

NALA'ATSI SOUND ENGINEERING SCHOOL



PART 1: THE BASICS

- A) EQUIPMENT/GEAR:** What do you need to record?
- B) IMPORTANT TERMS:** What is the difference between Stereo and Mono? What is EQing? What is compression?
- C) GETTING STARTED:** Setting up a project

BUT, before all that. Task #1: Choose a song you love. Let's listen to it and analyze the production:

What is in the front of the mix (aka the loudest, what pokes out)?

What is in the background?

How many instruments/different sounds do you hear?

What effects do you think the engineer/producer used?

What is the overall vibe of the song?

What works about the production? What doesn't?

What questions do you have? Ie. How did they do _____?



EQUIPMENT/GEAR: What do you need to record?

1) **A computer:** Everything is digital these days. If you're recording 'analogue' you are a) very rich b) a purist c) all of the above

(analogue is awesome it's just not practical for most people)

Laptops are fine. Ideally you want at least 8GB RAM, a solid processor, and lots of storage. 12GB RAM is ideal, but 8 will definitely do.

Desktops are often better. They have more processing power & more RAM.



G-Unit contemplating their favourite DAW.

2) **A DAW (Digital Audio Workstation):** This is your 'virtual studio.' A DAW is the computer program version of a mixing board/recording studio. It is software that simulates an actual recording environment. This is where you do almost all of your mixing and producing. There are many programs. Some popular ones are: ProTools, Cubase, Logic, Ableton, etc. Some introductory ones are: GarageBand & Audacity. They all have pros and cons, and many similarities. Once you know how to use one you can use all of them. We will be using Cubase to start.

3) An Interface: So you have your computer and your DAW that you definitely didn't download illegally. Now you need a way to actually get sounds onto your computer. You need an interface. An interface basically takes the electronic signal from a microphone and converts it to a digital signal, which then runs into your computer and into your recording program.



This is an interface with 4 microphone inputs. It connects to your computer/laptop via USB.

The interface connects your mics to your computer. In other words, what you record using a microphone goes through your Interface and then into your computer. The more microphone inputs you have, the more \$\$\$ they cost. The one I have, that we'll be using, has 8 microphone inputs. This means you can record 8 microphones at the same time, and they will all go into your computer. With this interface we can record 8 instruments at the same time live, straight to our computer. Cost range: for 2 inputs \$150-200, for 8 inputs \$400-700. Always cheaper if you buy used. I bought mine used for \$450, it works like a charm.

4) Microphones: People have lots of opinions about microphones. Especially man-babies on internet forums. Avoid these people and avoid these forums. That being said, microphones are very important.

Microphones affect *how* sounds are captured when you're recording. For example, if you record a guitar using a vocal microphone, it will sound very different than if you recorded the same guitar with a bass microphone. The beautiful thing about recording is there's no right answer. Maybe you wanted to get a crunchy/bass tone out of the guitar - so using the bass mic would be the right answer. Or maybe that was a terrible idea and it sounds like crap. In that case, let's put the bass microphone away and try something else.

There are 2 types of microphones. We will be using both types so you don't need to remember this now, you will learn it as you get practice with each type.



Gear doesn't matter when you've got raw emotion like this.

Dynamic microphones are cheap, practical, and meant for capturing loud sounds. For example, a snare drum, a guitar amp, a bass amp. They are not known for picking up a ton of detail, nuance, or subtlety, but they capture loud sounds very well. This is the kind of microphone you see at live shows. Below is the most common microphone in the world. It is a dynamic mic. Bono uses it to sing live, Beyonce does too, and so does your mom when she sings karaoke. It is the Shure SM58.



Condenser Microphones are used for quieter sounds. They are used for vocals (very rare that you would use a dynamic mic for vocals), for acoustic instruments, for cymbals on drums, for anything where you want to capture quieter sounds with more detail. They are more expensive. You can spend way too much money on them. Cheap ones are available too, but they are essential to your recording set-up. A lot of recording is learning when to use which kind of microphone.



5) Instruments: obviously very important to your recording. More on this to come, especially where to place microphones and how to capture a good sound from the instruments you're recording.

6) Headphones and speakers: You'll eventually want to get headphones and reference speakers that are made specifically for recording. The problem with most commercial headphones and speakers is that they aren't neutral. They almost always boost the bass, or the treble, or something else. They aren't giving you the actual balance of the recording. When you're recording, you need to make sure you are hearing back a neutral sound - not one that is artificially bumping up the bass, for example. If you're hearing more bass than actually exists in your recording, that's a problem. Good headphones for recording are around \$100. Reference speakers are around \$200+.

7) Compressors/Plug-ins: There are lots of effects that you can download and use in your DAW. We'll get to this later.

8) Sound Banks/Midi Controllers/Beatmaking Programs: Also something we will get into a bit later, once we learn the fundamentals.

Task #2: EFFECTS: What effects are you already familiar with? Listen to a song of your choice and identify as many 'effects' as you can.

IMPORTANT TERMS:

1) Stereo vs Mono: Mono means what you hear in both speakers or both sides of your headphones is the *exact same thing*. Stereo means you hear different things coming out of the right and left speaker or headphone. For example, the guitars might be louder on the left, the vocals might be louder on the right. This is called 'panning' - for example, "guitars are planned left." Most people record in stereo these days.

2) EQing: This is short for 'Equalizing.' Very important. It refers to how you balance the different frequencies of a sound. For example, with a bass guitar, you would cut out some of the high (treble) frequencies because that's not the sound you want in a bass guitar recording. You would instead emphasize the low (bass) frequencies.



Low/Bass frequencies are on the left. High/Treble frequencies are on the right. Going up & down is the volume, which is measured in decibels. How is this channel EQ'ed?

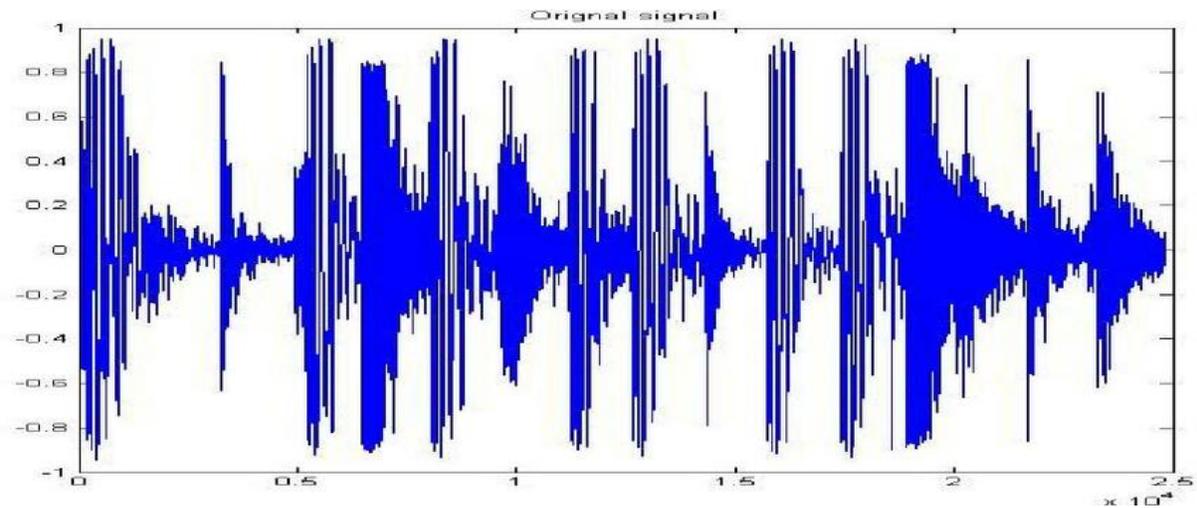
3) Mixing: Pretty straightforward. After you've recorded all your sounds, you need to make them sound good together. Mixing involves adjusting volumes, EQing, adding effects, and making sure the overall balance of your recording sounds good.

4) Decibels (DBs): The unit we use to measure volume/how loud something is.

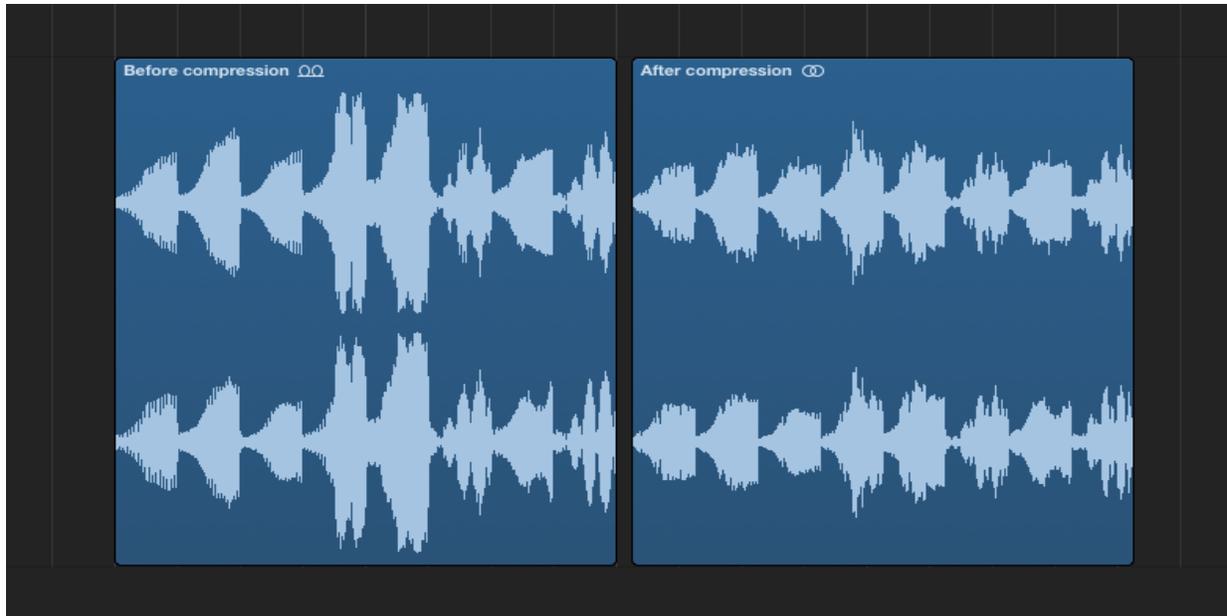
5) WAV: It stands for Waveform Audio File Format. A digital audio file. Each track you record (ie guitar, bass, snare) will show up as its own WAV file.
(Does anyone know the difference between a WAV file and an MP3?)

6) Signal: The sound you are capturing.

7) Compression: Often you will record a track and it will look like this:



Notice how there are many peaks, and then sections where the signal doesn't move far from the center. This means the signal you recorded was quite loud at times (where it peaks) and very quiet at others (where it stays close to the center line). Sometimes you want this - it's a large dynamic range; most times you want to even things to be at a more consistent and even volume. You achieve this through compression. Compression means taking those peaks and crunching them down a bit, then bumping up the overall volume.



This shows a WAV file before compression (on the left) and then after (on the right). Notice how the peaks have been crushed and now it's a more consistent signal. Now that we've compressed the WAV we can turn the overall volume up. The quiet parts will be louder and the loudest parts will be a bit quieter. Overall, it will be a more consistent volume. **There is such a thing as *too* much compression. You can compress away all your dynamic range (quiet/loud), leaving your recording sounding lifeless and a little bit like Nickelback. (Look into the 'Loudness Wars' if you're interested).**



GETTING STARTED: SETTING UP A PROJECT

We'll be using Cubase 5.1. It's from 2012 and is pretty standard for recording engineers. For now we're just going to figure out how to get it up and running, and how to start a project.



This is what Cubase looks like.

- 1) Setting up a project: the first thing you want to do is to create a folder. You're going to assign a place where all the stuff you record will go. You don't want to sort through a million WAV files, so it's good to be organized from the get-go. Call the folder the name of the song/project.
- 2) Turn on your interface (make sure it is connected via USB). Then open Cubase.
- 3) Start a new project: Select 'File' - 'New Project.' Choose 'Default' and then when 'Set Project Folder' comes up choose the folder you created for this project.

4) Set your interface as your VST Audio System: On the top row, select 'Devices' - 'Device Setup' - 'VST Audio System' needs to be set as your interface. The one we're using is called 'Focusrite USB 2.0 Audio Driver'

5) Set up your Inputs: this is how you determine which microphone will correspond with which input in Cubase. I want to keep this simple. So 'microphone 1' should go with 'input 1' and so on. Go to 'Devices' - 'VST Connections' - look to the second row on the top, click on 'Inputs' - right below that find 'Add Bus' and click it. Create 8 inputs (that's the max we can record at one time) and make sure it's set on 'Mono.' What you want to have is Mono in = Mic 1 / Mono in 2 = Mic 2 / Mono in 3 = Mic 3 etc. Now all the microphones are matched with the inputs in the program. If this is a bit confusing don't worry, it will make sense when we start using the program.

6) Set up your Outputs: just to the right of 'Inputs' you will see 'Outputs' - click it. Here you just want to make sure that it says 'Stereo Out' and underneath it is 'left' and then 'right'. Make sure the under 'Device Port' your left output is set to 'Mon 1' and your right output is set to 'Mon 2.'

*** Holy crap, we're almost ready to start recording!

7) Create tracks: Go to 'Project' - 'Add Track' - 'Audio' and add some tracks. Stick to mono for now. Then name the track what you plan to record on it. The final thing is to make sure that the input you assigned to the track is the right one. For example, on the third track we created in Cubase we're going to record a vocal track. Our vocal mic is 'microphone 5.' We need to make sure that the input in Cubase for that vocal track is 'Mono In 5' (Remember that earlier we made sure that each microphone corresponds with the same input - 'mic 1 = Mono In 1').

Task 3: Let's record some talking/singing and get practice.