DSAE 2404 3A1/5A1

CARDIAC SONOGRAPHY PATHOPHYSIOLOGY I

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

MODE OF INSTRUCTION
Face to Face Instruction

PREREQUISITE/CO-REQUISITE:
Passed all previous sonography courses.

COURSE DESCRIPTION
Adult cardiac pathologies. Topics include cardiovascular pathophysiology, quantitative measurements, and the application of 2-D, M-Mode, and Doppler. Recognition of the sonographic appearances of cardiovascular disease is stressed.

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

- Evaluate the etiology, signs and symptoms, treatment and echocardiographic features of common valvular and myocardial diseases.
- Discuss the criteria for recognition, evaluation and quantification of these diseases.
- Identify pathophysiology and hemodynamic consequences.

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 111	
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

Approved: MM/2026

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 by the specified date as listed in the College Calendar on the Student Success web page. 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 **1/20- 1/22**	**Review Syllabus/ Systolic Function/ Dysfunction PP**		
2 **1/27 -1/29**	**Systolic Function/ Dysfunction PP**	Syllabus and Unit I PPs Via Blackboard	
3 **2/03 –** **2/05**	**Systolic Function/ Dysfunction PP** **EXTENDED LAB**	Unit I PPs and Homework Assignments via Blackboard	
4 **2/10** **2/12**	***TEST 1*** **Ventricular Function/Dysfunction PP**	Unit I PPs and Homework Assignments via Blackboard	**UNIT I TEST DURING CLASS ON Blackboard 02/10/26** **HOMEWORK FOR UNIT I TEST DUE BEFORE TAKING TEST ON Blackboard 02/10/26**

5 **2/17-2/19**	**Ventricular Function/Dysfunction PP**	Unit II PPs and Homework Assignments via Blackboard	
6 **2/24-2/26**	**Ventricular Function/Dysfunction PP**	Unit II PPs and Homework Assignments via Blackboard	
7 **3/3** **3/5**	**Ventricular Function/Dysfunction PP /** ***TEST 2***	Unit II PPs and Homework Assignments via Blackboard / Unit III PPs and Homework Assignments via Blackboard	**UNIT II TEST DURING CLASS ON Blackboard 03/05/26** **HOMEWORK FOR UNIT II TEST DUE BEFORE TAKING TEST ON Blackboard 03/05/26**
8 **3/10-3/12**	**SPRING BREAK**		
9 **3/17-3/19**	**Stress Echo PP**	Unit II PPs and Homework Assignments via Blackboard / Unit III PPs and Homework Assignments via Blackboard	
10 **3/24** **3/26**	***TEST 3*** **Ischemic Heart Disease & Myocarditis PPs**	Unit III PPs and Homework Assignments via Blackboard	**UNIT III TEST DURING CLASS on Blackboard 3/24/26** **HOMEWORK FOR UNIT III TEST DUE BEFORE TAKING TEST ON Blackboard 3/24/26**
11 **3/31-4/02**	**Ischemic Heart Disease & Myocarditis PPs / CHF**	Unit IV PPs and Homework Assignments via Blackboard	
12 **4/7** **4/9**	***TEST 4*** **Tamponade / Pericardial Effusion PP**	Unit IV PPs and Homework Assignments via Blackboard	**UNIT IV TEST DURING CLASS ON Blackboard 04/07/26** **HOMEWORK FOR UNIT IV TEST DUE**

			<u>BEFORE TAKING TEST ON Blackboard 04/07/26</u>
13 **4/14-4/16**	**Tamponade / Pericardial Effusion PP**	Unit V PPs and Homework Assignments via Blackboard	
14 **4/21** **4/23**	**Extended Lab 4-21-25** ***<u>TEST 5</u>***	Unit V PPs and Homework Assignments via Blackboard Homework Assignment #6 Documented **(4 hours)** Community Service **(INSTRUCTOR MUST APPROVE YOUR COMMUNITY SERVICE – SO PRIOR NOTIFICATION IS REQUIRED**)	**<u>UNIT V TEST DURING CLASS ON Blackboard 04/23/26</u>** **<u>HOMEWORK FOR UNIT V TEST DUE BEFORE TAKING TEST ON Blackboard 04/23/26</u>** **<u>APRIL 23, 2026, COMMUNITY SERVICE HOURS ARE DUE BY MIDNIGHT ON BB</u>**
15 **4/28** **4/30**	**RESEARCH PROJECTS** **Review for Final**	Topics, Instructions and Criteria Housed in BB	**APRIL 28, 2026, TO BE PRESENTED DURING CLASS. ELECTRONIC COPY DUE ON APRIL 27 ON BB PRIOR TO CLASS.**
16 **05/05** **05/07**	***<u>FINAL EXAM</u>*** **SCAN FINALS DURING LECTURE**		**MAY 5, 2026** **<u>FINAL EXAM MUST BE TAKEN DURING CLASS ON BLACKBOARD.</u>**

- 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)
1/20	Review Scanning MV/TV Doppler		
1/22	Review Scanning MV/TV Doppler		

1/27	Review Scanning MV/TV Doppler	Protocol / Tips/ Instructions found on Blackboard	
1/29	**MV/TV Doppler Test**	Protocol / Tips/ Instructions found on Blackboard	**SCAN TEST 1 JANUARY 29, 2026, DUE BY MIDNIGHT ON CORESOUND**
02/03	AOV/ PV Doppler	Protocol / Tips/ Instructions found on Blackboard	
2/05	AOV/ PV Doppler **EXTENDED LAB**	**Protocol / Tips/ Instructions found on Blackboard**	
2/10	AOV/ PV Doppler	Protocol / Tips/ Instructions found on Blackboard	
2/12	AOV/ PV Doppler	Protocol / Tips/ Instructions found on Blackboard	
2/17	AOV/PV Doppler	Protocol / Tips/ Instructions found on Blackboard	
2/19	**AOV/ PV Doppler Test**	**Protocol / Tips/ Instructions found on Blackboard**	**SCAN TEST 2 FEBRUARY 19, 2026 DUE BY MIDNIGHT ON CORESOUND**
2/24	Parasternal Echo	Protocol / Tips/ Instructions found on Blackboard	
2/26	Parasternal Echo	Protocol / Tips/ Instructions found on Blackboard	
03/03	Parasternal Echo	Protocol / Tips/ Instructions found on Blackboard	
03/05	**Parasternal Echo**	**Protocol / Tips/ Instructions found on Blackboard**	**SCAN TEST 3 MARCH 05, 2026, DUE BY MIDNIGHT ON CORESOUND**
03/10-03/12	**SPRING BREAK**	**03/9-03/13**	**SPRING BREAK**

3/17	Apical Echo	Protocol / Tips/ Instructions found on Blackboard	
3/19	Apical Echo	Protocol / Tips/ Instructions found on Blackboard	
3/24	Apical Echo	Protocol / Tips/ Instructions found on Blackboard	
3/26	Apical Echo	Protocol / Tips/ Instructions found on Blackboard	
03/31	**Apical Echo Test**	**Protocol / Tips/ Instructions found on Blackboard**	**SCAN TEST 4 MARCH 31, 2026, DUE BY MIDNIGHT ON CORESOUND**
04/02	Complete Echo	Protocol / Tips/ Instructions found on Blackboard	
04/07	Complete Echo	Protocol / Tips/ Instructions found on Blackboard	
04/09	Complete Echo	Protocol / Tips/ Instructions found on Blackboard	
04/14	Complete Echo	Protocol / Tips/ Instructions found on Blackboard	
04/16	**WRITTEN PROTOCOL TEST/** Practice Complete Echo	**Protocol / Tips/ Instructions found on Blackboard**	**TEST 5 APRIL 16, 2026, TAKEN AND DUE IN CLASS**
04/21	**Complete Echo Test**	**Protocol / Tips/ Instructions found on Blackboard**	**SCAN TEST 6 APRIL 21, 2026, DUE BY MIDNIGHT ON CORESOUND**
04/23	Complete Echo	Protocol / Tips/ Instructions found on Blackboard	
04/28	Finish Research Projects	Protocol / Tips/ Instructions found on Blackboard	

04/30	Complete Echo	Protocol / Tips/ Instructions found on Blackboard	
05/05	**SCAN FINALS**	**Protocol / Tips/ Instructions found on Blackboard**	**SCAN TEST 7 MAY 05, 2027, DUE IN CLASS AFTER SCAN FINAL**
05/07	**SCAN FINALS**	**Protocol / Tips/ Instructions found on Blackboard**	**SCAN TEST 7 MAY 07, 2026, DUE IN CLASS AFTER SCAN FINAL**

- 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 grades will be calculated according to the following criteria:
Semester grades will be calculated from unit tests, lecture final exam, lab participation, lab scan tests, research assignment and homework assignments.

- Unit tests/ Final **(59%)**
  - **(Unit Tests worth 39%/ Final Exam worth 20%)**
- Research/ Power Point Project **(10%)**
- Homework **(5%)**
- Lab **(26%)**
  - **Lab Tests** **(6.50% of the 26%)**
  - **Participation** **(6.50% of the 26%)**
  - **Lab Final** **(13% of the 26%)**

Course Outline

A. LIT
   a. Policies
   b. Academic calendar
   c. Classroom policies
B. Schedules
   a. Lab schedule
   b. Clinical schedule
   c. Review previous semester cardiac anatomy and physiology.
   d. Advanced cardiac anatomy and Physiology

e. Cardiac cycle
f. Cardiac Hemodynamics
g. Cardiac Doppler
h. Doppler equation
i. Doppler Quantification

C. Cardiac Physiology
    a. Effects of abnormal pressures and loading
        i. Volume concepts
        ii. Afterload
        iii. Preload
        iv. Frank Starling's Law
D. Physiological response of cardiac chambers to the following:
    a. Increased volume
        i. Preload (varying preload conditions)
        ii. Frank Starling Law
    b. Increased pressure
        i. Afterload (varying afterload conditions)
        ii. Hypertrophy
    c. Pulmonary vascular disease
E. Normal and Abnormal hemodynamics and flow patterns.
    a. Miscellaneous measurements specific to patient history.
F. Ventricular systolic function/dysfunction
    a. Ejection Fraction
    b. Simpson's method
    c. Etiology/ Signs/ Symptoms/ Recognition/ Evaluation/ Quantification of normal/abnormal measurements
G. Ventricular diastolic function/dysfunction
    a. Chamber size
    b. E to A ratio
    c. PISA
    d. Pulmonary veins
    e. Tissue Doppler
    f. Etiology/ Signs/ Symptoms/ Recognition/ Evaluation/ Quantification of normal/abnormal measurements
H. Stress Echo
    a. Indications/Contraindications/ Physical History
    b. Etiology/ Signs/ Symptoms/ Recognition/ Evaluation/ Quantification of normal/abnormal measurements
I. Heart failure
    a. Etiology/ Signs/ Symptoms/ Recognition/ Evaluation/ Quantification of normal/abnormal measurements by echocardiographic features/ Treatments (Cardiac Assist Devices/ Intracardiac Devices/ Heart Transplant)
J. Ischemic Heart Disease

a. Coronary Artery Anatomy/ Distribution Review/ Heart Cath Review
b. Etiology/ Signs/ Symptoms/ Recognition/ Evaluation/ Quantification of normal/abnormal measurements by echocardiographic features

K. Myocarditis
    a. Etiology/ Signs/ Symptoms/ Recognition/ Evaluation/ Quantification of normal/abnormal measurements by echocardiographic features
L. Pericardial Disease/ Tamponade
    a. Etiology/ Signs/ Symptoms/ Recognition/ Evaluation/ Quantification of normal/abnormal measurements by echocardiographic features
    b. Interventional procedures/care/ IV administration techniques
M. Hypertensive heart
    a. Etiology/ Signs/ Symptoms/ Recognition/ Evaluation/ Quantification of normal/abnormal measurements by echocardiographic features

GRADE SCALE

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

TECHNICAL REQUIREMENTS

For the latest technical requirements, including hardware, compatible browsers, operating systems, etc., review the Minimum Computer and Equipment Requirements on the LIT Online Experience page. A functional broadband internet connection, such as DSL, cable, or WiFi 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.

ARTIFICIAL INTELLIGENCE STATEMENT

Lamar Institute of Technology (LIT) recognizes the recent advances in Artificial Intelligence (AI), such as ChatGPT, have changed the landscape of many career disciplines and will impact many students in and out of the classroom. To prepare students for their selected careers, LIT desires to guide students in the ethical use of these technologies and incorporate AI into classroom instruction and assignments appropriately. Appropriate use of these technologies is at the discretion of the instructor. Students are reminded that all submitted work must be their own original work unless otherwise specified. Students should contact their instructor with any questions as to the acceptable use of AI/ChatGPT in their courses.

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. Cell Phones and any other electronic devices must be turned off while in class.
3. Do not bring children to class.
4. All assignments are due at the beginning of class and/or when stated in the syllabus. **LATE ASSIGNMENTS WILL NOT BE ACCEPTED and will result in a grade of ZERO!**

5. All exams will be on the dates specified unless the instructor makes a change. **If the student misses an exam due date, the student will be given a 0 after midnight on the day that it was due.** Before midnight the day of the test, the score will drop 10 points for every hour the exam is late beginning with the time it was due. For example, if the test is due at 7:00 and the student turns in the exam at 7:01 the grade drops 10 points. At 8:00 pm, the grade will drop 20 points, etc. The time is set by the individual instructor so 7:00 pm is only an example.

6. 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.

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

7. All exams will be online on Blackboard. 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 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

- 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.
    - **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.

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

9. 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.

10. 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.

11. 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.

12. There will be no extra credit assignments given in this course.

13. Four hours of community service will be **REQUIRED** this semester in this course. These hours **must be approved by the instructor** prior to service.

14. Additional class policies as defined by the individual course instructor and sonography handbook.