

# Review Topics

## Physics of Music

### Chapters 7-8

#### Chapter 7: Sound Recording and Reproduction

##### General concepts

- Connecting electronic components
- Simple circuits and Ohm's law

##### Microphones

- Type of transducer
  - Magnetic induction and Faraday's law
  - Dynamic microphones
  - Capacitors
  - Condenser microphones
  - Other types
- Directionality
  - Omnidirectional, cardioid, shotgun and parabolic microphones
- Transient response

##### Loudspeakers

- Magnetic force on an electrical current and electromagnetic loudspeakers
- Frequency response
  - Woofers, tweeters, midrange, etc.
  - Crossover network
- Types of enclosure
  - Infinite baffle, acoustic suspension, and tuned port

##### Preamplifiers and their features

- Filters
- Loudness compensation
- Attenuation factors for treble and bass

##### Power amplifier basic features

##### AM-FM Tuners

- The electromagnetic spectrum and the place of radio
- Bandwidth and frequency assignments
- FM multiplex stereo

##### Tape recording

- Hysteresis and tape bias
- Magnetization, noise, and Dolby noise reduction

##### Compact Disc technology

- Analog and digital signals
- Binary and base ten
- Digitization of waves, A to D and D to A converters
- General CD features

##### Error control

- Dynamic range of CD technology
- Laser beam tracking

Reading accuracy and eight-to-fourteen modulation  
Burst errors and Cross-Interleave-Reed-Solomon (CIRC) code  
Frequency cutoff and aliasing

MP3

How MP3 reduces file size  
File size vs. fidelity

## **Chapter 8: Room and Auditorium Acoustics**

Reverberation time  $T_R$

Effect of reverberation time on room acoustics

Acoustical descriptive terms:

Liveness  
Intimacy  
Fullness vs. clarity  
Warmth vs. brilliance  
Texture  
Blend and Ensemble

Acoustical problems:

Focusing of sound  
Echoes  
Shadows  
Resonances  
External noise  
Double-valued  $T_R$

Control of reverberation time

Calculation of reverberation time:  $T_R = 0.050 \frac{V}{A}$

Effect of materials and audience

Design of auditoriums

Home listening rooms