

ECS614U/ECS749P: Sound Recording and Production

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Mastering

What is mastering?

- Mastering is the final stage in the music production process, in which the final mix is prepared and transferred onto the master; from which all copies are made.

Mastering analogue

- Before digital, mastering involved the cutting of a physical medium e.g. vinyl.
- Physical constraints in the cutting process led to the use of pre-processing, e.g. compression, to control transient parts of the signal.
- Additional pre-mastering processing was found to further improve the sound of the record.

- Mastering digital recordings does not involve a physical medium but a similar approach is adopted:
 - Add a final layer of 'polish' using a range of audio effects.
 - Ensure consistency across songs on an album.
 - Preparing the album for duplication i.e. finalising fade ins, fade outs and gaps between songs.

Mastering process

- 1 Bounce down your finished (stereo) mix.
- 2 Import the mix or stems into a **new** project.
- 3 Apply premastering effects.
- 4 Set the song loop, and fade ins and outs correctly.
- 5 Bounce down you mastered mix.

Mastering effects

- The following audio effects are used in the mastering process:
 - Dynamic.
 - Parametric equalizer.
 - Reverb.
 - Multiband dynamic.
 - Harmonic exciter
 - Stereo imaging enhancer.
 - Limiter.
 - Dither.
- You are applying the effects to the combined stereo signal so the use of these effects is different. In general be subtle!

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- A gentle compressor or expander (or both) can be used to change the dynamic range of your stereo mix.
- The effect should be subtle, i.e. long attack and release times, and small ratio.

Equalizer

- The is used to give a good tonal balance in the mix by shaping the frequency spectrum.
- The filters used should be smooth (low Q) and low gain (less than 5 dB). If anything drastic is needed it implies there is something wrong in the mix.
- It is common to cut bass frequencies below around 30Hz.
- Be careful when adding gain to bass frequencies as it may just sound muddy. Better to consider in multiband dynamic stage.

- Smooth over any real reverberation artefacts that occurred during recording.
- To fill in the sound and add fullness to a mix.
- To unify the sense of space in a mix which contains multiple instruments with different real or virtual reverb.

Multiband effects

- Multiband effects split the audio into a number of frequency bands.
- The audio in each band is processed separately.
- The audio in each band is then recombined.
- This allows parts of the audio signal to be targeted and treated without affecting the others.

- Compression and expansion can be applied to individual parts of the frequency spectrum.
- The affect should be subtle, i.e. long attack and release times, and small ratio.
- Think about what you are trying to do. If you cannot think of a reason why you need to multiband compressor then don't use it!

Harmonic exciter

- Adds higher order harmonics to the mix and makes it sound more lively.
- It is essentially a type of distortion.
- More sophisticated enhancers are multiband.
- Be careful how much you add!

Stereo image enhancer

- Used to increase the stereo width.
- Be careful with bass sounds as these should definitely come from the center.
- If used too much there will be a hole in the middle of the mix.
- There are generally frequency controls but more sophisticated image enhancers will be multiband. This enables some control over the spatial placement of individual instruments.

- Often called a maximiser, these tools are used to increase the loudness of the mix.
- They essentially squash the mix up to a maximum possible **peak** amplitude.
- There are two general types:
 - Soft limit - sample values are allowed to go over the limit.
 - Brickwall limit - sample values are constrained strictly to the absolute limit.
- Overuse will make the mix sound distorted. Try not to get sucked into the loudness war!

I'll fix it in when I master...

- You don't want to be correcting recording problems in the mixing stage, and in a similar way, you don't want to be correcting mixing errors in the mastering phase.

Does digital mastering make sense?

- There is no physical medium to cut the master onto so why not just add the pre-mastering effects to the master output?

Does digital mastering make sense?

- Separating the mixing and mastering stages introduces objectivity and a fresh perspective.
- Having mastering effects on the output bus is dangerous - it's easy to forget that they are there and continue to make changes to the mix.

- Every time an operation is applied to a digital audio signal errors are introduced because the new sample values have to be rounded off (quantization error).
- Dithering algorithms are used to smooth out these errors.
- They work by adding a random, low level noise signal to the mix.
- Dither is applied the final time that you bounce your mix.

The loudness wars

- An objective of the pre-mastering processing is to make the mix sound louder.
- In recent years this has gone too far with overly compressed and lifeless sounding mixes.
- In some respects you need to compete in order to make your mix stand out, but be careful!

What should you do?

- Audition your final mastered mix on as many different sound systems as possible.
- Be aware of the final destination of your recording i.e. is it headed for the dance floor?
- Use: EQ, multi-band dynamics and a limiter.
- Use volume automation to control the fade in and fade out.
- Be cautious. Less is usually more!

Soundscape submission

- The original mix should be at equal or higher sample rate and bit depth than the final master.
- CD master is 16 bit and sample rate is 44.1KHz.
- For the soundscape assignment you must submit both the pre and post master mixes.
 - Pre master mix: 16+ bit and 44.1+kHz.
 - Mastered mix: 16 bit and 44.1kHz.