



Sonographic Instrumentation

DMS206

Spring 2020

Number of Credits: 4

Office: JW236

Days Class Meets: Online

Contact Phone: cell 517 917-4815

Meeting Times: Online

Contact Email: geiersbstephenm@jccmi.edu

Location: Online

mercerlindsayl@jccmi.edu

Instructor: Stephen Geiersbach MS, RT(R), RDMS

By Appointments through Big blue Button

Lindsay Mercer, BS, RDCS

Due to the COVID – 19 Pandemic, the following modifications will be made to DMS206 course:

1. Since all students are excused from clinical and lab until further notice, all lab assignments are temporarily suspended. Lab grades will not be counted in the final grade.

Course Description

Students explore the mechanics of A-mode, B-mode, M-mode, Doppler, and real time equipment. Accessory equipment such as cameras, transducers, phased, annular and linear arrays, and all types of hard copy documentation instruments are investigated. Multiple methods of preventative maintenance and quality control are presented. Laboratory reinforces learning activities.

Prerequisite(s)

MTH 131, DMS 104

Course Goals

This is the second of two applied ultrasonic physics courses that prepare students entering the field of diagnostic medical sonography to understand wave energy and how it interacts with matter to produce diagnostic images. Students will learn through lecture and lab assignments.

Course Objectives

1. Students who successfully complete the Sonographic Instrumentation course will demonstrate competencies in all aspects of ultrasound instrumentation.

2. Students who successfully complete the Sonographic Instrumentation course will demonstrate competencies in all aspects of applied ultrasound physics.

3. Students who successfully complete the Sonographic Instrumentation course will demonstrate competencies in all modes of ultrasound such as: M-mode, C-mode, B-mode and Doppler.

4. Students who successfully complete the Sonographic Instrumentation course will demonstrate competencies in understanding all aspects of ultrasound induced bioeffects.

5. Students who successfully complete the Sonographic Instrumentation course demonstrate competencies in understanding all aspects of signal production and processing.

Units/topics of Instruction

1. Elementary Principles
2. Propagation of Ultrasound through Tissue
3. Ultrasound Transducers
4. Pulse Echo Instruments
5. Principles of Pulse Echo Imaging
6. Images, Storage, and Display
7. Doppler
8. Image Features and Artifacts
9. Quality Assurance of Ultrasound Instruments
10. Bioeffects and Safety
11. Physiology & Fluid Dynamics
12. Venous Hemodynamics
13. Vascular Physical Principles

Textbook

TEXTBOOK: Miele, F. Ultrasound Physics & Instrumentation, Fifth Edition, Pegasus Lectures, Inc., Texas 2013. ISBN: 978-0-9885825-0- No digital copy is available by the publisher.

SUGGESTED ADDITIONAL TEXT: Edelman, S.K., Understanding Ultrasound Physics, fourth Edition, ESP, Inc., Canada 2012. No digital copy is available by the publisher.

Grading Procedure

Item	Each Worth	Points Available
14 Tests	20 points	280 points
1 Final Exam	200 points	200 points
Totals		480 points

Any student who takes and passes the ARDMS SPI exam during the semester will receive 100% for all remaining assignments and the final exam.

Grading Scale

GPA	GRADE RANGE
4.0	95-100%
3.5	90-94%
3.0	85-89%
2.5	80-84%
2.0	75-79%
1.5	70-74%
1.0	65-69%
0.5	60-64%
0.0	0-59%

Failure

Any circumstances under which a student could be dismissed from or failed in the course that is not covered in other college publications. In pass/fail courses, a listing of minimal competencies.

Academic Honesty Policy

Academic Honesty is defined as ethical behavior that includes student production of their own work and not representing others' work as their own, by cheating or by helping others to do so.

Plagiarism is defined as the failure to give credit for the use of material from outside sources.

Plagiarism includes but is not limited to:

- Submitting other's work as your own
- Using data, illustrations, pictures, quotations, or paraphrases from other sources without adequate documentation
- Reusing significant, identical or nearly identical portions of one's own prior work without acknowledging that one is doing so or without citing this original work (self-plagiarism)

Cheating is defined as obtaining answers/material from an outside source without authorization.

Cheating includes, but is not limited to:

- Plagiarizing in any form
- Using notes/books/electronic material without authorization
- Copying
- Submitting others' work as your own or submitting your work for others
- Altering graded work
- Falsifying data
- Exhibiting other behaviors generally considered unethical
- Allowing your work to be submitted by others

Accessibility

Jackson College understands that cultivating a broadly diverse community is crucial to our educational mission and to our foundational commitment to leadership and service. Jackson College is fully committed to ensuring our courses are accessible to everyone including those with disabilities. We are currently working to increase accessibility and usability of our course materials in order to meet or exceed the requirements of Section 508 of the Rehabilitation Act of 1973, the Americans with Disabilities Act of 1991 and Web Content Accessibility Guidelines (WCAG) 2.0. For more information about Jackson College's efforts to ensure accessibility please visit the [Jackson College accessibility web page](#).

If you have an accessibility need in any of our classes please e-mail the Center for Student Success at JCCSS@jccmi.edu or visit the [Center for Student Success web page](#).

At the Center for Student Success (CSS), we are committed to providing all students the opportunity to achieve academic success by providing a variety of support services free of charge to Jackson College students. This includes, but is not limited to, peer and faculty tutoring, mental health referral, temporary assistance with transportation, various workshops/seminars, and the TRIO program.

In addition, the CSS staff is committed to adapting the College's general services to meet the individual needs of otherwise qualified students with disabilities, for the purpose of providing equal access to all programs and facilities.

Course Management

Ways that students can manage their enrollment in a course for special circumstances. Includes withdrawal, and audit and incomplete grading procedures.

Makeup Policy

There are 14 tests and 1 final exam in this course. It is the students responsibility to make certain they have a secure connection and that all tests are completed by the due date. All tests are open at the start of the semester and students can take them at any time prior to the due date. If a student chooses to wait until the last minute to take the test, they will do so at their own risk if they should experience technical difficulties. Each student will be allowed 1 test reset. If a student should miss a test deadline after that, they will receive a zero for that test.

Help

It is important to contact a Center for Student Success professional prior to the start of the semester in order to receive accommodations in a timely manner. While we will make every effort to coordinate accommodations in a timely manner, failure to self-identify prior to the start of the semester may delay notification to instructors and timeliness of acquiring accommodations. Accommodations do not automatically carry over to the next semester.

<https://www.jccmi.edu/center-for-student-success/accommodations-for-students-with-disabilities/>

Calendar

WEEK	DATE	TOPIC	HOMEWORK
1		Lesson: Mathematics Chapter 1 Level 1 Chapter 1 Level 2 Take Test 1	Read Pages: p.1-6, 497-524 Exercises: 2.1, 3.1, 6.1, 7.2, 8.1, 8.3, 9.3, 9.6, 9.8, 9.11, 9.12, 10.4, 11.1,12.3, 15.3
2		Lesson: Waves Chapter 2 Level 1 Chapter 2 Level 2 Take Test 2	Reading Assignment: read pages 7-42 Do Exercises: 10, 13.7, 14.3 Conceptual Questions: 4, 7, 9, 10

3		<p>Lesson: Attenuation Chapter 3 Level 1 Chapter 3 Level 2 Take Test 3</p>	<p>Reading Assignment: read pages: 43-73 Do Exercises: 11, 12</p>
4		<p>Lesson: Pulsed Wave Operation Chapter 4 Level 1 Chapter 4 Level 2 Take Test 4</p>	<p>Reading Assignment: read pages: 75-98 Do Exercises: 13</p>
5		<p>Lesson: Transducers Chapter 5 Level 1 Chapter 5 Level 2 Take Test 5</p>	<p>Reading Assignment: read pages: 99-145 Do Exercises: 11, 28</p>
6		<p>Lesson: System Operation Chapter 6 Level 1 Chapter 6 Level 2 Take Test 6</p>	<p>Reading Assignment: read pages: 147-222 Do Exercises: 7, 26</p>
7		<p>Lesson: Doppler Chapter 7 Level 1 Chapter 7 Level 2 Take Test 7</p>	<p>Reading Assignment: read pages: 223-274 Do Exercises: 1.8 Conceptual Questions: 5, 33</p>
8		<p>Lesson: Artifacts Chapter 8 Lesson: Bioeffects</p>	<p>Reading Assignment: read pages: 275-300 Conceptual Questions: 8</p>

		Chapter 9 Take Test 8 Take Test 9	Reading Assignment: read pages: 301-324 Do Exercises: 7 Conceptual Questions: 14
9		Lesson: Contrast and Harmonics Chapter 10 Lesson: Quality Assurance Chapter 11 Take Test 10 Take Test 11	Reading Assignment: read pages: 325-347, 349-376 Do Exercises: 12
10		Lesson: Physiology & Fluid Dynamics Lesson: Venous Hemodynamics Take Test 12 Take Test 13	Reading Assignment: read pages: 377-401: Conceptual Questions: Reading Assignment: read pages: 403-43
11		Lesson: Vascular Physical Principles Take Test 14	Reading Assignment: read pages: 403-434 Review for Final
12		<u>FINAL EXAM</u>	

Important Dates:

Spring 2020

Event	Dates	Notes
REGISTRATION BEGINS FOR ALL STUDENTS <i>New students must contact Admissions at 517.796.8425 prior to registering for classes.</i>	April 10, 2020	<u>Register – Spring 2020</u>

Semester Dates	May 18 – Aug. 10, 2020	
Day and evening classes begin	May 18, 2020	
Memorial Day	May 25, 2020	No classes
Independence Day Holiday	July 3-5, 2020	No classes
End of Spring Semester	Aug. 10, 2020	

Academic Advising

It is important to contact a Center for Student Success professional prior to the start of the semester in order to receive accommodations in a timely manner. While we will make every effort to coordinate accommodations in a timely manner, failure to self-identify prior to the start of the semester may delay notification to instructors and timeliness of acquiring accommodations. Accommodations do not automatically carry over to the next semester. Please e-mail JCCSS@jccmi.edu or visit the [Accommodations for Students with Disabilities](#) web page

Student Responsibilities

Students are expected to cover the necessary topics and to demonstrate their ability to meet performance objectives. It is expected by the instructor that all assignments and readings will be completed on time. The very nature of this course makes it very difficult for one to catch up once they are behind.

Attendance- Participation Policy

For online sections:

Just as in a traditional classroom course, regular class participation and keeping up on the reading and assignments is strongly correlated with survival in college. It is my recommendation that you plan to do your assignments and take your exams BEFORE the last day they are due. If problems occur, there is time to fix them before the deadline.

In compliance with Federal Title IV funding requirements, as well as college initiatives, I will be monitoring student participation on a regular basis and officially reporting student activity throughout the term to assure compliance with college policy and federal regulations. It is imperative that you log in to the course and actively participate *within the first couple days of the term* to validate your enrollment in the course. After that, not actively participating in class may result in you being withdrawn from the course. Being withdrawn from a course can have an impact on financial aid, billing, athletic eligibility, and housing status. As a college student you are responsible for how your participation impacts your academic progress; the accountability lies with you.

Caveat

Some revisions may be necessary during the semester for school closings, instructor illness and other procedural improbabilities.