

DSAE 2403 3A1/5A1

CARDIOVASCULAR CONCEPTS



**LAMAR INSTITUTE
OF TECHNOLOGY**

CREDIT

4 SCH Semester Credit Hours (3 hours lecture, 2 hours lab)

MODE OF INSTRUCTION

Face to Face Instruction

PREREQUISITE/CO-REQUISITE:

Passed all previous sonography courses.

COURSE DESCRIPTION

Anatomy, physiology and pathophysiology of the cardiovascular system. Focuses on cardiac and vascular structural anatomy and relationships, electrical innervation, embryology and hemodynamics of the heart and vascular system. Includes pathophysiology, etiology, pathology, signs, symptoms, risk factors, and treatment of cardiovascular diseases.

COURSE OBJECTIVES

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

- Identify the anatomical structures of the cardiovascular system.
- Describe blood flow and electrical conduction through the heart.
- Describe normal and pathological hemodynamics.
- List the major stages of fetal cardiovascular development.
- Describe the signs, symptoms, etiology, pathophysiology, risk factors, treatment methods, and evaluation methods for the most prevalent cardiovascular diseases.

INSTRUCTOR CONTACT INFORMATION

Instructor:	Melissa Mann	(Lecture/Lab)
	Mark Adams	(Lab)

Email:	mamann@lit.edu
	maadams@lit.edu

Office Phone:	Mrs. Mann 409-257-0057
---------------	------------------------

Office Location:	GATEWAY 114
------------------	-------------

Office Hours:	Please see Starfish to schedule an appointment
---------------	--

REQUIRED TEXTBOOK AND MATERIALS

1. **The Notebook 8.0 edition, by Susan King DeWitt, BS, RDCS, RCS**
<http://echocardiographer.tripod.com> as well as the workbook that corresponds with this textbook.
2. Computer with internet access
3. Webcam for taking exams

Suggested Textbook and Materials

1. **Textbook of Clinical Echocardiography**
By: Catherine Otto MD
ISBN#978-1-4160-5559-4
2. **Sound Advice for the Ultrasound Lab: Echocardiographic Protocol**
By: Tom Whelan RT(R), RVT, RDCS, FASE
The Advanced Health Education Center

ATTENDANCE POLICY

Students are expected to be in class unless prior arrangements have been made. Absences must be limited to serious illness and/or immediate family emergencies. **Three (3) lecture absences will result in a letter grade reduction. Two (2) lab absences will result in a 10 point grade reduction from the overall lab average. Excessive tardiness (more than 15 minutes/class or more than 2 consecutive classes)** will result in an absence being awarded. Also, leaving class early will result in an absence being awarded. In the event that LIT is forced to cancel classes due to inclement weather, DMS classes and clinical rotation will also be canceled. Notification of closures will be made through local radio and TV stations. Students out of the immediate broadcast area should contact the Program Director for information. **It is extremely important that students communicate with the faculty regarding absences by telephone and/or email at all times.**

DROP POLICY

If you wish to drop a course, you are responsible for initiating and completing the drop process. If you stop coming to class and fail to drop the course, you will earn an "F" in the course.

LECTURE COURSE CALENDAR

WEEK	TOPIC	READINGS	ASSIGNMENTS (Due on this Date)
1 (8/22 – 8/24)	Go over Syllabus and Class Rules CARDIAC PHYSIOLOGY PP UNIT TEST I	Blackboard Chapter I Pgs. 18-26 / Workbook Assignments via Blackboard	

2 (8-29 – 8/31)	CARDIAC PHYSIOLOGY PP UNIT TEST I	Blackboard Chapter I Pgs. 18-26 / Workbook Assignments via Blackboard	
3 (9/05 –9/07)	9/05 CARDIAC PHYSIOLOGY PP UNIT TEST I 9/07 - UNIT TEST I TEST/HOMEWORK DUE	<i>Blackboard/ Notebook</i> <i>Chapter I</i> <i>Pages 18-30</i> Unit I PP and Homework Assignments via Blackboard	<u>UNIT I TEST and</u> <u>HOMEWORK DUE</u>
4 (9/12-9/14)	ECHO DOPPLER PP 2403 UNIT TEST II	Blackboard Chapter III Pgs. 41-53/ Chapter Iva Pgs. 61-105/ Workbook Assignments via Blackboard	
5 (9/19-9/21)	ECHO DOPPLER PP 2403 UNIT TEST II	Blackboard Chapter III Pgs. 41-53/ Chapter Iva Pgs. 61-105/ Workbook Assignments via Blackboard	
6 (9/26-9/28)	ECHO DOPPLER PP 2403 UNIT TEST II/ TEST/HOMEWORK DUE	Blackboard Chapter III Pgs. 41-53/ Chapter Iva Pgs. 61-105/ Workbook Assignments via Blackboard	<u>UNIT II TEST AND</u> <u>HOMEWORK DUE</u>
7 (10/3-10/5)	BEGIN ECHO DOPPLER QUANTITATION PP 2403 UNIT TEST III	Blackboard Chapter III Pgs. 41-53/ Chapter IVa Pgs. 61-105/ Chapter IVb Pgs. 106-122 Workbook	

		Assignments via Blackboard	
8 (10/10-10/12)	BEGIN ECHO DOPPLER QUANTITATION PP 2403 UNIT TEST III	Blackboard Chapter III Pgs. 41-53/ Chapter IVa Pgs. 61-105/ Chapter IVb Pgs. 106-122 Workbook Assignments via Blackboard	
9 (10/17-10/19)	10/17 - ECHO DOPPLER QUANTITATION PP 10/19 – 1340 SCAN FINALS DURING THIS TIME	Blackboard Chapter III Pgs. 41-53/ Chapter IVa Pgs. 61-105/ Chapter IVb Pgs. 106-122 Workbook Assignments via Blackboard	
10 (10/24-10/26)	10/24 - UNIT III TEST TEST/HOMEWORK DUE 10/26 - Embryology PP 2403 UNIT TEST IV	Blackboard Chapter II Pgs. 31-40/ Workbook Assignments via Blackboard	<u>UNIT III TEST and</u> <u>HOMEWORK DUE</u>
11 (10/31-11/02)	Embryology PP 2403 UNIT TEST IV	Blackboard Chapter II Pgs. 31-40/ Workbook Assignments via Blackboard	
*	BLACKBOARD JOURNAL ASSIGNMENT		<u>DUE ONLINE</u> <u>November 4, 2023</u> <u>BY MIDNIGHT</u>
12 (11/07-11/09)	11/07 - Embryology PP 2403 UNIT TEST IV 11/09 - UNIT IV TEST TEST/HOMEWORK DUE	Blackboard Chapter II Pgs. 31-40/ Workbook Assignments via Blackboard	<u>UNIT IV TEST AND</u> <u>HOMEWORK DUE</u>
13 (11/14-11/16)	<u>RESEARCH PROJECT PP</u> <u>PRESENTATIONS PART</u>	<u>Electronic Copy</u> <u>DUE 11/13/23</u>	

		<u>BY 8 PM HARD COPY IN REPORT FOLDER DUE BEGINNING OF CLASS 11/14/23</u>	
14 (11/21-11/23)	11/21 – REVIEW FOR FINAL <u>FLASHCARD REVIEW ASSIGNMENT DUE</u> 11/23- THANKSGIVING NO CLASS		<u>FLASHCARD REVIEW ASSIGNMENT DUE November 21, 2023.</u> <u>2403 FINAL EXAM OPEN ON Blackboard 11/22/23 – 11/27/23 FINAL EXAM MUST BE TAKEN VIA BLACKBOARD BY 5PM ON THIS DAY</u>
*	<u>2403 LECTURE FINAL EXAM</u>		<u>2403 FINAL EXAM OPEN ON Blackboard 11/22/23 – 11/27/23 FINAL EXAM MUST BE TAKEN VIA BLACKBOARD BY 5PM ON THIS DAY</u>
15 (11/28-11/30)	<u>2403 SCAN FINALS MV/TV DOPPLER DURING CLASS</u>	<i>Blackboard/ Coresound</i>	
16 (12/05)	MAKEUP WORK		

- This schedule is subject to change at the discretion of the instructor.

LAB COURSE CALENDAR

DATE	LAB ACTIVITY	INFO NEEDED	ASSIGNMENTS (Due on this Date)
8/24	EKG PP PRACTICE/ Review 2D Views	Protocol / Tips/ Instructions found on Blackboard	
8/31	EKG PP PRACTICE/ Review 2D Views	Protocol / Tips/ Instructions found on Blackboard	
9/07	Review 2D/Measurements	Protocol / Tips/ Instructions found on Blackboard	

9/14	<u>2D MEASUREMENTS TEST</u>	Protocol / Tips/ Instructions found on Blackboard	<u>TEST</u> <u>SEPTEMBER 14, 2023</u> <u>2D MEASUREMENTS</u>
9/21	Practice M-Mode of AOV/PV	Protocol / Tips/ Instructions found on Blackboard	
9/28	<u>M-MODE MEASUREMENTS TEST</u>	Protocol / Tips/ Instructions found on Blackboard	<u>TEST</u> <u>SEPTEMBER 28, 2023</u> <u>M-MODE MEASUREMENTS</u>
10/05	Practice 2D/M-Mode	Protocol / Tips/ Instructions found on Blackboard	
10/12	Review 2D/M-Mode	Protocol / Tips/ Instructions found on Blackboard	Review 2D/M-Mode
10/19	<u>1340 SCAN FINALS</u> <u>2D/M- MODE DURING</u> <u>LAB</u>	Protocol / Tips/ Instructions found on Blackboard	<u>1340 SCAN FINALS</u> <u>October 19, 2023</u> <u>2D/M-MODE</u> <u>MEASUREMENTS</u>
10/26	Apical/SUB CF Doppler	Protocol / Tips/ Instructions found on Blackboard	
11/02	<u>CF Doppler Test</u>	Protocol / Tips/ Instructions found on Blackboard	<u>TEST</u> <u>November. 2, 2023</u> <u>CF DOPPLER</u>
11/09	MV/TV Doppler	Protocol / Tips/ Instructions found on Blackboard	
11/16	MV/TV Doppler	Protocol / Tips/ Instructions found on Blackboard	<u>BUTTON PROTOCOL</u> <u>MV/TV DOPPLER TEST</u> <u>November. 2, 2023</u> <u>CF DOPPLER</u>
11/23	HOLIDAY- THANKSGIVING		
11/30	<u>2403 SCAN FINALS</u> <u>MV/TV Doppler</u> <u>DURING THIS LAB</u>	<u>Protocol / Tips/</u> <u>Instructions found on</u> <u>Blackboard</u>	<u>2403 SCAN FINALS</u> <u>November 30, 2023</u> <u>MV/TV DOPPLER</u>

- This schedule is subject to change at the discretion of the instructor.

COURSE EVALUATION

There are two components to this course, lecture and lab. They come together for a combined overall grade.

Final Semester grades will be calculated according to the following criteria:

1.	Unit tests	39%
2.	Final Exam	20%
3.	Research Project	10%
4.	Class Participation/Homework/ Journal Assignment	5%
5.	Lab	26%

a. Lab Tests	(6.50% of the 26%)
b. Participation	(6.50% of the 26%)
c. Lab Final	(13% of the 26%)

Course Requirements

1. Unit tests
2. Reading assignments
3. Homework
4. Research Project
5. Journal Assignment
6. Lab Tests
7. Lab Participation
8. Scan Final
9. Lecture Final Exam

GRADE SCALE

- 93-100 A
- 85-92 B
- 77-84 C (Must pass the class with a 77 or higher to continue in the program)
- 69-76 D
- 0-68 F

Course Outline

- A. Hemodynamics of the heart
 - a. Pulmonary circulation
 - b. Systemic circulation
 - i. Effect of systemic diseases on cardiovascular anatomy and physiology
 - c. Coronary Circulation
 - i. Myocardial infarction
 - ii. Abnormal wall motion
 - d. Types of flow
 - e. Factors affecting blood flow
 - i. Pressure gradient
 - ii. Stenosis
 - iii. Preload
 - iv. Afterload
 - f. Disease states affecting afterload and preload
 - i. Clinical History
 - ii. Physical Exam
 - iii. Skin Integrity
- B. Cardiovascular physiology
 - a. IVCT
 - b. Systole
 - c. IVRT
 - d. Diastole
 - e. Cardiac function
 - i. Heart rate
 - ii. Stroke volume
 - iii. Cardiac output
 - iv. Cardiac index
- C. Cardiac function and physiology
 - a. Preload
 - b. Afterload
 - c. Propagation of electromechanical events
 - d. Electrical events vs. mechanical events
- D. Differential diagnosis in the echocardiographic examination
 - a. Chest pain
 - b. Edema
 - c. Dyspnea on Exertion
- E. Doppler echocardiography
 - a. Doppler equation
 - b. Types of Doppler
 - i. Spectral Doppler
 - ii. Color Flow Doppler

- c. PW Doppler
 - d. CW Doppler
 - i. HPRF Doppler
 - ii. Pedoff probe
 - e. Doppler angle
 - f. Aliasing
 - g. Types of flow
- F. Normal and abnormal hemodynamics and flow patterns
- G. Quantification by Doppler
- a. Bernoulli's Formula
 - i. Pressure gradient
 - ii. RVSP
 - b. Poiseuille's Law
 - c. Stroke volume by Doppler
 - d. Continuity equation
 - e. Pressure half time
 - f. PISA
- H. Embryology
- a. Heart development
 - b. Fetal circulation
 - i. Foramen ovale
 - ii. Ductus arteriosus
 - iii. Ductus venosus
 - iv. Placenta
 - v. Pressures
 - c. Changes at birth
 - d. Persistent fetal circulation
- I. Ergonomic knowledge and Techniques
- a. Blackboard Journal Assignment
 - i. Industry standards and OSHA guidelines
 - ii. Types of WRMSKD
 - iii. Role of prevention of MSI in Admin.
 - iv. Role of prevention of MSI in Sonographers.
 - v. Best practices for prevention

Grade Scale

TECHNICAL REQUIREMENTS

The latest technical requirements, including hardware, compatible browsers, operating systems, etc. can be online at <https://lit.edu/online-learning/online-learning-minimum->

[computer-requirements](#). A functional broadband internet connection, such as DSL, cable, or Wi-Fi is necessary to maximize the use of online technology and resources.

DISABILITIES STATEMENT

The Americans with Disabilities Act of 1990 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. LIT provides reasonable accommodations as defined in the Rehabilitation Act of 1973, Section 504 and the Americans with Disabilities Act of 1990, to students with a diagnosed disability. The Special Populations Office is located in the Eagles' Nest Room 129 and helps foster a supportive and inclusive educational environment by maintaining partnerships with faculty and staff, as well as promoting awareness among all members of the Lamar Institute of Technology community. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator at (409)-951-5708 or email specialpopulations@lit.edu. You may also visit the online resource at [Special Populations - Lamar Institute of Technology \(lit.edu\)](#).

STUDENT CODE OF CONDUCT STATEMENT

It is the responsibility of all registered Lamar Institute of Technology students to access, read, understand and abide by all published policies, regulations, and procedures listed in the *LIT Catalog and Student Handbook*. The *LIT Catalog and Student Handbook* may be accessed at www.lit.edu. Please note that the online version of the *LIT Catalog and Student Handbook* supersedes all other versions of the same document.

STARFISH

LIT utilizes an early alert system called Starfish. Throughout the semester, you may receive emails from Starfish regarding your course grades, attendance, or academic performance. Faculty members record student attendance, raise flags and kudos to express concern or give praise, and you can make an appointment with faculty and staff all through the Starfish home page. You can also login to Blackboard or MyLIT and click on the Starfish link to view academic alerts and detailed information. It is the responsibility of the student to pay attention to these emails and information in Starfish and consider taking the recommended actions. Starfish is used to help you be a successful student at LIT.

ADDITIONAL COURSE POLICIES/INFORMATION

1. No food, drinks, or use of tobacco products in class.
2. Beepers, cell phones, head phones and any other electronic devices must be turned off while in class.
3. Do not bring children to class.
4. **All exams will be on the dates specified unless the instructor makes a change. In case of an absence on exam day, the student will have a 10 point reduction on his/her test score. The score**

will continue to drop 10 points for every class day missed following the test. Also, if the student attends any sonography classes on test day, he/she must take the test that day or a zero will be given. The student will have to make up the test if missed, the class day that the student returns.

5. The terminology excused or not excused absence does not apply to this class. All absences are equal. Therefore, no matter the circumstances involved in the student's absence it will be counted towards the total for the semester.
6. All assignments are due when stated **at the beginning of class or online at the dates given on the syllabus**. Late assignments will result in a drop of 10 points per late day, and more than five days past due will result in a grade of **0**. Missed in-class assignments receive a grade of **0**.
7. It shall be considered a breach of academic integrity (cheating) to use or possess on your body any of the following devices during any examination unless it is required for that examination and approved by the instructor: Cell phone, smart watch/watch phone, laptop, tablet, electronic communication devices (including optical), and earphones connected to or used as electronic communication devices.
 - a. **Cheating on any (lecture/lab) exam results in immediate dismissal from the program and an F for the course.**
8. All exams will be online. You will be using LockDown Browser with Webcam Monitoring. The rules for the tests are:

Disable all notifications on your computer. This is how LockDown Browser is used to take a test.

- Locate the "LockDown Browser" shortcut on the desktop and double-click it. (For Mac users, launch "LockDown Browser" from the Applications folder.)
- If prompted to close a blocked program (e.g. screen capture, instant messaging) choose Yes.
- Log into the course, navigate to the test and select it.
- A Startup Sequence will guide the student through a webcam check and other items required by the instructor.
- The test will then start.

20-point deductions for each occurrence:

- Where you are taking your exam must be well lit. If it is not well lit, you will have 20 points deducted from your test.
 - Your face must be visible the entire length of the test. If your face cannot be seen even for a few seconds you will have 20 points deducted from your test.
 - No music should be playing nor should a TV/radio/video be on in the background.

- You may not read the questions out loud. If you do so, you automatically receive a 20-point deduction.
 - You may not wear sunglasses, hats, hoodies, earbuds, headphones, etc. during the exam. Your ears must be fully visible the entire exam, failure to comply with this will be a 20-point deduction. If you do this on another exam it will turn into a 50-point deduction
- 50-point reduction or a zero on the entire test

- You must be in a private location. If another person is seen or heard while you are taking your test this could be misconstrued as cheating resulting in a 50-point reduction or a zero. That is up to the situation and your instructor.
- All phones, notes, books, and other papers must be removed from the testing location. If these items are seen during your exam, you receive an automatic zero on the exam.
- Do NOT leave the exam room for any reason, if you do, it is an automatic 50-point deduction.
- Any suspicious activity that appears to be cheating will result in a zero.

Testing Tips

1. You must use Google Chrome browser.
 - You must have a webcam and a microphone attached to your computer
 - Be prepared to scan the room with a camera, if you cannot move your computer, you will need to have a mirror available to assist with scanning the room.
2. It is the student's responsibility to ensure that ALL of the above requirements are met. By completing the verify signature portion of the exam, you are accepting responsibility for your actions during the exam. Failure to follow the requirements will result in deductions from your exam grade when reviewed by your Instructor.

9.

- a. **Cheating on any (lecture/lab) exam results in immediate dismissal from the program and an F for the course.**

10. You will have the length of the class to finish an exam. No extra time will be given.

11. Class roll is taken by the sign in sheets. If you did not sign in, you will be counted absent.

12. The sign in sheet will be taken up 15 minutes after class starts. If you are more than 15 minutes late to class, you will be counted absent. Also, if you leave the classroom for more than 15 minutes you will be counted absent.
13. When absent, the student is required to contact the instructor to obtain make-up assignment for missed class. It is the student's responsibility to make up lecture/lab assignments or a grade of zero will be given.
14. If you wish to drop a course, the student is responsible for initiating and completing the drop process. If you stop coming to class and fail to drop the course, you will earn an "F" in the course.
15. There will be no extra credit assignments given in this course.
16. Students with special needs and/or medical emergencies or situations should communicate with their instructor regarding individual exceptions/provisions. It is the student's responsibility to communicate such needs to the instructor.
17. If you fail any test, you are required to get ahold of me and schedule a collaborate session/in person session to review the material. It is your duty to be prepared for this meeting.
18. Any taping of the material, when we go over tests/ results, will be considered cheating and you will be dismissed from the program. It is our duty to prepare you for the registry.
19. Additional class policies as defined by the individual course instructor and sonography handbook.