

DMSO 2351 3A1 Doppler Physics

CREDIT

3 Semester Credit Hours (3 hours lecture, 0 hours lab)

MODE OF INSTRUCTION

Face to Face

PREREQUISITE/CO-REQUISITE:

Passed all previous sonography courses.

COURSE DESCRIPTION

Doppler and Hemodynamic principles relating cardiovascular imaging and testing.

COURSE OBJECTIVES

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

- Describe Doppler and Hemodynamic principles and actions.
- Identify instrument options and transducer selection
- Interpret methods of Doppler flow analysis
- Differentiate common image artifacts
- Describe potential bioeffects

INSTRUCTOR CONTACT INFORMATION

Instructor:	Tracy Ryals RDMS, RVT
Email:	taryals@lit.edu
Office Phone:	409-234-6033
Office Location:	Gateway 115
Office Hours:	Please see Starfish to schedule an appointment.

REQUIRED TEXTBOOK AND MATERIALS

- *Understanding Ultrasound Physics* by Sidney K. Edelman, Ph.D. 4th edition
ISBN# 0-9626444-5-5
- Computer with internet access
- Webcam for taking exams.

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**; unexcused absences are not allowed. **Three (3) absences will result in a letter grade reduction.** **Excessive tardiness (more than 10 minutes/class or more than 2 consecutive classes) will result in an absence being awarded.** 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.

- 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.

Approved: [TR/1/12/24](#)



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- 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 lab assignments or a grade of zero will be given.

It is extremely important that students communicate with the faculty regarding absences by phone 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.

COURSE CALENDAR

DATE	TOPIC	READINGS (Due on this Date)	ASSIGNMENTS (Due on this Date)
Tues 1/16	LIT closed due to weather		
Thurs 1/18	Syllabus Ch 18 Hemodynamics Lecture	Syllabus Ch 18 Hemodynamics Ch 18 PowerPoint	
Tues 1/23	Ch18 Hemodynamics Lecture		
Thurs 1/25	Ch18 Hemodynamics Lecture		
Tues 1/30	Ch18 Hemodynamics Review		Ch 18 Quiz Due Unit #1 Test opens 12 PM Due 02/02/24 by 7PM
Tues 2/01	Ch19 Doppler Lecture	Ch 19 Doppler Ch 19 PowerPoint	
Thurs 2/06	Ch19 Doppler Lecture		
Tues 2/08	Ch19 Doppler Lecture		
Thurs 2/13	Ch19 Doppler Lecture		
Tues 2/15	Ch19 Doppler Lecture		
Thurs 2/20	Ch19 Review		Ch 19 Quiz Due Unit #2 Test opens 12PM Due 2/23/2024 by 7 PM
Tues 2/22	Ch20 Optimizing Lecture	Ch 20 Optimizing Doppler Imaging Ch 20 PowerPoint	
Thurs 2/27	Ch22 Quality Assurance	Ch 22 Quality Assurance Ch 22 PowerPoint	
Tues 2/29	Ch22 Quality Assurance		
Thurs 3/05	Ch20 & 22 Review		Ch 20 & 22 Quiz Due Unit #3 Test Opens 12 PM Due 3/08/2024 7 PM
Tues 3/07	Ch23 Clinical Setting Lecture	Ch 23 Clinical Setting Ch 23 PowerPoint	
Thurs 3/12	Spring Break		
Tues 3/14	Spring Break		
Thurs 3/19	Ch24 Bioeffects Lecture	Ch 24 Bioeffects Ch 24 PowerPoint	

Tues 3/21	Ch24 Bioeffects Lecture		
Thurs 3/26	Ch23-24 Review		Ch 23-24 Quiz Due Unit #4 Test Opens 12 PM Due 03/29/2024 by 7 PM
Tues 3/28	Registry Review		
Thurs 4/02	Registry Review		
Tues 4/04	Registry Review		
Thurs 4/09	Registry Review		
Tues 4/11	Registry Review		
Thurs 4/16	Registry Review		
Tues 4/18	Registry Review		
Thurs 4/23	Registry Review		
Tues 4/25	Registry Review		
Thurs 4/30	Registry Review		
Tues 5/02	Registry Review Last Class Day		
Tues 5/02	Final Exam		Final opens 05/01/2024 12 PM Due 05/06/20 by 7 PM

* This schedule is subject to change at the discretion of the instructor at any time.

COURSE EVALUATION

Final grades will be calculated according to the following criteria:

- **Unit Exams 85%**
- **Course Assignments 5%**
- **Final Exam 10%**

GRADE SCALE

- 93-100 A
- 85-92 B
- 77-84 C
- 69-76 D
- 0-68 F

Course Outline

A. LIT

1. Policies
2. Academic calendar
3. Classroom policies

B. Hemodynamics

1. Energy
2. Pressure-flow relationships
3. Venous hemodynamics

C. Doppler

1. Doppler Equation
2. Types of Doppler
3. Aliasing
4. Color Flow Doppler
5. Doppler Artifacts

D. Optimizing Doppler Imaging

1. Normal Incidence
2. Color Doppler Gain
3. Spectral Doppler Gain
4. Aliasing
5. Wall Filters

E. Quality Assurance

1. Requirements
2. Objective vs Subjective
3. Phantoms
4. Performance Measurements
- 5.

F. Bioeffects

1. Converting Sound Energy into Heat
2. Risk-benefit Relationships
3. Mechanisms of Bioeffects
4. Study Techniques
5. Clinical Safety & Prudent Use

G. Sonographers in the Clinical Setting

1. Major Principles
2. Informed Consent
3. Patient-sonographer Interaction
4. Sonographer-work Environment interaction
5. Standard Precautions

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 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 \(lit.edu\)](https://www.lit.edu/specialpopulations).

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

- No food, drinks, or use of tobacco products in class.
- Cellphones and any other electronic devices must be turned off while in class.
- Do not bring children to class.
- All assignments are due at the beginning of class when stated on the addendum. Late assignments will have a **10 point deduction** for every class day that the assignment is late. Missed in-class assignments receive a grade of zero.
- 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.
- 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.
- Exams will be online. You will be using LockDown Browser with Webcam Monitor.

RULES FOR TESTING

- 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.
 - There is no extra credit given for this course.
 - You will have the length of the class to finish an exam. No extra time will be given.
 - **YOU WILL GET ONE TEST RESET PER SEMESTER!!**