

**JACKSON COLLEGE**  
**DIAGNOSTIC MEDICAL SONOGRAPHY PROGRAMS**  
**DMS-104 Introduction to Sonographic Instrumentation**  
**ONLINE COURSE SYLLABUS**

*To print use your keyboard functions (ctrl + p) to print with a PC, or use the (command/apple + p) on a Mac.*

**Facilitator:**

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**OFFICE HOURS:** Wednesday 10am-1pm by appointment. Other hours are 24/7 in my Virtual Office. The **best way to contact me is via Kim's Virtual Office forum within the course**. I also will use my Virtual Office forum to contact you (be sure to subscribe to that forum). Other alternatives are e-mail. Meetings will take place via Skype, Big Blue Button, or my campus office. Please provide the *course and section you are in when contacting me via email, but I will likely have you post in my Virtual Office forum in the course.* **\*\*Email must come from your JC account. Outside email will not be accepted.\*\***

**COURSE DESCRIPTION:** Students will learn the history and basic principles of static and real-time ultrasound machines. The instrumentation of A-mode and its conversion into the real time B-mode scanners will be explored. Laboratory assignments reinforce learning activities.

Pre-requisites for this course are MAT-131, and ENG 085

**TEXTBOOK:** Miele, F., Ultrasound Physics & Instrumentation 5th Edition, Pegasus Lectures, Inc., Texas 2013 ISBN: 978-0-9885825-0-7

**SUGGESTED ADDITIONAL TEXTS:** Edelman, S.K., Understanding Ultrasound Physics , 4th Edition, ESP, Inc., Canada

Kremkau,S., Diagnostic Ultrasound Principles and Instruments

Zagzebski, J.A., Essentials of Ultrasound Physics

Hedrick, W.R., Hykes, D.L., Starchman, D.E., Ultrasound Physics and Instrumentation.

**Course Objectives:** Students who successfully complete the Introduction to Sonographic Instrumentation course will be proficient in Demonstrating computational skills using positive and negative numbers, fractions, and decimals, ratio, and percents.

Students who successfully complete the Introduction to Sonographic Instrumentation course will be proficient in understanding exponents and metrics as it applies to the fundamentals of applied ultrasound physics.

Students who successfully complete the Introduction to Sonographic Instrumentation course will be proficient in understanding the implication of applied ultrasound mathematics to medical imaging.

**Center for Student Success:** Tutors (plus additional services for academic success) can be accessed by calling 517-796-8415 or by stopping by the Center for Student Success, Bert Walker Hall. Students requiring special assistance (including those affected by the Americans with Disabilities Act) should contact the Center for Student Success. This is the first step in acquiring the appropriate accommodations to facilitate your learning.

*Students with disabilities who believe that they may need accommodations in this class are encouraged to contact the office of Learning Support Services at 787-0800, extension 8270/8553 as soon as possible to ensure that such accommodations are implemented in a timely fashion*

### **SCHEDULE OF ASSIGNMENTS**

**YOU HAVE 2 DUE DATES ON LAB WEEKS. ALL LAB DISCUSSION POSTS ARE DUE ON SUNDAY PRIOR TO LAB SUBMISSION DEADLINE AT 10 PM ET. ALL LAB ASSIGNMENT SUBMISSIONS ARE DUE WEDNESDAYS AT 10 PM ET. ONLY LABS 1-8 ARE TO BE SUBMITTED FOR GRADING. TESTS MUST BE COMPLETED BY DEADLINE OR A ZERO GRADE WILL RESULT (NO EXCEPTIONS).** All other exercises are for your benefit. Additional items can be found in the Helpful Websites resource.

#### **Week 1 Orientation & Mathematics Level 1**

Orientation (conversion, formula sheet, etc.)

Read Pages: p.1-6, 497-524

Post intro discussion

Review all items under Important Course Items & Help Forums and Resources

Course orientation (time will be posted in the course)

LECTURE: Mathematics Level 1

LAB 1

Notes: Mathematics

Exercises: 2.1, 3.1, 6.1, 7.2, 8.1, 8.3, 10.4, 12.3, 15.2, 15.3

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**Week 2 Mathematics Level 2 & Test 1**

LECTURE: Mathematics Level 2

LAB 2

Notes: Mathematics (from previous week)

Read Pages: p.1-6, 497-524

Exercises: 9.3, 9.6, 9.8, 9.11, 9.12, 11.1

**TEST 1 COVERS ALL MATERIAL TO DATE**

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**Week 3 Waves Level 1**

LECTURE: Chapter 2 Level 1

LAB 3: Echo-ranging Technique

Notes (you will use for both levels of chapter 2)

Read Pages: 7-24

Exercises: 10

Conceptual Questions: 4, 7

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**Week 4 Waves Level 2**

LECTURE: Chapter 2 Level 2

LAB 4: Acoustic Propagation

Notes (from previous week)

Read Pages: 24-42

Exercises: 13.7, 14.3

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**Week 5 Test 2**

**TEST 2 COVERS MATERIAL THROUGH CHAPTER 2 LEVEL 2**

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**Week 6 Attenuation Level 1**

LECTURE: Chapter 3 Level 1

Notes (you will use for both levels of chapter 3)

Read Pages: 43-53

Conceptual Questions: 5

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### **Week 7 Attenuation Level 2**

LECTURE: Chapter 3 Level 2

Midterm Practice Test

Notes (from previous week)

Read Pages: 54-73

Exercises: 11

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### **Week 8 Midterm**

**MIDTERM EXAM (not proctored, but timed) COVERS ALL MATERIAL THROUGH CHAPTER 3 LEVEL 2**

**SUBMIT PROCTOR INFORMATION FOR THE FINAL BY THE END OF THIS WEEK**

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### **Week 9 Pulsed Wave Level 1**

LECTURE: Chapter 4 Level 1

LAB 5: pulsing characteristics #1

Notes (you will use for both levels of chapter 4)

Read Pages: 75-82

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### **Week 10 Pulsed Wave Level 2 & Test 3**

LECTURE: Chapter 4 Level 2

LAB 6: pulsing characteristics #2

Notes (from previous week)

Read Pages: 82-98

Exercises 13

Conceptual Questions: 16

**TEST 3 COVERS ALL MATERIAL THROUGH CHAPTER 4 LEVEL 2**

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### **Week 11 Transducers**

LECTURE: Chapter 5

LAB 7: pulsing characteristics #3

Notes

Read Pages: 99-116

Exercises: 10

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## **Week 12 Doppler**

LECTURE: Chapter 7.1

LAB 8: Frame Rate

Notes

Read Pages: 223-234

Exercises: 1.8

Conceptual Questions: 5

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## **Week 13 Test 4**

**TEST 4 COVERS ALL MATERIAL THROUGH CHAPTER 7**

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## **Week 14 Review**

Practice test final

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## **Final Exam**

**FINAL EXAM WILL COVER ALL MATERIAL AND MUST BE PROCTORED.**

**Nothing will be allowed in the testing lab, no notes, no calculator, etc. A photo ID is required.**

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*"The size of your success is measured by the strength of your desire; the size of your dream; and how you handle disappointment along the way." Robert Kiyosa*

## **GRADING SYSTEM POINTS % OF GRADE**

4 TESTS @ 70 PTS EACH = 280 45%

8 LAB ASSIGNMENTS @ 5 PTS EACH = 40 7%

1 MIDTERM @ 100 16%

1 FINAL EXAM @ 200 32%

TOTAL 620 100%

4.0=95-100%

3.5=90-94%

3.0=85-89%

2.5=80-84%

2.0=75-79%

*Some revisions may be necessary during the course due to school policies,*

*textbook issues, test issues, etc. Any change will be posted as a course announcement.*

**Student's responsibilities:** 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. It is also the student's responsibility to have a secure internet connection for testing purposes. If the student's ISP kicks them off the internet during a test, the student will not be allowed to take the test again and will receive a zero for that test. Students can find secure internet connections at their local college. To complete this course, each student is required to view the material found in the assignments and take 4 tests, a midterm and a final on-line. In addition to the online tests, each student is required to collaborate with their group to complete and submit 8 Lab assignments. Simply follow your syllabus and plan your time wisely. If you have any questions, please do not hesitate to contact me. There are forums set up for students to collaborate on each lab assignment. You are required to share your work with others (**all initial posts will be due on Sunday's of the lab weeks**) to help comprehend the material. It is the students responsibility to check the announcement area, my Virtual Office forum, lab forums, and emails for important information during the course.

**Facilitator's Responsibilities:** to facilitate learning, provide and explain the necessary materials for each student to understand the assignments and develop course performance objectives to a near mastery level. The instructor will be monitoring the forums and adding comments to student collaboration when needed.

**Tests:** All tests are accumulative. The student must be prepared to answer questions from any prior lesson. The midterm and final exam will be timed at one minute per question. All other tests are not timed. It should be noted that **calculators are not allowed** into the board exam, so they are not allowed to be used in this class. The final exam **MUST** be proctored. If you live within 200 miles of JC's main campus you will be taking the proctored final exam at the JC testing lab located in the Bert Walker Hall building on main campus (see link on front page of course under the Important Links block). If you live more than 200 miles you must find a certified testing lab in your area which may consist of Sylvan, or your local college testing lab. Please see the proctor assignment for more information including a link to proctors in your area. When selecting your proctor, be sure you will have a secure internet connection. I will need the proctor name, their job title, e-mail, phone and institution. This **MUST** be submitted to me by the end of midterm week in the specified area. **NO TEST WILL BE AVAILABLE AFTER THE DEADLINE.** They are all open from the beginning of the semester, and will not be accessible after the deadline under ANY circumstance. Never wait until the last minute to take a test!

**Academic Honesty:** <https://www.jccmi.edu/wp-content/uploads/1004.pdf>

### **Policy Summary:**

Academic dishonesty is generally an instructional and teachable opportunity for faculty to guide students and for students to learn from their actions and/or behavior. The Academic Honesty policy provides guidance for determining the level and severity of academic dishonesty, establishes how to track and report violations, and defines consequences to students.

### **Definitions:**

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

### **Policy Statement:**

Faculty members who suspect a student of academic dishonesty may penalize the student by taking appropriate action up to and including assigning a failing grade for the paper, project, report, exam, or the course itself. Instructors must document all instances of academic dishonesty, beyond those of a minor nature, in writing to the Office of the Academic Deans using the attached form.

Proctored Testing. Students who are suspected of cheating during a course exam or during Course Placement will be questioned and reported to the appropriate faculty member or Dean of Students. The proctors are not to stop the exam but report the questionable behavior. As in other instances, the faculty member will determine the penalty and appropriate action. If the student is suspected of cheating on Course Placement, the Dean of Students is to be contacted and will determine the next steps.

Reporting. The Office of the Academic Deans will record and track students who have been reported for academic dishonesty. If the same student has a second incident, the Dean will enact sanctions appropriate to the level of infraction. The sanction will be selected in consultation with the involved faculty. The Dean can administer consequences up to and including suspension.

In the event of a dispute, all parties should follow the Student Complaints/Academic procedure as outlined in the JC Faculty Agreement. This policy is also presented in the Student Rights and Responsibilities Handbook.

## **Academic Student Complaint**

**Process:** <https://www.jccmi.edu/ombudsman/student-complaint-process/>