DESN 384 Digital Sound - Module 1

Suggested Order of Activities

On CANVAS, listen to the Introduction lecture session 1 audio, while looking at the pp1-Intro-Sound-Study2020 pdf.

View the "FTP with Filezilla" video on how to turn in assignments. You will use FTP to turn in assignments 2, 3 and 4 below.

View the First Audacity video to help you create assignment 3, and read the First Audacity demo.

View the Intro to Sound Physics 1 Video
Read the accompanying Intro to Sound Physics pdf

View the Ocean Storm Scene video which demonstrates how to use Audacity to complete assignment 4

Then we move into the sound theory activities.
The Flash presentation on drbraukmann called ***Intro to Sound Animated*** *is a great start. (Say yes to install Flash.)*

Watch the Sound Characteristics parts 1 and 2 videos, and read the accompanying pdf.

Resource LInks Reading: Read/view the supporting media found on ***drbraukmann.com*** under the ***web resource links***. This is our textbook. Read/view topics S1, S2, S3, S4, S5, S6, A1, A2, and be able to answer the study questions that are included beneath the *web resource link*s page. It may help you to look at the questions as your read the linked material.

Answering these study questions, including those listed at the end of this assignments page, and with the links on the web resource link page, is a way for you to remember important concepts, and to prepare for the quizzes. *You do not have to turn in your answers.* However, you will be asked to know the answers for our next quiz. Each quiz will be taken entirely from the study questions.

There will be a weekly Zoom meeting to review the study question *answers* before the quiz.

Assignment 1: Audacity

• First download and install a version of Audacity on your computer. See the handy links on drbraukmann.com.

The latest version of Audacity allows you to export as MP3 files. Check it out. If your version of Audacity does not give you an MP3 option, you may need to update to the latest version. (The fix for older versions of Audacity was to install the LAME library.)

• Using *Braukmann's First Audacity Video, and the accompanying handout,* and the *On-Line Audacity Manual (Ai, A2 on the Web Resource Links page* , become familiar with the following 11 basic processes in Audacity:

1. importing a .wav or aiff file or mp3 file,
2. loading a second file into a second or third track,
3. playing, stopping, or rewinding,
4. selecting a portion of a track or the whole track with either the selection tool  *or the selection menu options, (must be done before editing tools work.)*
5. trimming out a portion of a sound file,
6. adding a fade in or fade out,
7. changing the level of the sound in a track up or down

8. making the level rise or fall over sections of the sound, 
9. mixing tracks together,
10. exporting a file, or a mixed file, as an MP3,
11. creating white, pink, and brown noise.

Assignment 2: Learn FTP so that you can successfully load assignments into your particular folder. Common software used for FTP uploading include: *Fetch* on Mac, *Filezilla* for Windows or Mac. (Filezilla is free and won't hassle you to buy the pro version later.)

Our FTP site login details
Host: ***ftp.drbraukmann.com***
User: ***stus1@drbraukmann.com***
Password: ***275threshold!***

Assignment 3: 10-Second Collage. Find and bookmark the DESN275 web page at www.drbraukmann.com. Note that you can access most documents by simply clicking on them. Sound files in the libraries can be downloaded by right-clicking, and using "save-as."

Using only sound files from the sound library at drbraukmann, create an interesting 10-second (exactly!) collage. Turn in as an MP3 version into your folder with the following naming convention: *yourNameWk1As3.mp3, (as in "braukmannWk1As3")*

Assignment 4: • Ocean Storm Assignment. See the video demonstration on CANVAS, and read the Storm Scene instructions posted. We need to hear heavy rain, thundering seas, wind, and the captain's voice in the background. But no actual recordings will be used for the wind, the rain, or the ocean. Rather, to create these sounds, combine types of noise generated in Audacity to represent the sounds. Then add the captain's voice, found on the course home page, the "Shiver Our Timbers dialog," and if you wish, creaking wood from the library. Turn it in as an MP3 with the same convention: *yourNameWk1As4.mp3*

Further Notes and Study Questions: • Read the supporting information *below*, and be able to answer the study questions that are included. Some of these topics are reviews, and a few will be new topics for you.

Each week there is planned an on-line study session with Dr. Braukmann. (Thursday at 3:00) and Zoom

software will be used. Join to find any elusive answers to the study questions. A Zoom link will be added to each Canvas module each week.

Also regular office hours will be announced and Dr Braukmann will be available by email, phone or text.

Supplemental Questions to Study - Short topics that you need to know:

Q. What qualities should a headphone have for someone mixing sound?

- *All frequencies should be produced at an even level - you can hear it the way it was recorded.*
- *Comfortable for long sessions*
- *Able to reproduce detail - not mush sounds together.*
- *Important but optional characteristic keep the headphone sound from "leaking" into your microphone recordings.*

Generally ear buds add problems because they don't couple with your ears consistently, and so the bass is either missing, or too emphasized.

A *"popular" sounding headphone may have a little extra middle bass response, and not really be as accurate in presenting all the frequencies evenly.*

Q. Some common audio terms:

Hertz *cycles per second*
Period *the time needed for one cycle*
Ultrasonic
a higher frequency than we can hear
Amplitude (is it different from loudness)
the actual measureable intensity of sound.
Loudness
the ***perceived*** *intensity of a sound.*
or how loud it seems *to us at the moment.*
Waveform the shape created if we plot sound amplitude vs time on a graph

Q. Why do we compare waveforms to sine waves?
Sine is a mathematical term. Most common natural sounds are variations of sine waves. So sine waves has become a common term.

Q. What is a periodic waveform?
What is a complex periodic waveform?
A periodic waveform is one that repeats very often, 100s or 1000s of times per second. You can easily see the repetition when you look at the waveform. Complex ones have lots of overtones included. Most musical instruments, and the human voice, create complex periodic waveforms.

Q. What is the relationship between wavelength and frequency?
Simply put: the lower the frequency, the longer the wavelength. A note with a frequency of 1100 cycles per second, (or 1100 cps, or 1100 Hz) occupies about 1 foot of air as it move toward your ear. <u>It's wavelength is 1 foot.</u> A 110 Hz note occupies 10 feet of air. It's wavelength is 10 feet. (approximately)

Q. What frequency range is *easiest* for humans to hear?
The range around 1000 to 3000 Hz. It is no coincidence that this is also the range of a baby crying. So if we are adjusting sound, and some element seems too loud, we may only need to reduce the sound energy in that narrow range. We would leave the other bigger ranges, 20-1000 Hz, and 3000-10,000 Hz, unchanged. But the average listener would say the <u>whole</u> thing sounded significantly quieter! That is one of the things an equalizer (or EQ) tool does for us.

Q. You need your ears to be in great shape if you intend to edit sound. What do you lose if you expose your ears to damagingly loud sounds?
Hearing can become dull or muted. The range of frequencies that can be distinguished can shrink. Persistent ringing, or tinnitus, can develop.

Q. What is the fundamental frequency range of a typical male voice (baritone)? *110-425 Hz*
Of a typical female voice (contralto)? *200-700 Hz*
Of a bass guitar or double bass? *40-200 Hz*
Of a piano? *28-4100* Hz
Of an alto saxophone? *125-900 Hz.*
Expect this on a quiz.

Q. What is *noise* in a general sense?
Any sound we don't want. It might be static or hiss in electronic circuits, a fan running in the background of a film dialog recording.

Q. What is white noise? What is it based on*?*
Random bits of frequencies. All frequencies between 20 Hz and 20k Hz are represented. It sounds bright because there are lots of possible frequencies in the higher ranges.

Q. What is pink noise? What is it based on?
Also random bits of frequencies. The frequencies are represented proportionally by octaves between 20 Hz and 20k Hz. It sounds lower or warmer because there are proportionately more low frequencies represented; because there are proportionately more octaves the lower you go!

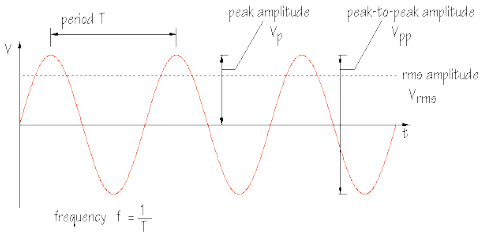
Q. Which sounds brighter: pink or white noise?
White noise.

Q. Which represents human hearing best: pink or white or Brownian noise? *Pink noise.*

Further Review Questions - If you've answered the questions under the web resource links, you probably know these by now. But let's check.

Q. Explain sound in terms of compressions and rarefactions.
A single sound wave consists of an increase in pressure (compression) followed by a decrease in pressure (rarefaction). This is like a pulse that travels through the air (or water, or other media)

Q. What do the horizontal and vertical axes on a waveform represent? *A: Vertical is amplitude or level. The horizontal represents time.*



Q. Explain frequency using the term “cycles.”

Q. What are Hertz (Hz)?

Q. What is the speed of sound?

Q. What is a periodic waveform?

Q. What three things happen when a sound strikes a surface such as a wall?

Q. What happens when two sounds are out of phase?

Q. What common situations in listening rooms or when using microphones, result in sound being out of phase?

Q. Why don't many recording studios have parallel walls?

Q. What physical characteristics make a perfect listening room?

Q. What is a diffusion panel?

Q. How is a diffusion panel helpful?

Q. What do overtones look like on a waveform?

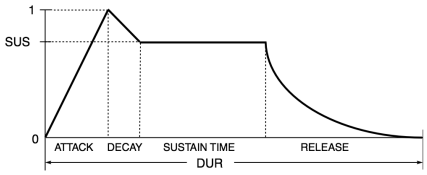
Q. What is the general range of human hearing (that is for those people who have not worked in construction, have not owned a big car stereo, and have not attended rock concerts or trap shoots without earplugs)?

Q. What do dogs hear that you can’t hear?
Frequencies above 20,000 Hz

Q. What is/are Timbre? Formants? Harmonics?
They are all overtones, extra frequencies added to the fundamental note. Timbre relates to the sound of an instrument. Formants relate to the human voice. Harmonics is a general term relating to all extra frequencies that are mathematically related to a fundamental frequency.

Why a saxophone sounds different than a trumpet: the harmonics are different! And people sound different because their formants are different. We are talking about overtones in all cases. But the terms are more specific.

Q. What is an amplitude envelope?
A graph showing the level of a sound, from the time it starts, to the time it completely dies out. (Could you sketch one?) All sounds, from a single guitar note, to a voice singing one word, to the sound of a thunder clap. Below is a general one.



Q. In a sound envelope, hat is meant by attack decay sustain release?

Q. Why are organizational skills important to sound recorders and editors?

Q. Why is documenting the details of your recording process important?