PHYSICS OF SOUND & MUSIC - PHYSICS 152/ F 2003
Michael Raymer, Professor of Physics
Office - 262 Willamette, 346-4785
Office Hours: TBA

DESCRIPTION - A non-major's science course to introduce the physical concepts necessary to understand how musical sound is produced and how it travels. Optional topics include how music is stored and reproduced, and how it is heard. Fundamental issues in physics will be discussed using only elementary math and simple algebra.

Required Text - *The Physics of Sound* by R. Berg and D. Stork

Attendance - Since much of the material is not covered in the text, especially the content of lecture demonstrations, attendance of all lectures is essential to learning the subject.

Grading -
Weekly Homework: 25%, you may work together on this.
Quiz 1 (Oct.21): 10%,
Quiz 2 (Nov.11): 10%,
Term Paper (due Nov.25): 25%, this must be independent work.
Final (8:00 am, Wed. Dec.10, Wil 110): 30%

Homework Policy - All assignments are due by 5:00 pm on the due date, normally a Thursday. Assignments will be accepted up to 24 hours late, but will receive at most 80% credit. Assignments more than 24 hours late will earn no credit.

Course Web Site: [http://blackboard.uoregon.edu/](http://blackboard.uoregon.edu/)
Course Announcements, Lecture Supplements, Homework assignments, and other materials will be posted, usually as pdf files. It is your responsibility to check here at least twice a week for updates.

Notices: *Use of electronic communication devices is not permitted during lectures, unless pre-approved by me.*

*All acts of alleged academic dishonesty will be reported to the university's student conduct officials.*

*If you have a documented disability and anticipate needing accommodations in this course, please make arrangements to meet with me soon.*
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COURSE SYLLABUS
Tues.10:00am - 11:50am, Thurs.10:00am - 10:50am Willamette 110
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WEEK 1 (SEP.30-OCT.3) Simple Oscillations
(text ch. 1.1 – 1.4)
harmonic motion, damping

WEEK 2 (OCT.6-10) Musical Frequencies and Intervals
(text appendix. A. ch.9.1 – 9.3, 9.7)
octaves, fourths, etc., scales, tunings

WEEK 3, 4 (OCT.13-24) Waves
(text ch. 2.1 – 2.4)
waves, propagation, addition, beats

WEEK 5, 6 (OCT.27-NOV.7) Standing Waves and Resonance
(text ch. 3.1 – 3.5)
transverse (string), longitudinal (air), air pipes, reflections,

WEEK 7 (NOV.10-14) Frequency Analysis and Synthesis
(text ch. 4.1 – 4.4, parts of ch.5, 7)
synthesis, Fourier analysis, spectrum, tone quality, resonance
curves

WEEK 8, 9, 10 (NOV.17 – DEC.5) Musical Instruments
(text parts of ch.10, 1, 12, 13, 14)

Final Exam 8:00 am Wed Dec.10 Willamette 110