DAKOTA COLLEGE AT BOTTINEAU

Course Syllabus

Course Prefix/Number/Title: DMS 211 Ultrasound Physics & Instrumentation I

Number of Credits: 2 semester credits

Course Description:
Students will be introduced to the principles of ultrasound physics and instrumentation. Emphasis will be placed on parameters of sound waves, interaction of sound and media, transducers, artifacts, safety, and quality assurance. Students will also become familiar with metric units, sound beams, types of resolution, display modes and scan converters.

Pre-/Co-requisites: None

Course Objectives:
1. Develop a foundational knowledge of acoustic variables used to identify sound waves.
2. Describe features of a sound wave, including the values of seven parameters.
3. Recognize and explain the differences between ultrasound equipment used for general, obstetric, echocardiographic and vascular sonography.
4. Develop competency in general ultrasound equipment machine operation.
5. Distinguish between the different types of ultrasound image capture and display.
6. Distinguish between pulsed waves and continuous waves.
7. Describe features of modern ultrasound transducers used in the clinical environment.

Instructors: Amy Hofmann

Office: Suite Q5101 Medical Arts Clinic, Trinity Health

Office Hours: 9 AM to 2 PM Tu, Th and by appointment

Phone: 701-857-5620

Email: amy.hofmann@trinityhealth.org

Lecture Schedule: 8:30 – 10:30 am/12:00 -2:00 MW in MAC Skywalk Classroom C

Textbook(s): Understanding Ultrasound Physics, Edelman, 4th Edition

Course Requirements:

Grading is based on completion of assignments, quizzes and test.

Assignments	15%
Quizzes	15%
Test	70%

Consistent with class attendance policy, the student is responsible for attending every class and for the material presented. If a student will not be attending a class, he/she must notify the Program Director prior to absence to plan for makeup time and activities.

Grading Criteria
A = 94-100% of the total points

B = 87 - 93% of the total points
C = 80 - 86% of the total points
F = <79% of the total points

Tentative Course Outline:

WEEK	TOPIC	READING/ACTIVITY
1/13	Sound, acoustic variables, parameters, description of sound, periods, frequency, wavelength	Chpt 1,2
1/20	propagation speed, pulse repetition duration,	Chpt 3
1/27	spatial pulse length, duty factor, pulse and continuous wave parameters	Chpt 4
2/3	sound beam intensity, spatial and temporal considerations	Chpt 5
2/10	interaction of sound and media	Chpt 6
2/17	range equations	Chpt 7
2/24	transducers	Chpt 8
3/3	sound beam shaping, focal depth, divergence	Chpt 9
3/10	March 10 - 14 Spring Break	
3/17	axial and lateral resolution	Chpt 10
3/24	Display modes	Chpt 11
3/31	Two-dimensional imaging	Chpt 12
4/7	real time imaging	Chpt 13
4/14	pulse echo instrumentation	Chpt 14
4/21	" "	
4/28	Review	Chpt 1-14
5/5	Review	
5/12	Final Test Chapters 1-14	

Competency/Department Learning Outcome(s):
CTE Competency #1: Employ industry-specific skills in preparation for workplace readiness

Learning outcome #1 – Students will be able to formulate effective technical factors based on patient body habitus, physical limitations, pathology and equipment limitations. SLO 1.1
Learning outcome #2 – Students will demonstrate professional behavior in the classroom and clinical setting by treating others with dignity, respect and compassion. SLO 3.2

Relationship to Campus Focus:
This course addresses a DMS Program theme by incorporating the latest diagnostic procedures, treatments, and other technologies that are currently used in sonographic imaging.

Classroom Policies:
1. Cell phones and related devices are monitored in the classroom at all times. It is recommended that you do not bring your cell phone or other electronic devices into the classroom or, at the very least, get instructor permission to use approved devices as classroom learning resources.
2. Food and beverages are permitted in accordance with classroom policy.
3. Be respectful of other students, instructors, and guests.

Student Email Policy:
Trinity Health/ Dakota College at Bottineau is increasingly dependent upon email as an official form of communication. A student's assigned email address will be the only one recognized for official mailings. The liability for missing or not acting upon important information conveyed via Trinity Health DMS

Program or the College because of failure to access a campus-assigned e-mail address rests with the student. Additionally, the student must provide Trinity Health DMS faculty with a personal email address for communication while in the program.

Academic Integrity:
According to the DCB Student Handbook, students are responsible for submitting their own work. Students who cooperate on oral or written examinations or work without authorization share the responsibility for violation of academic principles, and the students are subject to disciplinary action even when one of the students is not enrolled in the course where the violation occurred. The Code detailed in the Academic Honesty/Dishonesty section of the Student Handbook will serve as the guideline for cases where cheating, plagiarism or other academic improprieties have occurred. Additionally, dishonesty in the classroom or laboratory and with assignments, quizzes and exams is a serious offense and is subject to disciplinary action by the DMS Program Director. For more information, refer to the Trinity Health DMS Program Handbook policies.

Disabilities or Special Needs:
Students with disabilities or special needs (academic or otherwise) are encouraged to contact the instructor and Disability Support Services.

Title IX:
Dakota College at Bottineau (DCB) faculty are committed to helping create a safe learning environment for all students and for the College as a whole. Please be aware that all DCB employees (other than those designated as confidential resources such as advocates, counselors, clergy and healthcare providers) are required to report information about such discrimination and harassment to the College Title IX Coordinator. This means that if a student tells a faculty member about a situation of sexual harassment or sexual violence, or other related misconduct, the faculty member must share that information with the College's Title IX Coordinator. Students wishing to speak to a confidential employee who does not have this reporting responsibility can find a list of resources on the DCB Title IX webpage.

AI Student Policy:
Unless otherwise indicated in the course syllabus, or in individual instructions for course assignments, or in the absence of the express consent of the course instructor, students are not allowed to utilize generative AI to help produce any of their academic work. Any violation of this policy will be considered an act of academic dishonesty as outlined within the Dakota College Code of Student Life.

RESPONSIBILITIES

Students	• Responsible to follow the syllabus and assignment instructions regarding use of generative AI for all academic work. • Obtain permission of the instructor prior to the use of generative AI that is outside of the syllabus or assignment instructions. Provide appropriate rationale for how the use of generative AI will enhance the learning experience for the assignment. • In instances where generative AI is permissible, appropriately cite the generative AI program used and indicate where in the assignment it was used, in a brief submission statement.
Faculty	• Determine if the use of generative AI could enhance student learning in any assignment of project.

	• Clearly indicate in all course syllabi if generative AI is allowable for any academic work. • If allowable, give specific parameters for how and when generative AI may be used. • If a violation of generative AI for the individual course/syllabus is suspected, discuss the concern with the student. If violation is still suspected, inform the appropriate semester coordinator/program director.