Rough Syllabus for Music 106 J. Balzano June 9, 1978

Art and Science [½ week]

- Scientific bases for art
- Artistic criteria in science

The art of experimentation, the art of theorizing [1 week]

- Types of paradigms (exemplary experiments from psychoacoustics)
- Collecting data; variability and prediction
- Analyzing data: tests and techniques (exemplary experiments)
- Types of theories
  - Organism-centered: information processing
  - Stimulus/environment-centered: "Gibsonianism"
  - Neither organism nor stimulus-centered (contingencies only): behaviorism

Overview of the physics of sound [1 week]

- Periodicity, waves, harmonics
- Resonance
- Musical instruments briefly

Psychophysics: the basic correspondences [1 week]

- Pitch/Frequency
- Loudness/Amplitude
- Rhythm/Time
- Timbre/"everything else" (ASA def'n)
- Scaling & the measurement of perceptual distances
  - Types of psychophysical scales
  - Multidimensional scaling
- Exceptions to simple correspondences

Pitch perception and memory [2 weeks]

- How psychophysics squares with the facts of musical experience
- Two kinds of pitch perception studied in laboratories
- The basic musical intervals; the octave
- Perceptual properties of intervals
- Pitch memory
- Pitch sequences, melodies, transformations
- Musical scales
  - Tonality
  - Acoustic basis for scales
  - Algebraic basis for scales

Absolute pitch
Physiological levels of "explanation"
  Peripheral pitch coding
  Place and periodicity theories of pitch perception

Odd pitch phenomena and "illusions"
  Shepard tones
  Binaural pitch
  The pitch of very short and very high tones

Rhythm [1 week]

Is time perception relevant to rhythm?
Early studies
Perception of temporal patterns; periodicity
Streaming
Development of rhythmic abilities

Timbre [1 week]

Early theories of timbre and the failure of the Hammond organ
Temporal microstructure as a determinant of timbre
  Tape-cutting and transformation experiments
  Scaling expts.
Streaming and timbre
Texture: analogies w/vision

Speech perception [1 week]

What is perceptually special about language?
Language by ear and by eye
The search for acoustic invariants
  Vowels
  Consonants
Categorical perception: a speech mode?
Sensory & motor theories of speech perception
Intelligibility: statistical vs. deterministic constraint

Space perception [1 week]

"Cues" for distance and direction
Variables that are specific to distance and direction
Localization vs. lateralization
The precedence effect
Masking-level differences
Audible properties of objects and events; bats & the blind

Computer music and artificial intelligence
Hemispheric asymmetry and music [½ week]

Possible texts: (1) B. C. Moore, Introduction to the Psychology of Hearing. (2) V. Zuckerkandl, The Sense of Music. (3) H. Helmholtz, On the Sensations of Tone, (4) C. Seashore, The Psychology of Music, (5) Various articles and chapters from the literature.