

## DESN 498/385 Advanced Digital Sound Study Questions

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### Reading / Lecture study questions Sound Design Chapter 1

Physically, what is sound?

What causes *resonance*?

What is *pitch*? What is *loudness*?

Are *loudness* and *amplitude / level* the same thing?  
*Loudness is perceived and depends on many factors such as frequency, whereas amplitude is simply the maximum sound pressure compared to neutral atmospheric pressure.*

What is the fundamental frequency of a sound?

In typical musical tones, what % of the total sound heard is represented by the fundamental tone? (50%)

What is the timbre of a sound?  
*Quality given by the amount and type of overtones.*

What do overtones look like on a waveform?

Explain sound frequency using the term "cycles."

What are Hertz (Hz)?

Why does it make sense to measure sound intensity in **decibels**, considering it is some logarithmic math thing that sounds kind of complicated?

If you want sound 1 to seem to be twice as far away from the listener as sound 2, how much quieter should sound 1 be in dB? -6dB

Explain the parts of a sound envelope: attack, decay, sustain, release.

Explain why sound sources that are either in-phase or out of phase change the amplitude of the sound.

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Vocabulary from Class. Be able to explain each.  
Cycles, Waveform, Wavelength, Frequency  
In phase, out of phase  
Formants, Harmonics, Overtones  
White and Pink noise  
Loudness  
LAME  
Amplify  
Clipping

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### Questions on Monitor Speakers

Terms: near or close-field,  
de-coupling the speaker,  
frequency balance,

What dB levels do professional engineers recommend listening to your mixes?

What are the characteristics of a good mixing / listening room?

What does a *spectrum analyzer* tell you? (The hardware version is called a Real Time Analyzer)

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### Mixing Engineer's Handbook Ch 5 Frequency Range

What are the primary goals of EQing?  
*Make element clearer, better defined*  
*Make element sound bigger*  
*Make elements work together*

- *Eliminating a steady state noise*
- *Compensating for room acoustics*

What general frequencies represent the...

*Bottom - kick drum - 63Hz*  
*Boom - warmth - bass - 125Hz*  
*Fullness - mud - 250Hz*  
*Honk - body - boxy - 500Hz*  
*Upper voice - crunch - brightness - 2kHz*  
*Edge - 4kHz*  
*Sibilance - brittleness - sparkle - 8kHz*  
*Air - 10-16kHz*

The more elements/instruments in a mix, the more...  
*bass boosted OR bass cut on each?*

If you want something to stick out, roll off the...  
*bottom!*

If you want something to blend in, roll off the...  
*top (treble)*

### Discussion Questions on EQ - Equalizing Sound

Which frequency range would you try to adjust if the sound was too harsh, too brilliant, too heavy/boomy, or not warm enough?

*too harsh 500 Hz*      *too brilliant 10K Hz*  
*too heavy/boomy 40 Hz*  
*not warm enough? 200 Hz*

What is usually better with EQ, *cutting* or *boosting*, and why? *Cutting because less distortion introduced*

If you were given a sound file that needed EQ help, be able to sketch an EQ "curve" that would roughly

match one that you would use on Audacity's EQ tool to solve the problem, and provide the EQ help.

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### Mixing Engineer's Handbook Ch 7

What is dynamic range?

Be able to explain what a compressor does.

What is a threshold?

What is ratio?

What is attack?

Be able to explain what a limiter does.

Be able to explain what a deesser does.

Do pop music bass guitar tracks have much dynamic range, typically? Why?

What is gating? What are a couple examples of situations in which it would be needed?

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### Sound Design Ch2 Analog Recording & Reproduction

What are three significant differences between a *dynamic* microphone and a *condenser* microphone?

What is *phantom power*?

What are *ribbon* microphones famous for?

What do these microphone directionality terms mean? A sketch would be fine if you understand it.  
Omnidirectional    Cardioid

Hypercardioid    Bi-directional or Figure-8

What does a *pop filter* do?

What are the main things a *mixer* device does?

What is the difference between *balanced* and *unbalanced* cables? Which one has 3 connectors? Which is better?

What is the definition of *frequency response* for both microphones and monitors?

Review Table 2-2 and Table 2-3 and be able to describe at least 4 of the seven frequency ranges.

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### Reading: Mixing Engineer's Handbook Ch6 Reverberation

EQing reverbs: How to make it stick out, or blend in  
How to make reverb fit, to fill in a space

How to calculate delays to the track tempo

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### Study Questions

What characteristics of live sound are usually lost when we use multi-channel tracks and panning in a DAW?

What elements of binaural ("two-ear") sound affect our ears' ability to perceive a stereo *image*? (A well-*imaged* sound will seem to come from a definite direction.)

How do we perceive whether a sound is coming from in front of, or behind us?

What are an important pro and con for each of the following stereo microphone setups? Which ones can be added to produce a good mono (for TV or Radio)?

Coincident pair of cardioids

Near-coincident pair

Spaced pair of cardioids

Spaced pair of omnis

Blemllein double figure-8

Baffled pair

When might a boundary mic be a practical choice?

What must you do to mix in a spot or accent mic track so as not to interfere with a live stereo mix?

Why do we often mic ensembles on tall mic stands, often 13' above the floor?

How would a reversed (crossed wires) mic cable affect a mix?

What is the reverberation time for a good concert hall (for acoustic instruments)?

What are two options for mic-ing an acoustic guitar?

What are two options for mic-ing a piano?

What is the ideal ratio of distance-apart to distance from the sound source, for placement of spaced pairs of mics?

Explain latency in a recording system. When and why does it happen? How can we overcome it?

Why would we want to try to talk musicians into using a click track? What's in it for them is music that doesn't speed up or slow down. But what is in it for us mixing engineers?

What do we need to keep in mind about the performing musician's space?

Be prepared to make a case for recording a room with the musicians, and for making a case for eliminating the room altogether.

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### **Mixing Engineer's Handbook Ch 3 Balance**

How can two elements "fight one another"?  
*Same freq range + same pan position*

How do you keep elements from fighting?  
*Turn one off - move apart in pan*  
*EQ uniquely*  
*Limit the number of elements*  
*Turn one down*

What is a *foundation* in pop music?  
*Usually bass and drums*

What is a *pad*?  
*Long duration holding instruments*  
*Synth, horns, vibe chords etc*

What is a *lead*?  
*The main vocal or instrument to listen to.*

What is a *fill*?

*Something you put in the pauses in lead*

What are the rules for Arrangements?  
*3-5 elements at once are enough usually*  
*Everything in its own frequency range*

What are a couple of elements that most mixers generally agree they start with?  
*Bass + Drums or Vocal/lead*

What is the phenomena called "phantom center"?

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What is a "comb filter" effect? What typically causes it?

Why do cardioid mics often create more problems with off axis sound than omni mics?

For each foot longer distance between sound source and mic, what is the delay?

How much delay is there possible between your left and right ears?

What are the physical guidelines for setting up to record voice professionally?

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### **Reading: Sound Design for Interactive Media Class Discussion Study Questions**

What is important about the first music in a film? (at least two things)

What does assigning a specific bit of music (*leitmotif*) to a character do for a film? (at least two things)

What is a "*narrative ambience*"?

How is sound design applied to the human voice (at least two things)

What are *synchronous* sound effects? (explanation + two examples)

What are *Asynchronous* Sound Effects?

What does Music accomplish in the heart of a film?

How can sound help create connections between characters, places, objects, experiences, and ideas? (at least three things)

How can you use sound to create questions in the viewer's mind? (at least three things)

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**Reading Questions Chapter 6 Part 1, pp 155 -171**

What do sound designers do?

What is *masking*?

What is *cancellation*?

Explain "*defeated expectation*" as applied to a sound track.

What are *acousmatic* sounds?

What is *diegetic* sound?

What is an example of *active diegetic off-screen* sound?

What is an example of *false synchronization*?

What is synchronization as applied to *game design*?

What tools give the impression of **space** as in a large or small room?

How many primary sounds can be heard and understood at the *same time* (not counting ambient sounds)?

What does soft, tranquil or loud beat-centered music do to an individual's body processes?

What does the author think is the most sensitive part of the range of human hearing?

How can you make a foreground sound stand out above background sounds? (at least three things)

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**Reading Questions Chapter 6 Part 2, pp 171-**

What is a "working concept"?

What are the general steps in the *pre-production* phase of a project?

What are the general steps in the *production phase*?

How can you create dissonance?

Be able to explain in general, table 6.5 and to give at least two specific examples.

Be able to explain in general, table 6.6 and to give at least two specific examples.

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**Questions from presentations**

**Describe the following sound file formats:**

PCM, AIFF, WAV and AU

TTA and FLAC

MP3 and Ogg Vorbis

WMA and ACC

Real Audio

Dolby Digital or AC-3

DTS

MIDI

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**Mastering**

How is mastering different from mixing?

If you are bringing files to a studio to be mastered, what are four good pieces of advice?

-Have a good mix to start with.

-Play your mix at home, in car, everywhere, first

-Don't do lots of compression. Let them do that.

-Bring an example of a project you like.

-If unsure, bring two versions of your mix.