

Dr. William Robertson
207 Wiser-Patten Science Bldg.
Office phone: 898-5837

Office Hours: Monday and Wednesday 9:30 a.m.-4:00 p.m.
E-mail: wroberts@mtsu.edu
WWW: http://capone.mtsu.edu/wroberts/P160_open.htm

Physics 1600: The Physics of Music, Fall 2014

Textbook: There is no text. In the past I assigned *The Science of Sound* by Rossing, Addison Wesley, 2nd Edition; it is a great book (now in 3rd edition) but I really go my own way and students did not find that it was necessary. Boom! I've just saved you \$90 or so.

Course Goal: Introduce students to the scientific approach to sound and musical acoustics.

Expected Prerequisites: Math 1710. Some of the examples presented in class, in the homework and on-line exercises, and in quiz and exam questions will make use of basic math and algebra.

Web-based Learning: There is a web-based aspect to this course accessible at the http address given above. On the web I will be posting a summary of the material covered in class. Don't feel that this material serves as a replacement for coming to class—it doesn't! However, it will give you some source of review. More importantly, the homework problems for each section are on the web. To be able to successfully complete the quizzes (60% of your course grade!) you will have to do the homework. I do not collect or grade the homework. It's your responsibility to get comfortable with your ability to solve the assigned problems and to find me and ask questions when you encounter problems.

Grading: The course grade will be determined by a combination of your in-class quizzes, a special project, and a final exam in the following ratio:

Quizzes	(In-class 4 worth 15% each)	60%
Special Project		20%
Final Exam		20%

- Quizzes will be interspersed throughout the semester. The in-class quizzes will feature material covered since the previous quiz, and they will primarily emphasize examples from the homework.
- The special project is an opportunity for you to explore an aspect of the subject that interests you. The choice of topic, and even the medium of presentation, is fairly fluid. The only requirement is that the topic be concerned with a scientific approach to a musical or acoustics subject. My personal favorite for the special project is one in which you build your own musical instrument. However, because I realize that not everyone has access to even simple tools, some alternatives are to write a paper on the physical principles of a specific musical instrument, or design a survey testing some acoustic or psychoacoustic phenomenon. I will give more details on the project in class as well as a list of ideas and suggestions. Before you start on your project you must get an approval from me of your chosen topic.
- The final exam is a comprehensive multiple-choice test on everything we've covered in the semester.

Homework: The schedule on the following page identifies the lecture topics. This schedule is *tentative*; it will change slightly as the semester progresses. Such changes will be communicated in class, *so be there!* Homework assignments are available on the web. Homework will not be collected; however, as mentioned, it is vital preparation for the type of questions that will appear on quizzes and the final exam. The answers to homework problems are posted on the web so you can assess how well you understand the material.

Withdrawal: It is the policy of the Department of Physics & Astronomy that no drops will be approved after the official university deadline. The last day to drop with a grade of W for this semester is October 29, 2014.

Disability & Access Center: Reasonable Accommodations for Students with Disabilities: Middle Tennessee State University is committed to campus access in accordance with Title II of the Americans with Disabilities Act and Section 504 of the Vocational Rehabilitation Act of 1973. Any student interested in reasonable accommodations can consult the Disability & Access Center (DAC) website www.mtsu.edu/dac and/or contact the DAC for assistance at 615-898-2783 or dacemail@mtsu.edu.

Schedule

This is an approximate schedule for the semester. I find that I plan to cover more than I can actually accomplish which implies that we might not get to some of the topics listed at the end of the semester. I have put what I think is vital near the beginning—we **will** cover this material. The one part of the schedule that will not change is the dates on which the quizzes are given. The topics on the quiz might well change—obviously, I will only ask questions on material that we have finished covering. I will announce in the class before the quiz what material you will need to review.

TUESDAY		THURSDAY	
Aug 26	Introduction: What is Physics? Measurements and Units	Aug. 28	Simple Harmonic Motion
Sept. 2	Simple Harmonic Motion	Sept. 4	Simple Harmonic Motion. Resonance. Sept 7 is last day to drop w/ no grade
Sept. 9	Waves	Sept. 11	Waves
Sept. 16	QUIZ 1 on Units, Simple Harmonic Motion.	Sept. 18	Waves
Sept. 23	Structure of the ear	Sept. 25	Structure of the ear
Sept. 30	Pitch and Frequency	Oct. 2	Pure Tones and Complex tones
Oct. 7	QUIZ 2 Waves, the ear, and pitch	Oct. 9	Loudness, decibels and all that.
Oct. 14	FALL BREAK-NO CLASSES	Oct. 16	Loudness, decibels and all that.
Oct. 21	Musical scales and temperament	Oct. 23	Musical scales and temperament
Oct. 28	The Science of Consonance Last drop day (with a W) is Oct. 29	Oct. 30	The Science of Consonance
Nov. 4	QUIZ 3 Loudness and decibels, scales.	Nov. 6	Room acoustics
Nov. 11	Room acoustics	Nov. 13	Room acoustics
Nov. 18	Room acoustics	Nov. 20	QUIZ 4 Consonance, Room Acoustics
Nov. 25	Final Project Presentations	Nov. 27	Thanksgiving: no classes
Dec. 2	Final Project Presentations	Dec. 4	Study Day
		Dec. 11	FINAL EXAM 1:00-3:00 p.m.

Do you have a lottery scholarship? To retain the Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. A grade of C, D, F, FA, or I in this class may negatively impact TELS eligibility. If you drop this class, withdraw, or if you stop attending this class you may lose eligibility for your lottery scholarship, and you will not be able to regain eligibility at a later time. For additional Lottery rules, please refer to your Lottery Statement of Understanding form (<http://www.mtsu.edu/financial-aid/forms/LOTFOD.pdf>) or contact your MT One Stop Enrollment Counselor (<http://www.mtsu.edu/one-stop/counselor.php>).