Physics 605
Syllabus

8/12/2011

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

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
2	Final
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, adiabatic versus isothermal, velocity potential

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

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.

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

We will try to go a little faster than scheduled to accommodate the ASA meeting

Date	Chapter	Homework Due
Aug 23	Sec 1.1, 1.2, 1.3, 1.4	
Aug 25	Sec 1.4, 1.5, 1.6,1.7	
Aug 30	Sec 1.7, 1.8	
Sep 1	Sec 1.9, 1.10	
Sep 3	Sec 1.10, 1.11	
Sep 6	Sec 1.12, 3.1, 3.2	**Ch1 set 1 problems due**
Sep 8	Sec 3.3	
Sep 13	Sec 3.4	**Ch1 set 2 problems due**
Sep 15	Sec 3.4	
Sep 20	**Test 1, Chapter 1**	
Sep 22	Sec 3.5	
Sep 29	Sec 3.5, 3.6	
Oct 4	Sec 3.6, 3.7	
Oct 6	Viscosity (Reif), 10.1 + Batchelor	**Ch3 set 1 problems due**
Oct 11	Sec 10.2, 10.3	
Oct 13	Sec 10.3	**Ch3 set 2 problems due**
Oct 18	Sec 10.3, 10.4	
Oct 20	**Test 2, Chapter 1, 3**	
Oct 25	Propagation in tubes (Tijdeman)	
Oct 27	Propagation in tubes (Tijdeman)	
Nov 1	Ground impedance models	
Nov 3	Spherical wave reflection	**Ch10 set 1 problems due**
Nov 8	10.7, 10.8	
Nov 10	Non-linear Acoustics (Hamilton and Blackstock)	**Ch10 set 2 problems due**
Nov 15	Sec 11.1, 11.2, 11.3	
Nov 17	Sec 11.3, 11.4	
Nov 21-25	Thanksgiving holiday	
Nov 29	**Test 3, Chapters 1, 3, 10**	**Ch 11 problems due**
Dec 1	My version of Sec 11.9, Review	
Dec 6	Final Exam 8:00	