: Electrical Axis, Axis Deviation, Atrial and Ventricular Enlargement, Ventricular Conduction Disturbances, Myocardial Ischemia and Infarction, Electrolyte Abnormalities and Metabolic Factors, Pericardial, Myocardial and Pulmonary Syndromes, Wolf-Parkinson-White Pre-excitation Patterns, Sinus Rhythm, Tachycardias and Bradycardias, Supraventricular Arrhythmias, Atrioventricular Heart Block, Cardiac Arrest and Sudden Death, Pacemakers and Implantable Cardioverter-Defibrillators, etc.
- Take and interpret an ECG
- Understand and apply Differential Diagnosis
- Understand the uses and limitations of ECG

COURSE LEARNING OUTCOMES[1]

	Course Learning Outcome	Program Learning Outcomes	Institutional Learning Outcomes	Assessment activities
1	Understand the anatomy and physiology of the cardiovascular system and the cardiac conduction system.	PLO 1	ILO 1a, ILO 2a	In-class activities
2	Identify the parts of the electrocardiography wave forms and correlate each with the cardiac	PLO 2, PLO 7	ILO 1a	In-class activities, lab

[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).

	cycle. Calculate heart rate and complete measurements of all waveforms and intervals. Describe the electrocardiographic characteristics of a normal ECG pattern and those associated with cardiac arrhythmias including sinus, atrial, junctional and ventricular arrhythmias.			activities, quizzes
3	Demonstrate the correct placement of ECG electrodes on a patient. Demonstrate the proper use of single channel and three channel ECG machines and apply the appropriate test functions. Measure ECG waveforms and intervals, determine heart rate, rhythm, and complete a preliminary assessment of findings. Summarize the steps used to perform an exercise stress test on a patient. Explain the steps used to perform a blood pressure.	PLO 2, PLO 5	ILO 6a, ILO 3a	In-class activities, lab activities, quizzes, midterm and final exams
4	Describe the cardiac pathophysiology associated with advanced cardiovascular system disorders. Identify the electrocardiographic findings associated with cardiac ischemia and myocardial infarction.	PLO 1, PLO 7	ILO 3a	In-class activities, quizzes, midterm and final exams
5	Demonstrate the steps used to perform a blood pressure on a resting patient and during an exercise stress test. Describe the indications for a 24 Hour Holter Monitor. Demonstrate the successful application of Holter Monitor device. Summarize the steps used to safely perform an exercise stress test. Demonstrate the procedure for performing an exercise stress test, utilizing the computer instrumentation for monitoring the ECG during the procedure, obtaining blood pressures and observing safety conditions for patient.	PLO 2, PLO 3	ILO 7a	In-class activities, lab activities, quizzes, midterm and final exams
6	Explain the electrocardiographic findings of heart block, bundle branch blocks, accessory pathways, electrical axis, hypertrophy, and chamber enlargement. Identify the electrocardiographic findings associated with cardiac ischemia and myocardial infarction.	PLO 3, PLO 5	ILO 1a, ILO 6a	In-class activities, quizzes, midterm and final exams, case studies

7	Describe ECG findings related to cardiac medications. Explain the indications and test procedures of pharmacologic stress testing. Describe the technology of cardiac pacemakers and implantable defibrillators and the ECG findings associated with each.	PLO 3, PLO 5	ILO 4a, ILO 3a	Case studies, in-class activities, quizzes

INSTRUCTIONAL METHODS

Instructional methods will include lectures and in-class hands-on learning activities. Classroom activities are collaborative — students may and should help each other. The instructor will be available to help students with all tutorials and other assignments.

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

- Reading assigned textbooks 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 training (protocols handouts);
- Ultrasound laboratory live & video demonstrations;
- Students' ultrasound hands-on self-study training.

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).

REQUIREMENTS

- This is a lecture-lab course in which lecture topics are presented by the instructor, and the ultrasound hands-on lab practice is explained and demonstrated by the lab instructor.
- Students are expected to be prepared in advance before the class sessions.
- Being prepared includes the following: having read text materials (e.g., reading textbooks and lecture outlines) assigned for each class session and bringing required work materials (e.g., textbook, handouts, writing supplies, etc.) to the session.
- Homework assignments will include reading the topic(s) one week ahead of time.
- Students are expected to attend and participate in all 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.
- Students should understand that "introductory" does not mean "easy".
- Students 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 students 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.

HANDS-ON LABORATORY TRAINING

Hands-on laboratory will involve primarily students' demonstration of the knowledge presented during lectures. Practical experience will gain under the guidance of the instructor. Students are expected to arrive at the class on time, and stay through the end of the laboratory class.

COURSE GUIDELINES:

To successfully complete this course, the students must pass the quizzes, homework and final exam portions with a 70% or better. Students should attend all the class meetings (lectures and labs). However, considering possible urgent situations, students may be absent, from maximum four class meetings with prior notice to the instructor. Three late arrivals would affect the grade.

The term grade is based on attendance, class activity, project, midterm and/or sum of quizzes, final examination and lab. Individual projects will be assigned at the beginning of the semester. Project is due by the last meeting before the final examination. No project will be accepted after the due date.

If students have missed a class without a valid reason, no make-up for quizzes and presentations will be allowed. No make-up for missed or failed midterm. Final examination, if failed, can be retaken only once. If failed second time, the subject is considered failed. The course is considered failed if student fails Lab final examination. Dictionaries can be used during the class time. No electronic devices during the test time. Students 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.

During the written exam, any student observed in a situation that could be considered suspicious (e.g., an open book within his/her field of vision, looking around or checking a cell phone or other wireless devices, etc.) but no cheating is observed, will be warned. Once warned, any applicant found cheating on the written exam will be failed for the exam and prohibited from retaking the written exam without permission from the dean.

Students cannot leave the room during the test/exam. As soon as student leaves, his/her exam is considered finished.

Lecture is not a substitute for textbooks. Students should read textbooks and use other sources to be prepared for the tests. Lecture is to guide the students to prepare for the course subjects.

HOMEWORK

The goal of the homework is to help students achieve the course learning objectives. Homework consists of two parts. First part is to read the textbooks and materials to review and analyze the lecture given during a previous class session. Students are expected to spend six hours for each class session outside of class in completing the reading assignments related to each lecture. These assignments are graded through short quizzes given at the beginning of the following class session. Second part of the homework consists of a project presented at the end of the course. Each student will choose the topic for presentation or will be assigned one by the instructor. The presentation should be approximately 10 minutes long and with 5 minutes for a discussion. The presentation should include ultrasound images related to the topic of presentation. The images need to be dated and should indicate the student's name. The topic and format for the presentation will be discussed in class for more details. A final draft of the presentation must be submitted for review one week prior to the presentation.

Evaluation Criteria for Project:

- Clinical statement: 2%
- Background information: 2%
- Slide content: 2%
- Slide design: 1%
- Resolution of the problem: 2%
- Oral presentation in class: 1%

Total: 10% of all the course grading elements

TESTING

Quizzes:

Students will take 11 quizzes; 10-15 questions each. These quizzes will address the detailed content and major concepts presented in the lectures, lecture outlines and text readings to evaluate students' work outside of the classroom. If a student takes more than ten quizzes, only the best ten quiz scores will be used in calculating the student's total points. Each quiz will be timed; 1 minute for every question to complete. No make-up for missed quizzes will be administered if student doesn't provide supporting document to excuse the absence (students will receive no score for missed quizzes).

Hands-on Laboratory Examination:

- During the final hands-on examination, students will have to demonstrate understanding of information presented primarily during the lectures and hands-on laboratory training.
- Students will have to perform EKG on patients.
- Students will have to schedule the time and date 2-3 weeks ahead of the hands-on laboratory examination.
- Students need to be at the Ultrasound Lab — ready to start practice at the exact scheduled time. (It is recommended that you arrive about 15 minutes prior to your scheduled exam time.)
- If you are late for your scheduled exam time, your time **CANNOT** be changed and you will NOT get a full hour! If you are late, you will only have the remaining time left in your hour.

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

Lab Grading:
Scanning Performance: 20%
Effective use of lab time, demonstrating development of skills, applying ECG techniques. Complete/full participation and working during class time is expected. Students are encouraged to use open lab time as needed. Students are required to complete 20 hours in lab self-study (with 6 independently performed studies, which would represent date and student's name on each ultrasound image).
Attendance: 10%
Absences, late arrival, poor use of class times, early leaves will result in students' poor or failing grade.

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	94-100	90-93	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
Lecture	Class Attendance	10%
	Quizzes	10%
	Project	10%
	Midterm Exam	20%
	Final Exam	20%
Laboratory	Scanning Performance	20%
	Attendance	10%
TOTAL		100%

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 the lecture and discussion, no matter who 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. For example, students must not disrupt class by leaving and reentering during class, must not distract class by making noise, and must be attentive to comments being made by the instructor and by peers.
- Never speak while the instructor is speaking.
- **Disruptive behavior will not be tolerated**.

- 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 during lecture and ultrasound laboratory classes.
- Drinks only in closed container.
- Please turn off your cell phones, and refrain from activities that disrupt the class (such as eating and walking in and out of the room while class is in session).
- 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).
- To encourage the free flow of conversation, no part of any class may be recorded on audio or video media without the permission of the instructor. You may record notes by hand or by typing into a mobile computer.
- The presence of guests to listen to any part of a class requires the consent of the instructor.

LECTURE SCHEDULE

08/20/2019 – Heart anatomy.
08/27/2019 – Heart physiology. Conduction system of the heart. Quiz # 1
09/03/2019 – Patient Preparation. Quiz # 2
09/10/2019 – Normal ECG. Electrical axis and axis deviation. Sinus mechanisms. Atrial rhythm. Cardiac enlargement. Quiz # 3
09/17/2019 – Junctional rhythms. Ventricular rhythms. Cardiac enlargement. Quiz # 4
09/24/2019 – Midterm examination.
10/01/2019 – Conduction blocks. Preexcitation Syndromes. Quiz # 5
10/08/2019 – Myocardial Ischemia and Infarction. Quiz # 6
10/15/2019 – Special Topics. Quiz # 7
10/22/2019 – Review and Final Examination.

LAB SCHEDULE

08/27/2019 – Introduction to ECG machine, preparation of patients for ECG procedure.
09/03/2019 – ECG leads, applying the electrodes on patients, ECG procedure.
09/10/2019 – Interpretation of normal ECG on different patients
09/17/2019 – Interpretations of pathologies
09/24/2019 – Midterm examination
10/01/2019 – Interpretation of ECG with arrhythmias
10/08/2019 – Interpretation of ECG with Myocardial Ischemia and Infarction
10/15/2019 – Interpretations of ECG in patients with electrolyte disturbances and drugs; Artefacts and interferences
10/22/2019 – Emergency cases
10/29/2019 – Final examination