Physics 371 Syllabus
Spring 1993

		Chapter	
Jan	19	1	Introduction
	21	2	Threshold Curves
	26	2	Loudness
	28	2	Masking, Stereo Perception
Feb	2	~~no class~~ 2	"
	4	1st Hour Exam	
	9	3	Anatomy of the Ear
	11	3	nerve impulses
	16	4, 5	Sound Intensity
	18	6	Math
	23	7	Simple Harmonic Motion
	25		
March	2	2nd Hour Exam	
	4	8	Descrition of a String
	Spring break		
	16	9	Traveling Waves on a String
	18	10	Physical Constants of a String
	23	11	Fourier Analysis
	25	12	Beats and Musical Scale
	30	13	Resonating Air Columns
April	1	14	Stringed Instruments
	6	14	Stringed Instruments
	8	14	Stringed Instruments
	13	3rd Hour Exam	
	15	15	Horns and Pipes
	20	15	Horns and Pipes
	22	16	Drum, Membranes
	27	17	Acoustics of Rooms
	29	17	Acoustics Term Paper due
May	4	17	Acoustics Term Paper due
	6	Special Topics	

SYLLABUS - PHYSICS 371 (tentative)

Acoustics for Musicians

J. Backus: "The Acoustical Foundations of Music "Second Ed. (Norton Co.)

9:55 Room 1313 Sterling

Instructor: W. Haeberli, Room 1506 Sterling Hall
Phone: 262-0009 (office); 233-1887 (home)

25-Jan	Introduction; fundamental quantities		Ch. 1
27-Jan	Oscillations: frequency, period, damping		Ch. 2
1-Feb	Wave propagation,		Ch. 3
3-Feb	Superposition		
8-Feb	"Standing waves", resonance		Ch. 4
10-Feb	Voicing of strings		
15-Feb	Pipes, "natural" scale		
17-Feb	Tone quality		Ch. 6
22-Feb	Formants		
24-Feb	exam (Ch 1-4)		
1-Mar	ear, loudness		Ch 5
3-Mar	frequency and pitch		Ch 7
8-Mar	Physics of musical intervals		Ch. 8
10-Mar	Just scale, tempered		
15-Mar	String Instruments		Ch. 10
22-Mar	Good and bad violins		
22-Mar	Woodwinds		Ch. 11
29-Mar	exam (Ch. 5-10)		
	spring break		
5-Apr	woodwinds		
7-Apr	brass		Ch. 12
12-Apr	piano		Ch. 13
14-Apr	piano		
19-Apr	percussion		Ch. 14
21-Apr	lab experiments		
28-Apr	exam		
3-May	lab experiments		
5-May	lab experiments		
10-May	concert hall acoustics	papers due	Ch. 9
12-May	concert hall acoustics		

Office Hours

After class or any other time by arrangement (I am in the building and do not mind being interrupted - talk to me after class or call me).

Home Work

One assignment per week - simple practice problems and reading assignment from text or additional lecture notes. An example of a similar problem will be done ahead of time in class. Try for half an hour at home - if you can't do it come to get help. Use a cheap calculator (preferable with square root).

Exams

The exams are similar to the home work and to questions from the study questions which will be handed out prior to the exams. There is no final exam.

Paper

A paper of about four pages - it can be a report about a lab experiment you choose to do, a paper about the physics of your instrument as you understand it from the text and/or from other reading. Anything having to do with musical acoustics (piano tuning, history of musical scales, can absolute pitch be learned etc).

Grades

Do not worry about grades. If you set aside 4-5 hours outside of class per week and attend class regularly you will get A or B.

Experiments available for student labs in acoustics.

(times of labs by special arrangement)
Physics of loudspeaker, microphone, tape recorder etc. (a demonstration lab).
Oscilloscope, oscillator
Hearing tests
Study of mechanical oscillations: resonance, damping
Vibration of strings
Vibration of air column (pipes)
Sound analysis (Fourier analysis)
Scales (tunable key board and frequency meter)