Physics 605 Syllabus

8/24/2009

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Offices: 2018 NCPA MWF 9:00 -10:00, 2:00-3:00 or by calling 915-5888 for an appointment. TTH 10:30 – 11:00, 1:00 – 2:30

I also am glad to answer questions by e-mail.

Text: Acoustics, an Introduction to its Physical Principles and Applications, by Allan D. Pierce, published by the Acoustical Society of America

Grading:

- 3 Tests
- 2 Homework average
- <u>2 Final</u>
- 7
- 100-87.5 A 87.5-75 B 75-62.5 C 62.5-50 D <50 F

Academic Regulations:

Regular attendance is expected. Every class is important. Please do not come late. Homework is to be turned in at the beginning of class.

Web site for correct time:

http://nist.time.gov/timezone.cgi?Central/d/-6

Advance Acoustics Goals: to develop a deep understanding of the physical processes of acoustic theory.

This class emphasizes processes unique to acoustics. Overlapping fields such as modes in enclosures, diffraction and refraction are not covered.

We cover Chapters 1, 3, 10 and 11 with supplementary materials from the literature. Familiarity with the material in Chapter 2 is advised

Key concepts:

Chapter 1: Acoustic propagation in fluids, velocity potential

Chapter 3: Boundary conditions, resonance, trace velocity matching principle, impedance translation, waves in tubes, ground impedance, spherical wave reflection.

Chapter 10: Losses due to thermal and viscous effects, molecular relaxation

Chapter 11: Finite amplitude wave, shock analysis

Expectations:

You are expected to read the text material before class and after class. It is expected that you will be able to reproduce any derivation presented on tests and the exam. I highly recommend that you take notes in class and annotate or recopy these notes after class so that you can use these notes to study. The problems in this course are similar to and often derived from research problems. Solving these will develop your ability to do independent research. Some of the homework problems are difficult. You should start working on the problems early so that if you need to read other texts or go to the library you will have time to do so. The text contains references to key papers in physical acoustics. It is good practice to look these references up to gain further insight into the material and to the historical development of the field.

Scheduling around the ASA meeting is still tentative - we may substitute seminar type lectures for class meetings during the ASA meeting to allow attendance.

The syllabus below is subject to change to accommodate instruction and/or student needs.

Date	Chapter	Homework Due
Aug 24	Sec 1.1, 1.2, 1.3	
Aug 26	Sec 1.4, 1.5, 1.6	
Aug 28	Sec 1.7	
Aug 31	Sec 1.8	
Sep 2	Sec 1.9	
Sep 4	Sec 1.11	
Sep 9	Sec 1.12	Ch1 set 1 problems due
Sep 11	Sec 3.1- 3.2	
Sep 14	Sec 3.3	Ch1 set 2 problems due
Sep16	Sec 3.3 - 3.4	
Sep 18	Sec 3.5	
Sep 21	Test 1, Chapter 1	
Sep 23	Sec 3.5, 3.6	
Sep 25	Sec 3.6	
Sep 28	Sec 3.6 - 3.7	
Sep 30	Viscosity (Reif), 10.1 + Batchelor	Ch3 set 1 problems due
Oct 2	Sec. 10.1	
Oct 5	Sec. 10.1	
Oct 5	Deadline for withdrawal	
Oct 7	Sec 10.2, 10.3	Ch3 set 2 problems due
Oct 9	Sec 10. 3	
Oct 12	Test 2, Chapter 1, 3	
Oct 14	Sec. 10.4	
Oct 16	Sec 10.4, Propagation in tubes (Tijdeman)	
Oct 19	Propagation in tubes (Tijdeman)	
Oct 21	Propagation in tubes (Tijdeman)	
Oct 23	Ground Impedance models	
Oct 26	ASA ?	
Oct 28	ASA ?	
Oct 30	ASA? Spherical wave reflection	
Nov 2	Sec 10.7	Ch10 set 1 problems due
Nov 4	Sec 10.7	
Nov 6	Sec 10.8	
Nov 9	Sec 10.8	
Nov 11	Non-linear Acoustics (Hamilton and Blackstock)	Ch10 set 2 problems due
Nov 13	Sec 11.1	
Nov 16	Test 3, Chapter 1, 3, 10	Test 3, Chapter 1,3,10
Nov 18	Sec11.3	
Nov 20	Sec 11.3	
Nov 23-27	Thanksgiving vacation	
Nov 30	Sec 11.3	
Dec 2	Sec. 11.4,11.9	Ch 11 problems due
Dec 4	Review	
Dec 7	Final Exam 8:00 - 11:00	