



Course Prefix/Number/Title: DMS 212 Ultrasound Physics & Instrumentation II

Number of Credits: 2 semester credits

Course Description:

This course is the continued study of the principles of ultrasound physics and instrumentation. Emphasis will be placed on characteristics of sound waves, interaction of sound in soft tissue, transducers, artifacts, safety and quality assurance. Students will also become familiar with metric units, sound beam profiles, Doppler techniques, optimization of images, bioeffects and ultrasound system components.

Pre-/Co-requisites: DMS 211

Course Objectives:

1. Describe pulsed echo instrumentation to include the pulser, beam former and receiver.
2. Describe the features of image display monitors and post processing option.
3. Discuss the purpose of fundamental harmonics in imaging accuracy.
4. Discuss fluid hemodynamics and how ultrasound imaging techniques evaluate flow.
5. Distinguish between continuous wave and pulsed wave Doppler and clinical application techniques.
6. Describe methods of quality assurance in ultrasound imaging.
7. Discuss bioeffects of ultrasound, clinical safety and prudent use in imaging.

Instructor: Amy Hofmann

Office: Suite 302 5th Ave Building, Trinity Health

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

Phone: 701-857-5620

Email: amy.hofmann@trinityhealth.org

Lecture/Lab Schedule: 12:30 – 3:30 pm Tu June 5 to July 28 in Suite 301

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
6/6	pulse echo instrumentation	Chpt 14
	displays and image processing	Chpt 15
6/13	dynamic ranging system components	Chpt 16
	Harmonics and contrast agents	Chpt 17
6/20	hemodynamics	Chpt 18
	Doppler and spectral analysis	Chpt 19
6/27	optimizing Doppler	Chpt 20
7/5	Image artifacts	Chpt 21
7/11	quality assurance	Chpt 22
7/18	Sonographers in the clinical setting	Chpt 23
	bioeffects of clinical diagnostic ultrasound	Chpt 24
7/25	review	
	testing	

CTE 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 developing the knowledge and cultural competency skill sets necessary to provide safe, high quality patient care for the neonate, pediatric, adult and geriatric patient utilizing the protocols and techniques 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:

The Dakota College at Bottineau campus community is increasingly dependent upon electronic communication among faculty, staff and students. A student's campus-assigned e-mail address will be the only one recognized by the campus for official mailings. The liability for missing or not acting upon important information conveyed via email because of a failure to access a campus-assigned e-mail

address rests with the student. Additionally, 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.