EE480: Acoustics and Audio
Fall Semester 2004

WRITTEN REPORT ASSIGNMENT

Each student enrolled in the course will be required to write a concise written report dealing with some topic related to acoustics and/or audio (several example topics are given below). The paper should represent an introductory treatment of the chosen topic. Several considerations will guide your choice of topic and format:

• The paper should be written in formal style, but at a level appropriate for reading by an engineer not necessarily familiar with the topic. Imagine that you are writing a background report at work for reading by your technical manager.

• Choose a topic you are interested in, *but* make sure you have sufficient reference material to produce a comprehensive treatment. Look for up-to-date books in the library, check journals and periodicals, use the web, and follow up on other sources of information. Your paper should include a bibliography of at least four *pertinent* references, perhaps including the Kinsler and Frey text.

• Organize your paper according to the following outline:

- Paper must be of typed-quality with 1" margins.
- All pages should be numbered consecutively.
- A **cover sheet** with:
    - · your name
    - · the title of your paper
    - · the course number, course title, and semester
- An **introduction** providing an overview of the topic and the paper.
- Two or more **sections** containing the report and significance of the findings.
- A **conclusion and summary** section including suggestions for other info sources.
- A complete **bibliography** organized by author, including all reference info.
- If needed, include an **appendix** of reference data, e.g., component data sheets.

• DUE DATES:
11/17/04: A **one page summary** of your paper topic (I will read and comment)
12/8/04: Final copy of paper **turned in** (due at the start of class that day)

TOPIC IDEAS:
These are some possible paper topics: note that you do *not* need to choose from this list!

Testing of Loudspeakers
Acoustical simulation using Matlab
Manufacture of Compact Discs and DVDs
Methods for Artificial Reverberation
Human Perception: Critical Bands and Masking
Musical Acoustics of String Instruments
Musical Acoustics of Percussion Instruments
Musical Acoustics of ???
Design of Audio Power Amplifiers
Design of Fixed/Variable Analog Filters Using Op Amps
Circuit Design, Component Selection and Layout for Audio Purposes
Electronic and Computer Music
MIDI: the **M**usical **I**nstrument **D**igital **I**nterface Standard
Modern DSP Chips
Digital Filter Basics
Microphones
DAT: **D**igital **A**udio **T**ape
MP3: What it is and how it works
Auditorium Acoustics and Measurements
Listening Room and Studio Design
The Roles of Futurism, Dadaism, and Fascism in the Development of Electroacoustic Music
Digital Sampling and Sample Rate Conversion
Sonic Booms
Binaural Localization
Aids for the Hearing Impaired
Speech Production and Perception
Automatic Speech/Speaker Recognition
Noise Reduction Techniques for Analog Tape (Dolby™, dbx™, etc.)
Our Violent World: Earthquake, Fire, and Cataclysm
The Telephone System
Active/Adaptive Noise Control
Analog/Digital/Analog Conversion
Noise Shaping for ADC and DAC
Digital Oversampling Theory and Practice
Measurement of Audio Equipment: Frequency Response, THD, etc.
Storage and Transmission Standards for Audio Signals
Testing Strategies for Psychoacoustic Experiments