# 8/3/2020

# brcc keystone logo

Baton Rouge Community College

*Academic Affairs Master Syllabus*

Date Approved: 28 August 2020

Term and Year of Implementation: Fall 2020

**Course Title:** Physics and Instrumentation I

**BRCC Course Rubric:** SONO 1102

**Previous Course Rubric**: SONO 110

**Lecture Hours per week-Lab Hours per week-Credit Hours**: 1-3-2

**Per semester: Lecture Hours-Lab Hours-Instructional Contact Hours**: 15-45-60

**Louisiana Common Course Number:**

**CIP Code:** 51.0910

**Course Description:** The course will provide the student with an introduction to ultrasound physics and instrumentation. Basic instrumentation, knobology and scanning technology will be included.

**Prerequisites:**  Admission to the Diagnostic Medical Sonography Program

**Co-requisites:** None

**Suggested Enrollment Cap:** 15

**Learning Outcomes.** *Upon successful completion of this course, the students will be able to:*

1. Define the basic terms of ultrasound physics.

2. Demonstrate understanding of the basic principles of ultrasound physics and their implementation in sonographic images.

3. Explain the fundamentals of sound wave formation, propagation, attenuation, reflection, refraction, etc.

4. Identify the ultrasound physical principles causing artifacts encountered in ultrasound images.

5. Demonstrate an understanding of the AIUM statements concerning the implementation of ultrasound and the ALARA principle.

6. Describe the bioeffects of ultrasound on human tissue.

7. Utilize basic principles of instrumentation for image acquisition and optimization.

**Assessment Measures.** Assessment of all learning outcomes will be measured using the following methods:

1. Instructor-designed exams will collectively assess a portion of the learning outcomes and will be administered during the semester as listed in the course syllabus.

2. An instructor-designed comprehensive final exam, adhering to a department-determined common content, will assess a portion of the learning outcomes and will be administered at the end of the semester.

3. Student scanning, patient care, communication, and documentation skills will be evaluated by instructor using a proficiency based clinical evaluation tool and an instructor-designed rubric.

**Information to be included on the Instructor’s Course Syllabi:**

* ***Disability Statement*:** Baton Rouge Community College seeks to meet the needs of its students in many ways. See the Office of Disability Services to receive suggestions for disability statements that should be included in each syllabus.
* ***Grading:*** The College grading policy should be included in the course syllabus. Any special practices should also go here. This should include the instructor’s and/or the department’s policy for make-up work. For example in a speech course, “Speeches not given on due date will receive no grade higher than a sixty” or “Make-up work will not be accepted after the last day of class”.
* ***Attendance Policy*:** Include the overall attendance policy of the college. Instructors may want to add additional information in individual syllabi to meet the needs of their courses.
* ***General Policies*:** Instructors’ policy on the use of things such as beepers and cell phones and/or hand held programmable calculators should be covered in this section.
* ***Cheating and Plagiarism*:** This must be included in all syllabi and should include the penalties for incidents in a given class. Students should have a clear idea of what constitutes cheating in a given course.
* ***Safety Concerns:*** In some courses, this may be a major issue. For example, “No student will be allowed in the lab without safety glasses”. General statements such as, “Items that may be harmful to one’s self or others should not be brought to class”.
* ***Library/ Learning Resources:*** Since the development of the total person is part of our mission, assignments in the library and/or the Learning Resources Center should be included to assist students in enhancing skills and in using resources. Students should be encouraged to use the library for reading enjoyment as part of lifelong learning.

**Expanded Course Outline:**

I. Basic mathematics, physics , units of operation

II. Fundamentals of waves, propagation, attenuation

III. Echoes: Reflection and Transmission, Refraction

IV. Transducers: construction and operation, damage issues

V. Ultrasound beams, Focusing and Lateral Resolution

VI. Pulsed ultrasound, PRF, Duty Factor, Intensity

VII. Axial Resolution, SPL

VIII. Image and signal processing

IX. Display and image modes, Contrast Resolution

X. Artifacts in Sonographic Images: Causes, Recognition & Correction