

**SCI220 – Foundations of Musical Acoustics 3(2,2)**  
**Course Syllabus**  
**Cogswell Polytechnical College**  
**Fall 2008**

**Instructor:** Adnan Marquez-Borbon

**Class Meetings:** T Th 1:30–3:30pm

**Office Hours:** TBA

**Room :** TBA

**Email:** [adnanm@ccrma.stanford.edu](mailto:adnanm@ccrma.stanford.edu) (put as email subject the title of the class)

**Course Description:**

Simple vibrating systems, waves and wave propagation, complex vibrations and resonance, intensity and loudness, frequency and pitch, scales, tuning, temperament, acoustic features and characteristics of acoustic musical instruments by family, room acoustics. Anatomy and acoustics of human ear and voice. Students learn the science of tone production and delivery.

**Prerequisites:** MATH115, SCI100

**DAT Learning Outcomes fulfilled by this course:**

Explain the conceptual basis of the tools and processes used in audio production from a scientific, mathematical or engineering perspective.

**GE Learning Outcomes fulfilled by this course:**

Describe scientific principles and perform experiments illustrating those principles; apply scientific reasoning to analyze data.

**Materials:** The required text is *Fundamentals of Musical Acoustics. 2nd revised edition* by Arthur H. Benade. Supplementary handouts and assignments will be provided by the instructor.

**Exam:** A midterm will be provided sometime during the 8<sup>th</sup> or 9<sup>th</sup> week of the semester. The material covered will include the textbook readings and any other extra material provided as noted by the instructor.

**Term Project:** A 6–8 page term paper will be required on a topic chosen before hand by the student. The paper should be written in the MLA style format (See *A Guide To MLA Documentation* by Joseph Trimmer or *MLA Handbook for Writers of Research Papers*, 6<sup>th</sup> Ed. By Joseph Garibaldi)

**Final Presentation:** A 10–15 min presentation based on the term paper topic will be held during the last week of classes. Power point slides, web pages and/or computer software examples are highly recommended as complementary presentation material.

**Grading:** Each assignment (including midterm and final exams, as well as the term paper) will be graded on a 100–point scale. No grade curving will be done. Exercises are due the following week during the regular class meeting.

Midterm – 40 %

Term paper – 25 %

Lab Exercises – 20 %

Presentation – 15 %

#### Grade breakdown

A: 90 – 100

B: 80 – 89

C: 70 – 79

D: 60 – 69

F: < 60

## Course Outline

<b>Week:</b>	<b>Topic</b>
1.	Introduction: Impulsive Sounds (Ch.2)
2.	Harmonic Motion: Simple and composite (Ch.3, 4)
3.	Pitch (Ch.5, 14)
4.	Psychoacoustics/ Hearing (Not in FMA)
5.	Loudness (Ch.13)
6.	Oscillation Modes (Ch.6, 10)
7.	Room Acoustics (Ch.11, 12)
8.	Successive Tones: Musical scales (Ch.15) – midterm
9.	Strings I: Plucked, struck, bowed (Ch.7, 8)
10.	Strings II: Bowed, violin family (Ch.23, 24)
11.	Keyboards (Ch.16, 17, 18)
12.	Voice (Ch.19)
13.	Brass Winds (Ch.20)
14.	Woodwinds (Ch.21, 22)
15.	2D surfaces: Drumhead and soundboards (Ch.9)
16.	Final Presentations and papers due