PHYS 1320 / MPSY 5340 / PHYS 3320 / KNW 2305

Music & Physics
Fall, 2016

INSTRUCTORS:
Fredrick I. Olness (office 201FS, phone 768-2500, olness@smu.edu)
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COURSE WEB PAGE:
Linked from below under "Physics Courses"
www.physics.smu.edu/olness

MEETINGS:

LECTURE: Tuesday & Thursday, 2:00 - 3:20, Fondren Science Rm.158
LAB: Monday (1-3pm) (3-5pm) or (5-7pm), Fondren Science Rm.60

BEWARE: On occasion, lecture and lab may be held in different rooms.
BEWARE: The first lab is on Monday August 22, 2016
BE SURE TO DO THE PRE-LAB IN ADVANCE!!!
(For PHYS 3320, there is a weekly recitation section in place of a lab.)

TEXT: *Note, we are changing to a different text beginning in 2008.*
John Backus (Author)
"The Acoustical Foundations of Music" Hardcover: 384 pages
Publisher: W. W. Norton & Company; 2 edition (December 1977)

REFERENCES:
Selected books will be placed on reserve.

GRADES: Components are:

PHYS 1320	MPSY 5340	PHYS 3320
Exams (50% total)	Exams (50% total)	Exams (40% total)
Daily quizzes (20%)	Daily quizzes (20%)	Daily quizzes (20%)
Laboratory (30%)	Paper & presentation (20%)	Homework (40%)
	Laboratory (10%)	

GROUP PROJECT: Students will work in groups of 2 or 3 on a selected project. This will count for 3 quiz-grades. **DUE DATE: THURSDAY DECEMBER 1, 2016**

PAPER & PRESENTATION (MPSY 5340 Only): Each student will be responsible for writing a paper 10 to 15 pages in length. You may, if you choose, submit your project in the form of a web page(s). The topic should be either the acoustics (psychoacoustics) of your own instrument or another acoustics topic of your choice. Presentations of this type are usually enhanced by a demonstration.

COMPUTER BASED HOMEWORK (Phys 3320 Only): For those in the upper level physics version, we will have separate homework assignments using both computer algebra and advanced mathematical techniques.

COURSE CONTENT: We will cover both the acoustics (physical sound properties) and the psychoacoustics (psychological, perceptual properties) of music. Topics will include sound in general, sound of musical instruments (including voice), sound characteristics of rooms, electronic production (synthesis) and reproduction of sound.

DEMONSTRATIONS: Demonstrations will be done in class sessions throughout the semester. You are encouraged to make suggestions about interesting ways to demonstrate the phenomena we are studying. Each class discussion will FOLLOW the reading of appropriate material, meaning that you will be expected to have completed the reading PRIOR to the class session for which it is listed. The same for tape listening assignments.

ASSIGNMENTS: Various problem sheets will be distributed for you to complete. Your completion of the problems is optional, and will be for your own benefit. As such, the problem sheets will not be graded. Other assignments, such as completing lab tasks and doing outside investigations will be considered under "participation".

Office Hours As posted, and by appointment. You should also be aware that there are a number of resources available for extra help including the LEC. Contact us for details.

Calculators: A scientific calculator is a must. Necessary functions are sin, cos, tan, exp, log, and roots, as well as the inverse operations. (Note, you need not spend more than about $15 for this. I didn't. I use a TI-30.)

Course Web Page The course web page is linked to www.physics.smu.edu/olness

Prerequisites: (PHYS 1320) No calculus. No advanced math. We shall assume a working knowledge of algebra and trigonometry, and will review the necessary material before it is used.

Quizzes: There will be a short quiz at the beginning of each class. The lowest 3 grades will be dropped **if** you complete your group project. (Note, this includes all missed quizzes, doctors appointments, and other emergencies.) No make up quizzes will be given after the scheduled quiz.

Homework: Physics is not a spectator sport! Homework is assigned for each chapter. I encourage you to work in a study group and to use my office hours if you have difficulty. (Note, I do not need to grade the homework since it will be obvious from the quiz grades who is doing the work.)

Final Exam: The final exam is scheduled for **Wednesday Dec. 14, 2016, 11:30am-2:30pm**
Be sure to double check the schedule on the web.

Laboratory: The labs are held Monday 1-3pm, 3-5, and 5-7pm. You will need a 1) calculator, 2) spiral lab notebook. There is no laboratory manual to purchase.

There will be a short PRE-LAB ASSIGNMENT due at the beginning of lab to ensure you prepared the material; this counts as a part of the lab grade. You are responsible for obtaining this material in advance.

Final Remark: I'm sure we missed something.

- Disability Accommodations: Students needing academic accommodations for a disability must first register with Disability Accommodations & Success Strategies (DASS). Students can call 214-768-1470 or visit http://www.smu.edu/Provost/ALEC/DASS to begin the process. Once registered, students should then schedule an appointment with the professor as early in the semester as possible, present a DASS Accommodation Letter, and make appropriate arrangements. Please note that accommodations are not retroactive and require advance notice to implement.

- Religious Observance: Religiously observant students wishing to be absent on holidays that require missing class should notify their professors in writing at the beginning of the semester, and should discuss with them, in advance, acceptable ways of making up any work missed because of the absence. (See University Policy No. 1.9.)

- Excused Absences for University Extracurricular Activities: Students participating in an officially sanctioned, scheduled University extracurricular activity should be given the opportunity to make up class assignments or other graded assignments missed as a result of their participation. It is the responsibility of the student to make arrangements with the instructor prior to any missed scheduled examination or other missed assignment for making up the work. (University Undergraduate Catalogue)

- Student Learning Outcomes: Please include in your syllabi all student learning outcomes, both those specific to your course, as well as those that satisfy major and general education requirements.

- Final Exams: Final course examinations shall be given in all courses where they are appropriate, and some form of final assessment is essential. Final exams or final assessments must be administered as specified in the official examination schedule, and shall not be administered during the last week of classes or during the Reading Period. Please state clearly in the syllabus the date/time and form of the final exam or assessment.

University Curriculum Components and Associated Student Learning Outcomes

Student Learning Outcomes: Pillar: Pure and Applied Science:

To be active, engaged citizens in a global society, graduates of SMU will be able to engage in scholarly discourse in science and engineering and to understand the implications of these disciplines. Students should be aware of the meaning and methods of science and engineering, and of the ways that both disciplines have shaped and continue to shape the world around us. To achieve this goal, students must take two courses, with lab experiences, in the Pure and Applied Science Pillar. Due to the constraints of lab courses, these courses may both be introductory.

1. Students will be able to demonstrate basic facility with the methods and approaches of scientific inquiry and problem solving. (Level 1)

2. Students will be able to explain how the concepts and findings of science or technology in general, or of particular sciences or technologies, shape our world. (Level 1 & 2)

Student Learning Outcomes: *Quantitative Reasoning*

Upon successful completion of this course, students will meet the expectations from the Quantitative Reasoning student learning outcomes:

1) Students will be able to develop quantitative models appropriate to problems in Physics.

2) Students will be able to assess the strengths and limitations of quantitative models and methods used in Physics.

4) Students will be able to collect, organize and analyze data from a variety of sources.

How this course achieves these Student Learning Outcomes:

The above objectives will be achieved through: participation in in-class discussion of lecture and reading materials; discussion with the lead instructor(s) of reading and lecture during regular office hours; successful completion of routine homework assignments; successful completion of in-class quizzes and several in-class examinations. In addition, students will participate in a weekly laboratory component that is included in this course. This will enhance the above objectives with hands-on application of principles learned from lecture and reading.