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-requisites: DMS-201

Instructor: Amy Hofmann

Office: Suite 302 5th Ave Building, Trinity Health

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

Phone: 857-5620

Email: amy.hofmann@trinityhealth.org

Lecture Schedule: 10:30 – 11:30 am MW January 10 to May 13 in Suite 301

Textbook: 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 Lecture Outline:

WEEK	TOPIC	READING
1/10	Sound, acoustic variables, parameters, description of sound, periods, frequency, wavelength	Chpt 1,2
1/17	propagation speed, pulse repetition duration,	Chpt 3
1/24	spatial pulse length, duty factor, pulse and continuous wave parameters	Chpt 4
1/31	sound beam intensity, spatial and temporal considerations	Chpt 5
2/7	interaction of sound and media	Chpt 6
2/14	range equations	Chpt 7
2/21	transducers	Chpt 8
2/28	sound beam shaping, focal depth, divergence	Chpt 9
3/7	axial and lateral resolution	Chpt 10
3/14	**March 14 - 18 Spring Break**	
3/21	Display modes	Chpt 11
3/28	Two-dimensional imaging	Chpt 12
4/4	real time imaging	Chpt 13
4/11	pulse echo instrumentation	Chpt 14
4/18	displays and image processing	Chpt 15
4/25	Review	Chpt 1-15
5/2	Review	
5/9	Final Test Chapters 1-15	

Course Goal and Objectives

Goal:

The goal of this course is to introduce the sonography student to the basics of ultrasound physics principles and related sonographic equipment design, concepts and relationships.

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.

General Education (GE) Goal and Objectives

Not applicable

Relationship to Campus Theme:

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 prohibited 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, turn it off.
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 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 email rests with the student.

Academic Integrity

All students are expected to adhere to the highest standards of academic integrity. Dishonesty in the classroom or laboratory and with assignments, quizzes and exams is a serious offense and is subject to disciplinary action by the Program Director. For more information, refer to the DMS Program Handbook policies.

Disabilities and Special Needs

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact the Program Director (701-857-5620) as early as possible during the beginning of the semester.