



# **INSTRUCTIONAL PACKAGE**

DMS 101

Ultrasound Physics I

202220  
Spring 2023

# INSTRUCTIONAL PACKAGE

## Part I: Course Information

Effective Term: 202220

COURSE PREFIX: DMS 101

COURSE TITLE: Ultrasound Physics I

CONTACT HOURS: 2

CREDIT HOURS: 2

### **RATIONALE FOR THE COURSE:**

This course introduces students to basic ultrasound physics principles and sonographic instrumentation in preparation for portions of the Ultrasound Physics board examination. Topics include sound characteristics, sound wave mechanics, transducers, and sonographic equipment.

### **COURSE DESCRIPTION:**

This course is a study of fundamental principles of acoustic physics including sound waves, sound wave propagation, sound wave interactions, image production, ultrasound transducers, transducer arrays, transducer operation, imaging modes, and biological effects.

**PREREQUISITES/CO-REQUISITES:** DMS 164, Minimum grade of C

\***Online/Hybrid** courses require students to complete the [DLi Orientation Video](#) prior to enrolling in an online course.

### **REQUIRED MATERIALS:**

Please visit the [BOOKSTORE](#) online site for most current textbook information. Use the direct link below to find textbooks.

Enter the semester, course prefix, number and section when prompted and you will be linked to the correct textbook.

### **ADDITIONAL REQUIREMENTS:**

Access to Trajecsys Online Record Keeping system to log all clinical records of examinations.

### **TECHNICAL REQUIREMENTS:**

Access to Desire2Learn (D2L), HGTC's learning management system (LMS) used for course materials.

Access to myHGTC portal for student self-services.

College email access – this is the college's primary official form of communication.

## **STUDENT IDENTIFICATION VERIFICATION:**

Students enrolled in online courses will be required to participate in a minimum of one (1) proctored assignment and/or one (1) virtual event to support student identification verification. Please refer to your Instructor Information Sheet for information regarding this requirement.

## **CLASSROOM ETIQUETTE:**

As a matter of courtesy to other students and your professor, please turn off cell phones and other communication/entertainment devices before class begins. If you are monitoring for an emergency, please notify your professor prior to class and switch cell phone ringers to vibrate.

**NETIQUETTE:** is the term commonly used to refer to conventions adopted by Internet users on the web, mailing lists, public forums, and in live chat focused on online communications etiquette. For more information regarding Netiquette expectations for distance learning courses, please visit [Online Netiquette](#).

## **Part II: Student Learning Outcomes**

### **COURSE LEARNING OUTCOMES and ASSESSMENTS\*:**

#### **Module #1**

**Materials Covered:** The Basics of Sound and Sound Waves  
Chapters 1-3 - Edelman  
Chapter 1 (pgs. 1-15) - Penny

**\*Assessment(s):** Complete Review assignment  
Unit Test

#### **Learning Outcomes:**

- Describe all acoustic physics parameters of sound waves.
- Examine and characterize acoustic physics principles of sound propagation.
- Examine and characterize acoustic physics principles of sound wave interaction.
- Define waves and their acoustic variables.
- Identify parameters of magnitude to sound waves.

**Module #2**

**Materials Covered:** Pulsed Waves  
Chapter 4 -Edelman  
Chapter 1 (pgs. 15-) - Penny

**\*Assessment(s):** Complete Review Assignment  
Unit Test

**Learning Outcomes:**

- Describe acoustic physics parameters of pulsed sound waves.
- Define pulsed waves and their acoustic variables.
- Explain the terms related to wave theory and apply mathematical principles.
- Differentiate between physics parameters of pulsed sound vs. sound.

**Module #3**

**Materials Covered:** Intensities and Interaction of Sound Media  
Chapters 5-6

**\*Assessment(s):** Complete in class assignment  
Unit Test

**Learning Outcomes:**

- Describe acoustic physics characteristics of sound intensity.
- Define waves and their acoustic variables.
- Examine and characterize acoustic physics principles of sound wave interaction.

**Module #4**

**Materials Covered:** Range Equation, Sound Beams and Transducers  
Chapters 7-11

**\*Assessment(s):** Complete in class assignment  
Unit Test

**Learning Outcomes:**

- Interpret transducer operations by performing the following functions on the ultrasound machine: image formats, the pulse echo principle, and the Doppler Effect.
- Apply the correct transducers relevant to each exam and why it is relevant.
- Explain the terms related to wave theory and apply mathematical principles of the Range Equation.

**Module # 5: Two-Dimensional Imaging****Materials Covered:** Chapter 12**\*Assessment(s):** Class activity  
Unit Test**Learning Outcomes:**

1. Explain the mechanical transducer.
2. Define each array transducer.
3. Describe the various number of elements, shape, steering and focusing of each array transducer.
4. Discuss how steering and focusing occurs in array transducers.
5. Define slice thickness and how it affects resolution.
6. Explain side lobes and grating lobes and their effect on image quality.

**Module #6****Materials Covered:** Artifacts  
Chapters 20**\*Assessment(s):** Artifact Presentation  
Unit Test**Learning Outcomes:**

1. Apply academic knowledge of imaging artifacts seen in ultrasound.
2. Apply the rules of logic related to ultrasound image artifacts.
3. Distinguish various artifacts and how to confirm presence and how Sonographers eliminate.

***\*Students – please refer to the Instructor’s Course Information sheet for specific information on assessments and due dates.***

## Part III: Grading and Assessment

### EVALUATION OF REQUIRED COURSE MEASURES/ARTIFACTS\*:

Students' performance will be assessed, and the weights associated with the various measures/artifacts are listed below.

- Tests/Quizzes
- Presentation
- Assignments
- Final Exam

### EVALUATION\*

Tests	60 %
Assignments	20 %
Final Exam	<u>20 %</u>
	100%

***\*Students, for the specific number and type of evaluations, please refer to the Instructor's Course Information Sheet.***

### GRADING SYSTEM:

Exams, quizzes, and assignments comprise your grade. Grades are assigned according to raw score divided by total possible points in each category.

Grading scale is as follows:

92-100- A
83-91- B
74-82- C
65-73- D
64 and below- F

This is a major area course and requires a grade of "C" or better.

Grades earned in courses impact academic progression and financial aid status. Before withdrawing from a course, be sure to talk with your instructor and financial aid counselor about the implications of that course of action. Ds, Fs, Ws, WFs and Is also negatively impact academic progression and financial aid status.

The Add/Drop Period is the first 5 days of the semester for **full term** classes. Add/Drop periods are shorter for accelerated format courses. Please refer to the [academic calendar](#) for deadlines for add/drop. You must attend at least one meeting of all of your classes during that period. If you do not, you will be dropped from the course(s) and your Financial Aid will be reduced accordingly.

## Part IV: Attendance

Horry-Georgetown Technical College maintains a general attendance policy requiring students to be present for a minimum of 80 percent (80%) of their classes in order to receive credit for any course. Due to the varied nature of courses taught at the college, some faculty may require up to 90 percent (90%) attendance. Pursuant to 34 Code of Federal Regulations 228.22 - Return to Title IV Funds, once a student has missed over 20% of the course or has missed two (2) consecutive weeks, the faculty is obligated to withdraw the student and a student may not be permitted to reenroll. **Instructors define absentee limits for their class at the beginning of each term; please refer to the Instructor Course Information Sheet.**

Students at HGTC are responsible for all course work and assignments. Attendance is a must. The **DMS Program requires a 90% attendance**. A 10% absence will result in a student academic consultation, and formulation of a plan of action. Any further absences may be grounds for dismissal per program policy. Breach of attendance policies may be addressed on an individual case-by-case basis at the discretion of the Program Director. If a student is absent on the day of a test or quiz, the student must notify the instructor within 24 hours of the date and time of the scheduled makeup exam. The student will be responsible for contacting the testing center on the Grand Strand campus to make up the test. A student who calls in absent a second time on a test day must present a valid written, dated excuse for the absence to make up the test/quiz. Failure to do so will result in a grade of zero for that test/quiz.

**For online and hybrid courses**, check your Instructor's Course Information Sheet for any required on-site meeting times. Please note, instructors may require tests to be taken at approved testing sites, and if you use a testing center other than those provided by HGTC, the center may charge a fee for its services.

## Part V: Student Resources



### THE STUDENT SUCCESS AND TUTORING CENTER (SSTC):

The SSTC offers to all students the following **free** resources:

1. **Academic tutors** for most subject areas, **Writing Center support**, and **college success skills**.
2. Online **tutoring** and academic support resources.
3. Professional and interpersonal communication **coaching** in the EPIC Labs.

Visit the [Student Success & Tutoring Center](#) website for more information. To schedule tutoring, contact the SSTC at [sstc@hgtc.edu](mailto:sstc@hgtc.edu) or self-schedule in the Penji iOS/Android app or at [www.penjiapp.com](http://www.penjiapp.com). Email [sstc@hgtc.edu](mailto:sstc@hgtc.edu) or call SSTC Conway, 349-7872; SSTC Grand Strand, 477-2113; and SSTC Georgetown, 520-1455, or go to the [Online Resource Center](#) to access on-demand resources.



## STUDENT INFORMATION CENTER: TECH Central

TECH Central offers to all students the following free resources:

1. **Getting around HGTC:** General information and guidance for enrollment, financial aid, registration, and payment plan support!
2. Use the [Online Resource Center \(ORC\)](#) including Office 365 support, password resets, and username information.
3. **In-person workshops, online tutorials and more services** are available in Desire2Learn, Student Portal, Degree Works, and Office 365.
4. **Chat with our staff on TECH Talk**, our live chat service. TECH Talk can be accessed on the student portal and on TECH Central's website, or by texting questions to (843) 375-8552.

Visit the [Tech Central](#) website for more information. Live Chat and Center locations are posted on the website. Or please call (843) 349 – TECH (8324), Option #1.



## HGTC LIBRARY:

Each campus location has a library where HGTC students, faculty, and staff may check out materials with their HGTC ID. All three HGTC campus libraries are equipped with computers to support academic research and related school work; printing is available as well. Visit the [Library](#) website for more information or call (843) 349-5268.

## STUDENT TESTING:

Testing in an **online/hybrid** course **and in make-up exam situations** may be accomplished in a variety of ways:

- Test administered within D2L
- Test administered in writing on paper
- Test administered through Publisher Platforms **(which may have a fee associated with the usage)**

**Furthermore**, tests may have time limits and/or require a proctor.

Proctoring can be accomplished either face-to-face at an approved site or online through our online proctoring service. To find out more about proctoring services, please visit the [Online Testing](#) section of the HGTC's Testing Center webpage.



The **Instructor Information Sheet** will have more details on test requirements for your course.

### **DISABILITY SERVICES:**

HGTC is committed to providing an accessible environment for students with disabilities. Inquiries may be directed to HGTC's [Accessibility and Disability Service webpage](#). The Accessibility and Disability staff will review documentation of the student's disability and, in a confidential setting with the student, develop an educational accommodation plan.

Note: It is the student's responsibility to self-identify as needing accommodations and to provide acceptable documentation. After a student has self-identified and submitted documentation of a disability, accommodations may be determined, accepted, and provided.

### **STATEMENT OF EQUAL OPPORTUNITY/NON-DISCRIMINATION STATEMENT:**

Horry-Georgetown Technical College prohibits discrimination and harassment, including sexual harassment and abuse, on the basis of race, color, sex, national or ethnic origin, age, religion, disability, marital or family status, veteran status, political ideas, sexual orientation, gender identity, or pregnancy, childbirth, or related medical conditions, including, but not limited to, lactation in educational programs and/or activities.

### **TITLE IX REQUIREMENTS:**

All students (as well as other persons) at Horry-Georgetown Technical College are protected by Title IX—regardless of their sex, sexual orientation, gender identity, part- or full-time status, disability, race, or national origin—in all aspects of educational programs and activities. Any student, or other member of the college community, who believes that he/she is or has been a victim of sexual harassment or sexual violence may file a report with the college's Chief Student Services Officer, campus law enforcement, or with the college's Title IX Coordinator, or designee.

\*Faculty and Staff are required to report incidents to the Title IX Coordinators when involving students. The only HGTC employees exempt from mandatory reporting are licensed mental health professionals (only as part of their job description such as counseling services).

### **INQUIRIES REGARDING THE NON-DISCRIMINATION/TITLE IX POLICIES:**

**Student and prospective student** inquiries concerning Section 504, Title II, Title VII, and Title IX and their application to the College or any student decision may be directed to the Vice President for Student Affairs.

**Dr. Melissa Batten, VP Student Affairs**

*Title IX, Section 504, and Title II Coordinator*

Building 1100, Room 107A, Conway Campus

PO Box 261966, Conway, SC 29528-6066

843-349-5228

[Melissa.Batten@hgtc.edu](mailto:Melissa.Batten@hgtc.edu)

**Employee and applicant** inquiries concerning Section 504, Title II, and Title IX and their

application to the College may be directed to the Vice President for Human Resources.

**Jacquelyne Snyder, VP Human Resources**

*Affirmative Action/Equal Opportunity Officer and Title IX Coordinator*

Building 200, Room 205B, Conway Campus

PO Box 261966, Conway, SC 29528-6066

843-349-5212

[Jacquelyne.Snyder@hgtc.edu](mailto:Jacquelyne.Snyder@hgtc.edu)