New Course Document

Description | SB AHLT-R 434

Course Request Key Fields

1. Requesting Campus: * SB - South Bend
2. Matching Course: * No
3. School: * CHSC - College of Health Sciences
4. Subject: * AHLT - Allied Health
5a. Course Number: * R-434
b. Has course number been reserved with, SES-CourseCatalog@exchange.iu.edu, Student Enrollment Services? Yes
6. Credit Type: * Undergraduate
7. Is this a Purdue Course? No
8a. Course Title * Ultrasound Physics 1
b. Recommended Abbreviation (30 characters including spaces): * Ultrasound Physics 1

Course Catalog Attributes

9. Academic Career: * Undergraduate
10. Effective Term (anticipated): * Fall 2011
11. Credit Hours: * Fixed at 3
12. Contact Hours: Fixed at 3
13. Is S-F grading approval being requested? * No
14. Is variable title approval being requested? * No
15. Prerequisites/Corequisites (Information Only):
16. Course Description: * This course will cover the Physics of Ultrasound Production and its Practical Application in the Clinical Setting. Participants will integrate course material with Practical aspects of Sonography in their Clinical Experiences. At the Conclusion of the course, the Sonography Student will be better prepared to enter advanced level coursework and Clinical Experience.

Course Attributes for Scheduling

17. Equivalent Courses: This is the same course taught at IUPUI as RADI-R434 in their Medical Imaging Technology Program.
18a. Repeatable for Credit? * No
19a. Type of Instructional Experience (Select primary component): * Independent Study
20. Instruction Mode (select all that apply): Face-To-Face
21. Instructor Name: Heidi Walker
22. Estimated Enrollment: 15
23. Estimated Enrollment Percent Expected to be Graduate Students: 0
24. Frequency of Schedule: * Once Per Year
25. Course Typically Offered: Fall Term
26. Will this course be required for majors? * Yes
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<tr>
<th>Question</th>
<th>Answer</th>
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<tr>
<td>Justification for New Course: *</td>
<td>To allow B.S.M.T. Ultrasound majors to complete degree requirements and test for Professional Certification.</td>
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<td>Does this course overlap with existing courses? *</td>
<td>No</td>
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<td>Are the necessary reading materials currently available in the</td>
<td>Yes</td>
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<tr>
<td>appropriate library?</td>
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<td>Do you anticipate this course will require a special fee? (Information Only)</td>
<td>No</td>
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**Essential Syllabus Information**

**ESI1. Course Content:**
This course will be conducted as an Independent Study, with the student meeting periodically with the Course Instructor for questions and Testing. Student will be responsible for completing all homework assignments and submitting Instructor based upon Syllabus Schedule.

**ESI2. Representative Bibliography or Resources:**
Understanding Ultrasound Physics, 3rd Edition. Sidney Edelman, Ph.D.

**ESI3. Teaching and Learning Methods:**
Independent Study with Home work Assignments with one on one meetings for clarification of content.

**ESI4. Learning Outcome/Objectives:**

**ESI5. Learning Assessment:**
Evaluation of student learning will be documented thru review of homework assignments, demonstration of student learning at one on one meetings, and thru written tests.

**South Bend Campus Specific Questions**

**SB1. Does this course satisfy General Education requirements?** *No*

**Notes (1)**

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**Attachments (1)**

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Course Syllabus

Course: RADI-R 434  Ultrasound Physics I

Instructor: Heidi Walker, RT(R), RDMS, B.A.

Office: Northside Hall 409.
Call for Appt. 520-4372 (office), 286-8293 (cell), hewalker@iusb.edu (email)

***Note: please send an email directly to me. If sending a message through Oncourse, click “send message to recipients email address(CC). I do not check messages via Oncourse!***

Time: Wednesday, 1:00 p.m. (Test Days)

Place: IUSB Northside 409

References:  *Understanding Ultrasound Physics, 3rd Edition*, Sidney K. Edelman, Ph.D.

Course Description:
This course will cover the physics of ultrasound production and its practical applications in the clinical setting. The course was designed with the content outline provided by the American Registry of Diagnostic Medical Sonographers. Participants will integrate course material with practical aspects of sonography in their clinical experiences. At the conclusion of this course, the sonography student will be better prepared to enter advanced level course work and also be better prepared for clinical rotations.

Course Objectives:
After completing this course, the student should be able to demonstrate applied knowledge of the following subjects:

1. Understand basics of ultrasound units.
2. Understand the acoustic variables of sound.
3. Describe sound wave; to include: Period, frequency, amplitude, power, intensity, wavelength and speed.
4. Describe pulsed waves; to include: Pulse Duration, Pulse Length, Pulse Repetition Period, Pulse Repetition Frequency, and Duty Factor.
5. Describe intensities, to include, Spatial, Temporal, Peak, Average.
6. Understand the interaction of sound and media: Decibels, Attenuation, Incidence, Scattering, Reflection, Transmission, and Refraction.
7. Know the range equation.
8. Knowledge of axial resolution, and pulse length, frequency and ringing.
9. Know the different types of transducers and materials used to make them. Know their different frequencies and architecture.
10. Know the shape of sound beams, and what “focusing” means.
11. Know the types of display modes.
12. Know the various types of two dimensional imaging.

Methodology:
This course will be conducted as an independent study, with the student meeting periodically with the course instructor for questions and for testing. Student is responsible for completing all homework assignments and tests, and submit to instructor based on the syllabus schedule.
**Attendance Policy:**

Attendance is mandatory for pre-arranged scheduled meeting times. If an emergency arises, please contact instructor as soon as possible to reschedule the meeting time.

**Course Grade:** Grade will be based on the following.

1. 3 tests (each worth 75 points)
2. Final Examination (100 points)
3. Homework (50 points)
4. Total Points Available: 375 for the semester. Total Points Earned divided by Total Points Available will formulate assigned grade.
5. The scale below will be utilized as stated in the Student BSMIT handbook.

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**Homework**

Questions are to be completed at the end of each chapter and will need to be submitted to instructor on scheduled test days. Questions and answers must be written out. Any mathematical equation questions must show work. Additional assignments will be given throughout the semester, at the discretion of the instructor.

**Accommodations**

If you require an accommodation or special service due to a disability, please inform the instructor, and arrangements can be made to accommodate the student.

**Instructor Philosophy**

This course is intended to help you prepare for the registry examination to become a Registered Ultrasonographer. It is up to you to make this happen with diligence to the study of this text, and comprehension of the Physical Principles of Ultrasound.
RADI-R 434  Ultrasound Physics I

Independent Study:  Course Schedule

Week 1:  8/28-9/3:  Chapter 1, The Basics  
  Homework:  End of Chapter Questions

Week 2:  9/4-9/10:  Chapter 2, Sound  
  Homework:  End of Chapter Questions

Week 3:  9/11-9/17:  Chapter 3, Describing Sound Waves  
  Homework:  End of Chapter Questions

Week 4:  9/18-9/24:  Chapter 4, Describing Pulsed Waves  
  Homework:  End of Chapter Questions

Week 5:  9/25-10/1:  Test 1:  Chapters 1-4  
  Submit Homework:  Chapters 1-4

Week 6:  10/2-10/8:  Chapter 5, Intensities  
  Homework:  End of Chapter Questions

Week 7:  10/9-10/15:  Chapter 6:  Interaction of Sound and Media  
  Homework:  End of Chapter Questions

Week 8:  10/16-10/22:  Chapter 7:  Range Equation  
  Homework:  End of Chapter Questions

Week 9:  10/23-10/29:  Chapter 8:  Axial Resolution  
  Homework:  End of Chapter Questions

Week 10:  10/30-11/5:  Test 2:  Chapters 5-8  
  Submit Homework:  Chapters 5-8

Week 11:  11/6-11/12:  Chapter 9:  Transducers  
  Homework:  End of Chapter Questions

Week 12:  11/13-11/19:  Chapter 10:  Sound Beams  
  Homework:  End of Chapter Questions

Week 13:  11/20-11/26:  Chapter 11:  Display Modes  
  Homework:  End of Chapter Questions

Week 14:  11/27-12/3:  Test 3:  Chapter 9-11  
  Submit Homework:  Chapter 9-11

Week 15:  12/4-12/10:  Chapter 12:  Two Dimensional Imaging  
  Homework:  End of Chapter Questions

Week 16:  12/11-12/17:  Finals Week:  Comprehensive.  Date and Time TBD

***Instructor reserves the right to revise syllabus as needed.***
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