



Audio and video techniques (TAV)

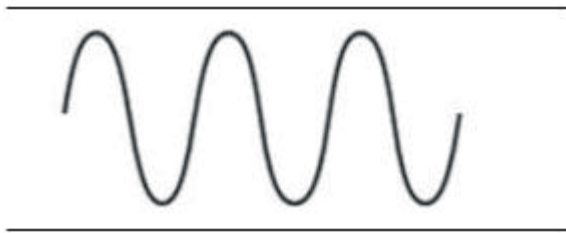
Lesson plan

AUDIO VIDEO TECHNIQUES

CLASS 01

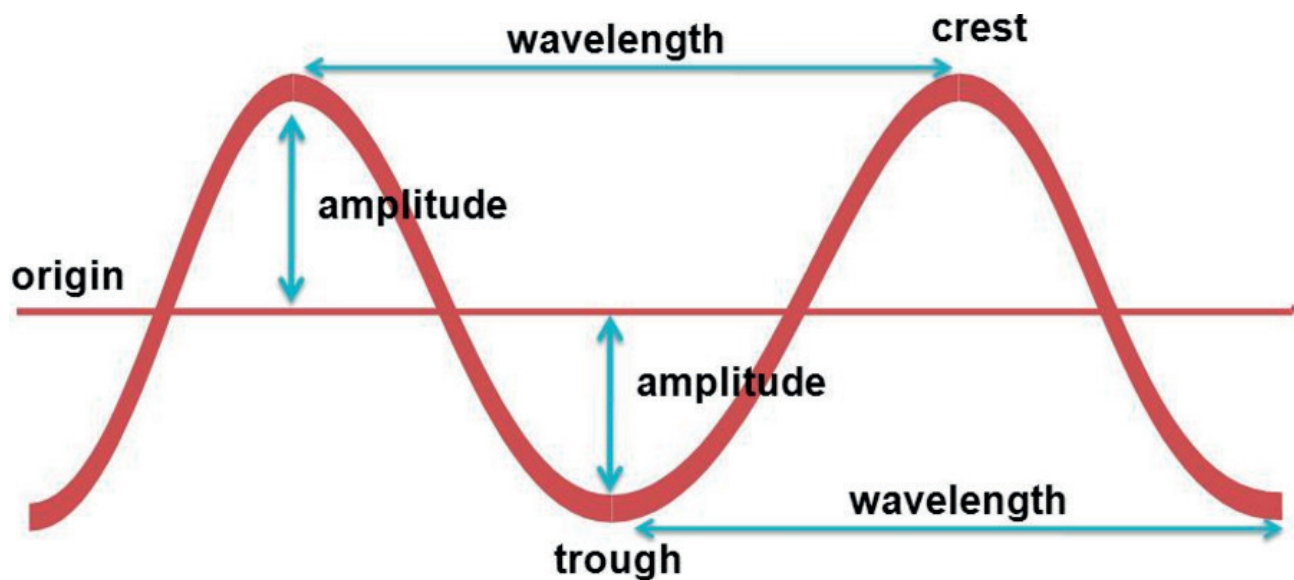
Audio – basic principles

Sound wave



Explanation:

- Similar to wave in water. The through follows the crest.
- Change of pressure travels in the air, is caught by the ear and interpreted by the brain as a sound.



Crest:

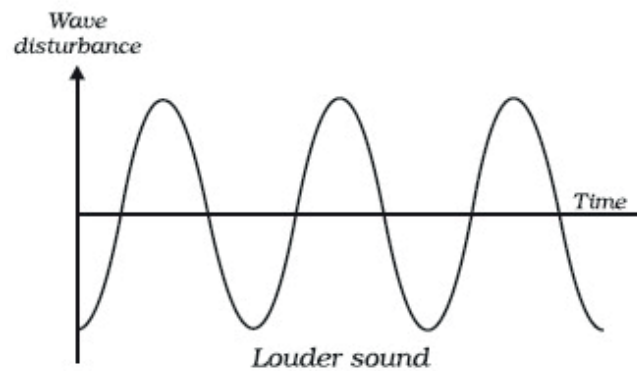
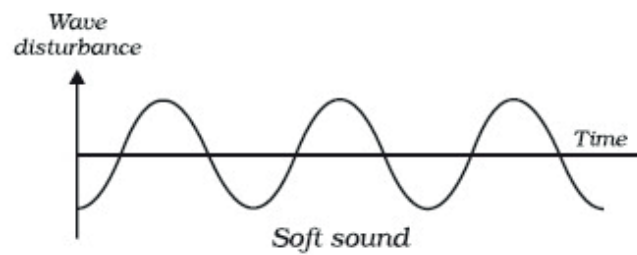
- Peak of pressure

Through:

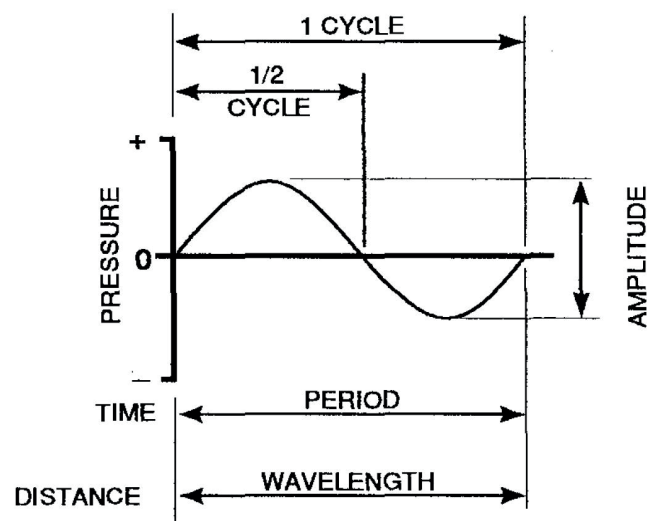
- Equal negative amplitude following the rest.

Amplitude:

- Change of pressure between crest and trough. Volume. Measured in db.

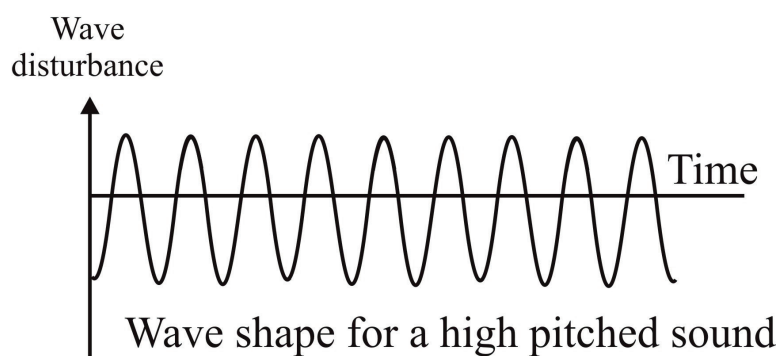
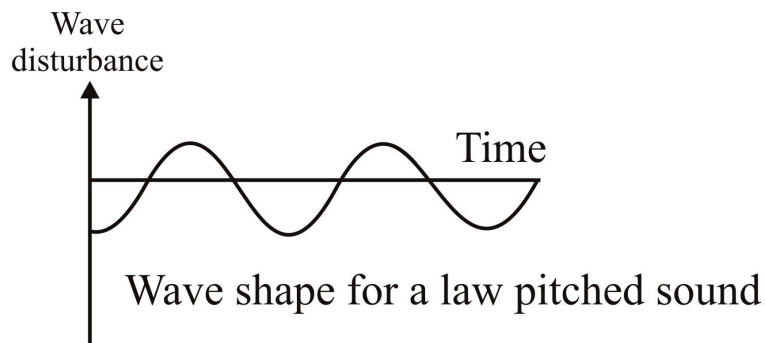
**Cycle/period:**

From zero pressure - to crest - to trough - back to zero pressure - on a time unit (period)



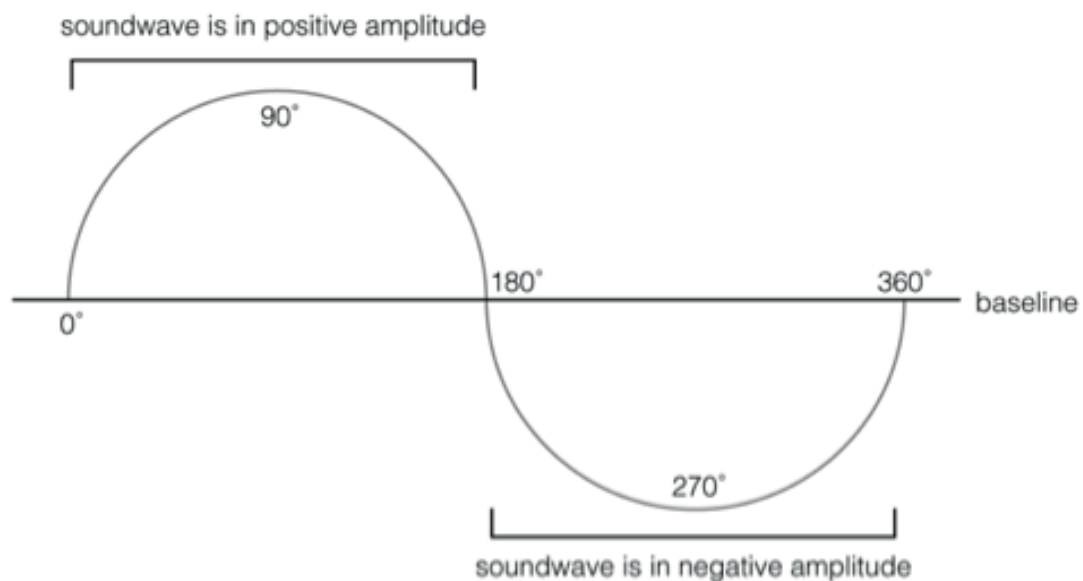
Frequency:

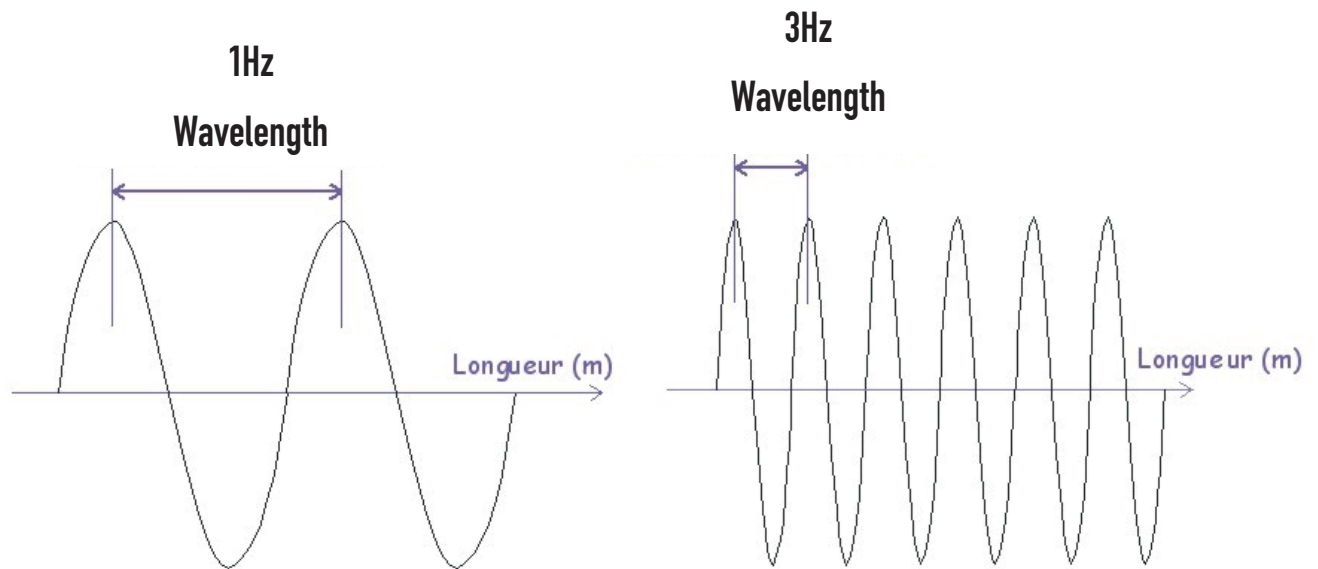
Number of cycles by period (time unit)

**Wavelength:**

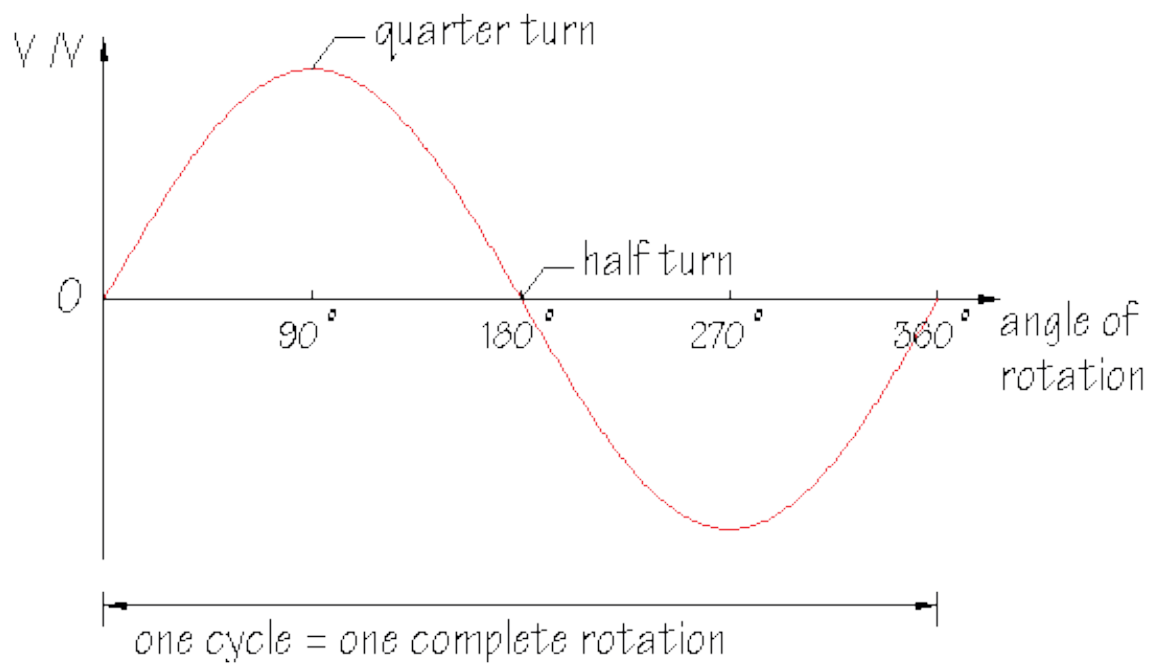
Distance between the beginning and the end of a cycle. Creates the pitch.

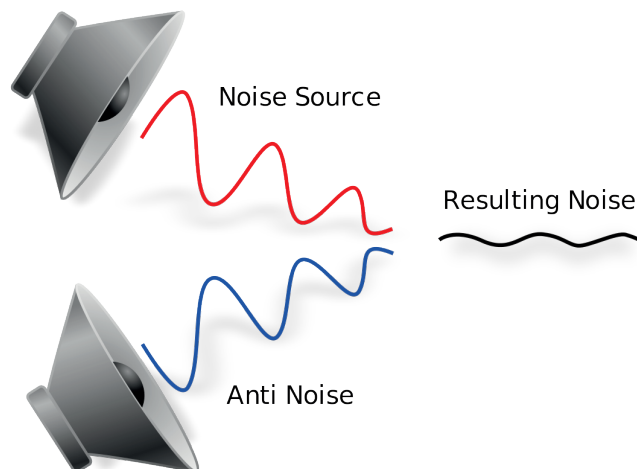
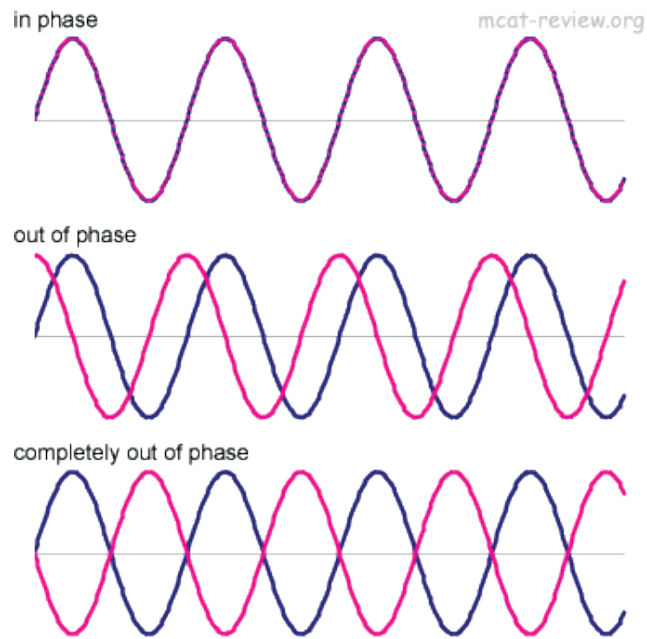
Higher is the frequency, shorter is the wavelength.



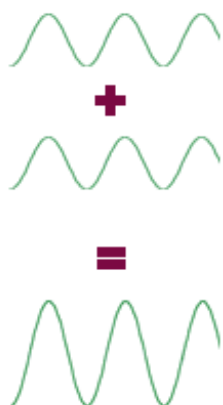
**Phase:**

Shape of the sound wave

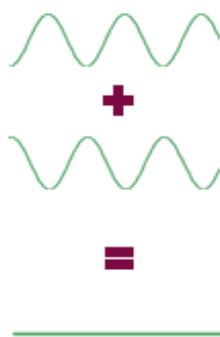




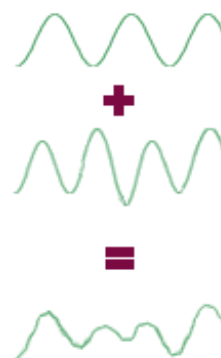
In Phase
Waves add together



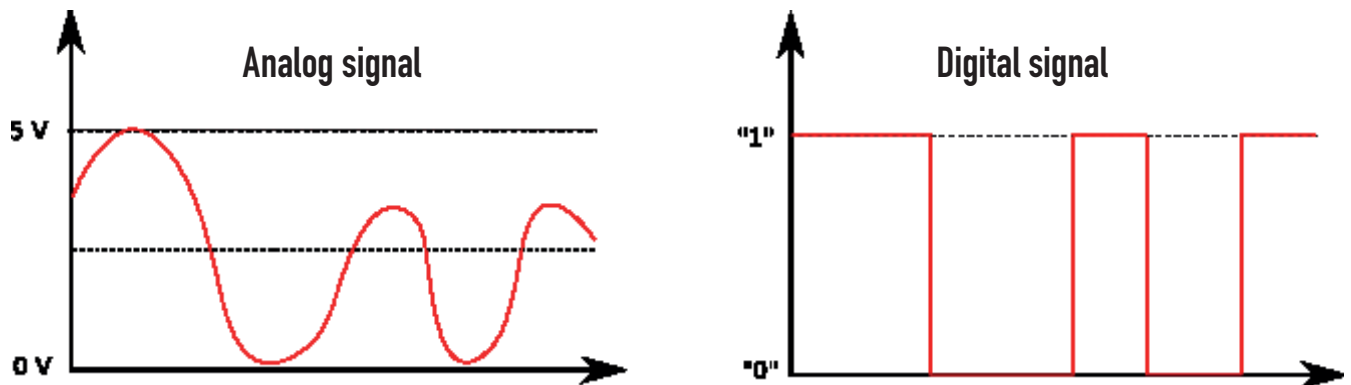
180° Out of Phase
Waves cancel each other



Different Waves
New wave created



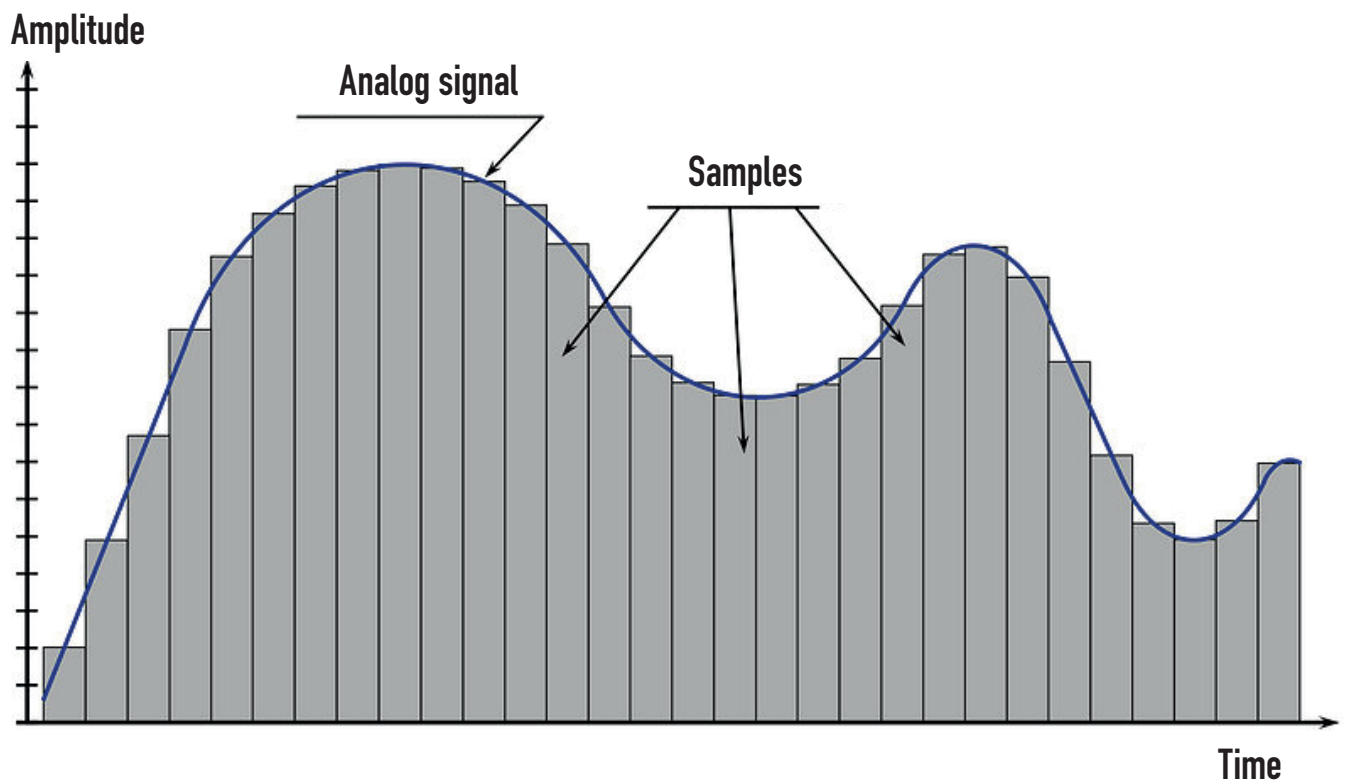
Analog and digital signals

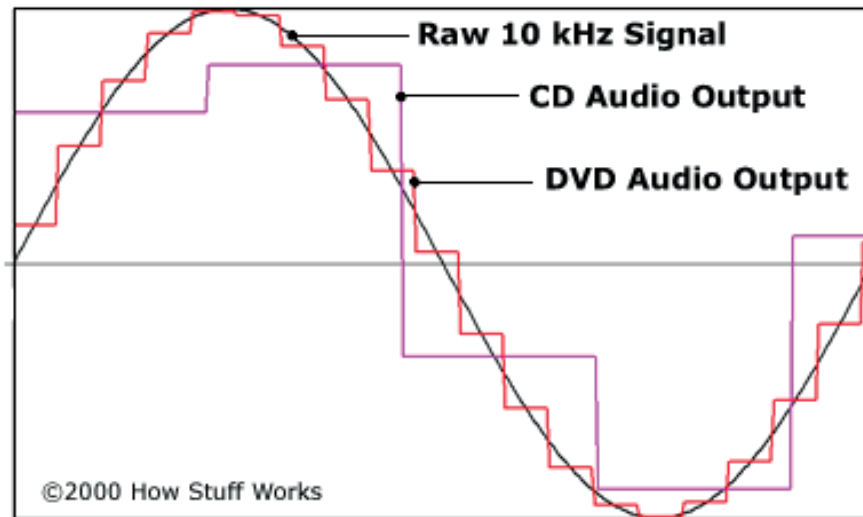


- To convert an analog signal to a digital signal, the analog signal must be sampled.
- Higher number of samples (sample rate) gives better result (closer to reality).

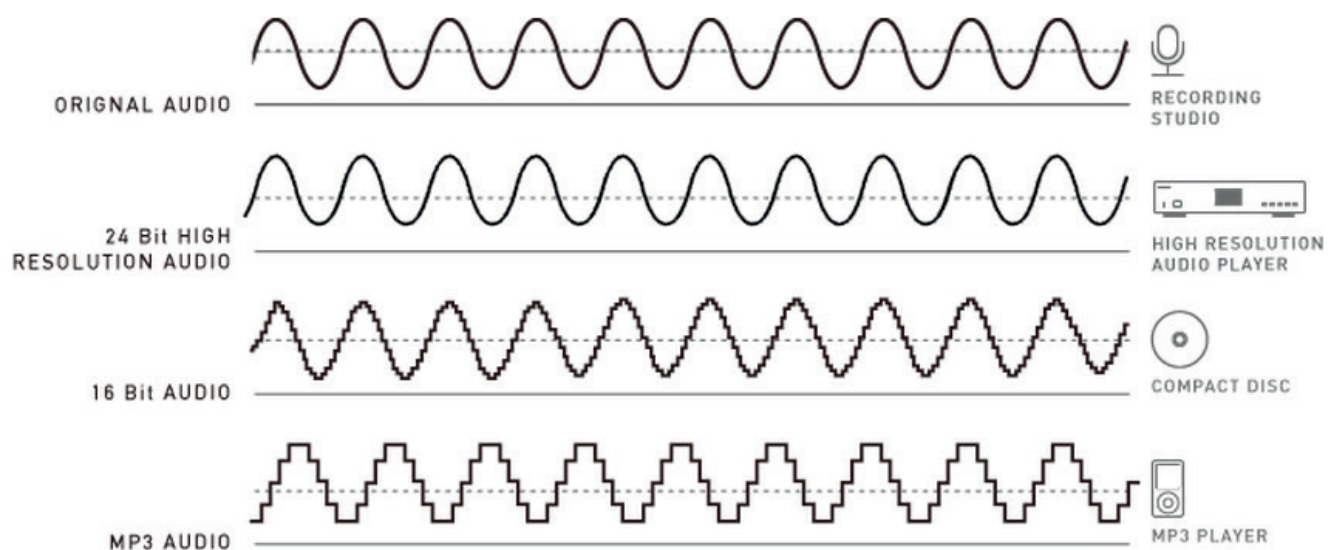
Sound resolution : depth of bits

- Higher resolution = higher bit rate = best quality (with high depth of bits)



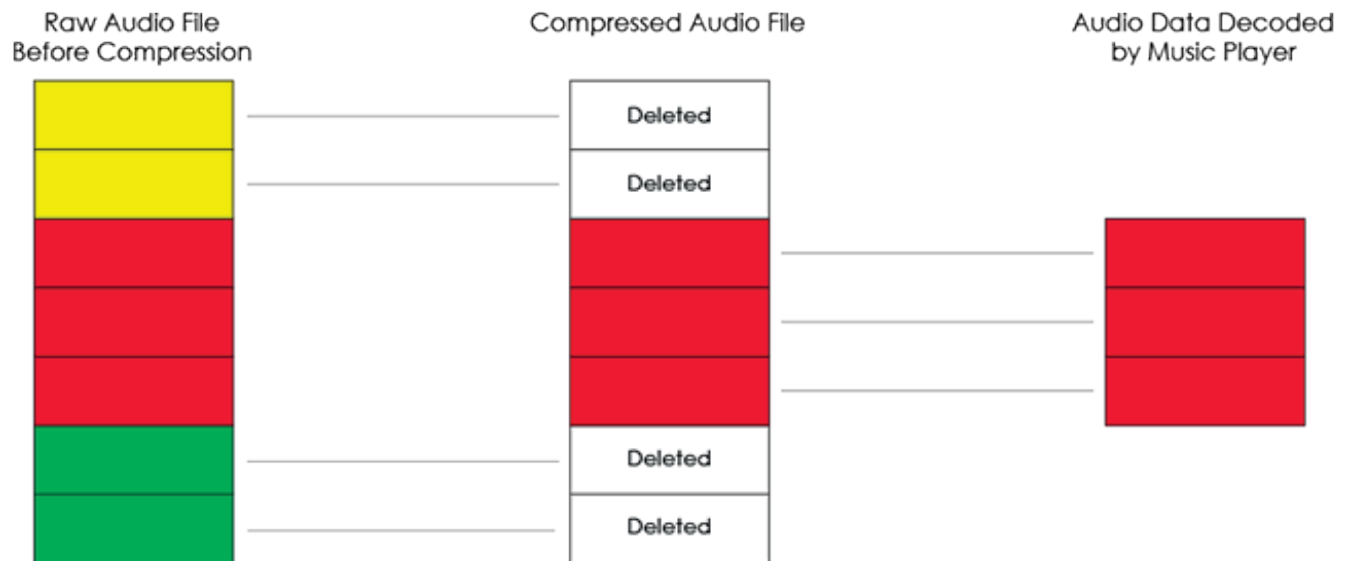


8-Bits	256 Discrete Values	48 dB SNR	Early CD-ROM Games
16-Bits	65536 Discrete Values	96 dB SNR	CD-Audio
24-Bits	16777216 Discrete Values	144 dB SNR	DVD-Audio/HD-Audio
32-Bits	4294967296 Discrete Values	192 dB SNR	Ultra HD-Audio Soundfiles

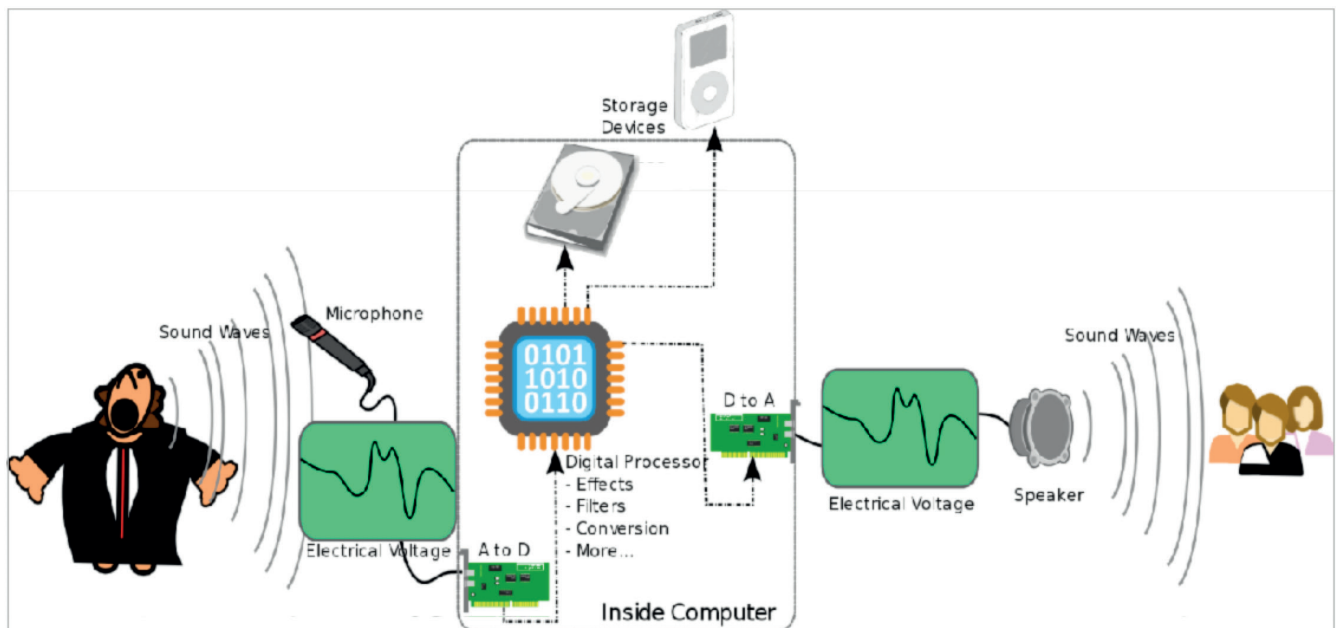


Compression

- Lossless & lossy compression



Sound reproduction process



Adobe Audition

- What is audition :
 - Audio editing
 - Audio recording
 - Audio adjustment, filters and effects
 - Can be used along with other Adobe softwares (Premiere, After Effects)

Audio file import formats accepted

AAC (including HE-AAC)

AIF, AIFF, AIFC (up to 32 channels)

AC-3, APE, AU, AVR, BWF, CAF (all lossless formats and most of lossy formats)

EC-3EC-3, FLAC, HTK, IFF, M4A, MAT, MPC, MP2, MP3 (including surround MP3)

OGA, OGG, PAF, PCM, PVF, RAW, RF64, SD2, SDS, SF, SND, VOC, VOX, W64, WAV (up to 32 channels)

Video file import formats accepted

AVI, DV, MOV, MPEG-1, MPEG-4, 3GPP et 3GPP2, AVI (Windows only), FLV, R3D, SWF, WMV

Interface

- Sound wave editor
- OPEN / IMPORT a file
FILE > IMPORT >
OR icon from the FILE pannel
- FILES pannel
- Sound wave pannel
- Zoom
- Navigation within the soundwave pannel
- Playing an audio file
- Playing in loop
- Scrubbing with the reading head

Creating a blank audio file

- From the menu or the top tool bar
- Create a one track mono file (rate, bits)
- Open an external sound file
- Selecting portions of sound + COPY
- PASTE sound copied in the mono file
- Creatin FadeIn and FadeOut (boxes on the waveform)
- Adjusting amplitude (overall volume)
- Adjusted selected portion's amplitude
- Erasing sound (overall)
- Erasing portion of sound (selections)

Assignment 01 :

- Create a 30 second action sequence
- This should «tell» some king of story
- Example :
Alrm clock rings, someone yawns, brushing teeth, door opens, sounds from the street, foot steps, car engine on, motor noise, break, impact

CLASS 02

Audition

Mixing sounds

- Instead of sound one after another they can be mixed
- Copy a sound you wish to mix with another
- In a mono file, select the existing sound
THE right-click PASTE-AND-MIX
Choose and adjust the wanted options
(explore the options)
- RESULT = The two sounds together at the same time.
- Saving project
- Exporting WAV and MP3

Exercise : Redo assignment 01 using mixing features

Create a stereo file

- Same as mono, but stereo
- Activating/deactivating LEFT/RIGHT channels
- Adjusting channels independently (simulate pan)
- Adding sounds in one channel only

Exercise : Upgrade exercise 01 with stereo features

Creating multitrack file

- Create a multitrack audio file
- Import/Place/paste file to a track
- Moving sound in the track
- Change the in-point and out-point
- Cut sound (blade)

Adjusting independent tracks

- Adjust amplitude and pan
- Adjust amplitude and pan using rubberband (envelop)
- Using multitracks to create ambiance + events
- Guide lines :
 - Max amplitude: -6 db
 - background noise/ambiance : -18 to -23db
 - Voices: -12 db
 - Big noise: -6db
- Saving project + Exporting multitrack session

Audio archives

- <http://wavs.unclebubby.com/>
- <http://www.findsounds.com/>
- <http://allthefreestock.com/>
- <https://www.freesound.org/browse/>
- <http://www.eventsounds.com/>
- <http://www.moviesoundscentral.com/>
- <http://www.peaceloveproductions.com/>
- <http://www.reelwavs.com/>
- http://www.talkingwav.com/various_wav_sounds.html
- <http://www.dailywav.com/>
- <http://www.moviewavs.com/>
- <http://www.thesoundarchive.com/>
- <http://www.wav-sounds.com/>
- <http://www.wavsource.com/>

Assignment 02 :

- Create a audio montage sequence (between 1 and 2 minutes)
- It must have a beginning, a development and an end
- There must be ambiance and events.
- It must include music at the beginning and at the end.

CLASS 03

Audition

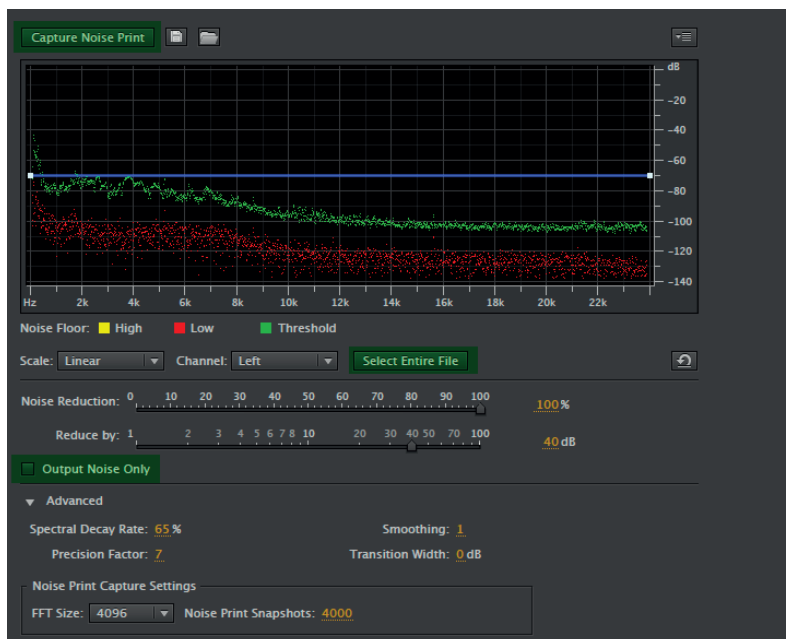
Cleaning sound

Room tone

- Silence = overall background noise where a sound is recorded
- What seems silence is rarely so (brain tricks us)
- When recording in location, record a minute of room tone to use it later
- Sometimes, room tone needs to be brought down - as loud as voices (air conditioning, crowded mumbles, street's traffic, etc.)

Reducing background noise

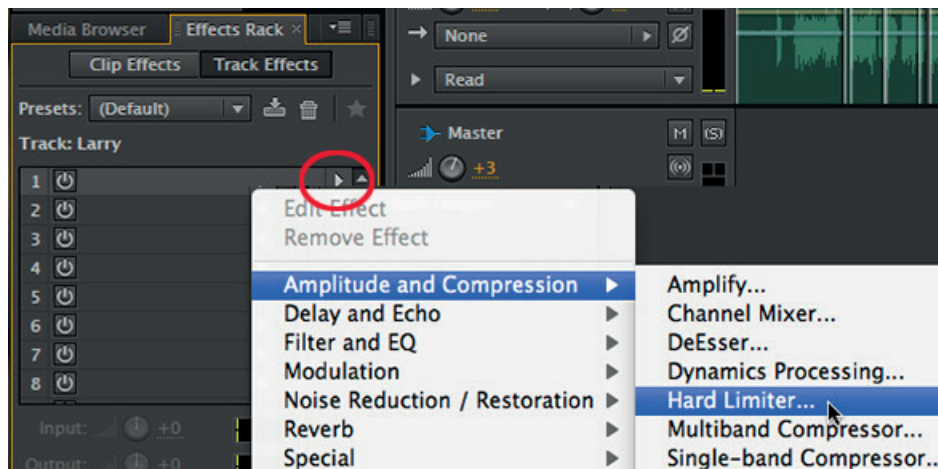
1. SELECT at least 0.5 second of room tone on the wave form
2. RIGHT-CLICK : «Select noise print»
3. MENU : EFFECTS / NOISE REDUCTION (PROCESS) + SELECT ENTIRE FILE
4. ADJUST : **Noise reduction** (selects frequency) + **Reduce by** (How much db to cut = between 6 and 30db)
CAREFUL : Too much reduction may cause robot like voice effect



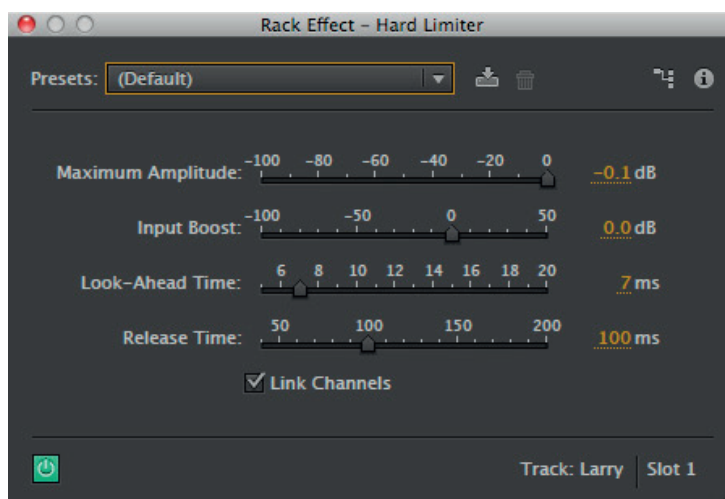
- This uses automatically the room tone print captured
You may also use FOLDER ICON to select room tone file recorded on location

Peak limiter

- **PEAK**: when the *vu meter* hits the maximum (red zone)
Very bad for ears + sound systems + TV
Must be avoided
- TV PRODUCTION = Maximum -6db (Broadcast systems adds 6db automatically)
SOUND PRODUCTION = Often -3db to -1db
OR FAVORITES / NORMALIZE: -0.1db
- **EFFECTS RACK: AMPLITUDE AND COMPRESSION / HARD LIMITER**

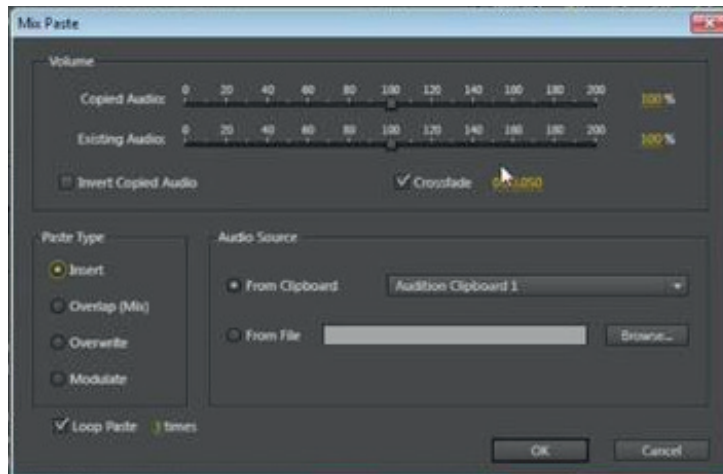


- **ADJUST**: maximum amplitude (also see presets)

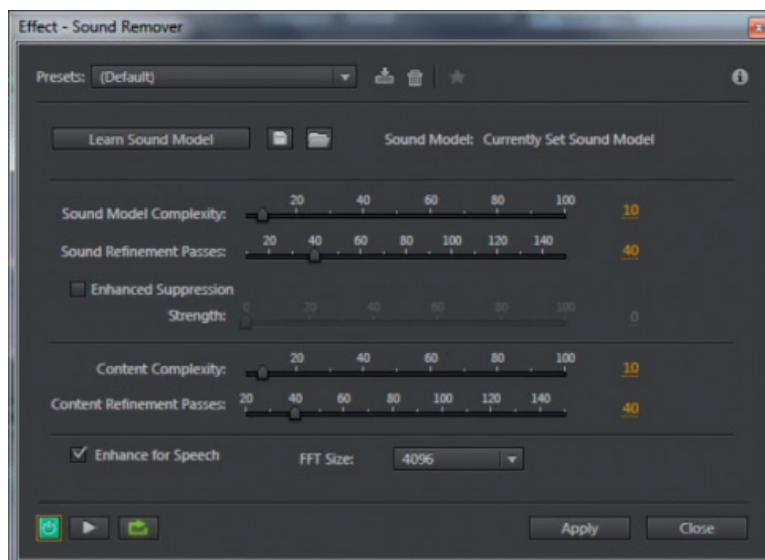


Cleaning the wave

- Any big noise will be visible on the wave
- YOU MAY : Lower amplitude of selected noise on the wave
- OR YOU MAY : MIX PASTE room tone over the noise :
 - Copy a long enough portion of room tone
 - Use MIX PASTE over the noise to clear out (using *Overwrite* option)



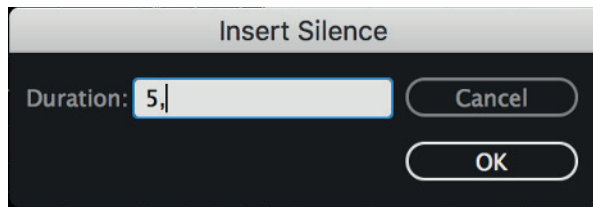
- OR : FAVORITES / AUTO HEAL (on selected portion of wave)
- ALSO : EFFECTS/ NOISE REDUCTION/RESTORATION / SOUND REMOVER
SELECT noise on wave and a bit of ambiance surrounding noise + *Learn sound model*



- If some parts are absolutely silent : make sure to use room tone

Adding silence

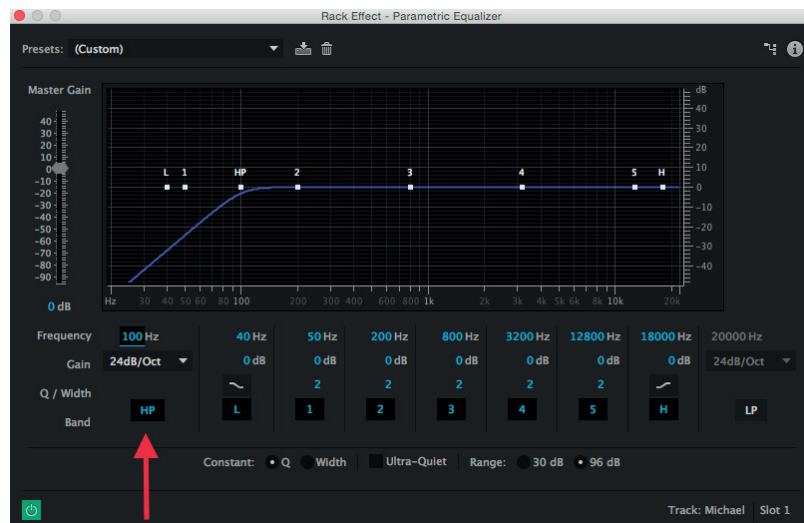
- EDIT / INSERT / SILENCE (also : right-click)



Reducing other noises

- CLICKS / POPS / ISS / HUM : explain what they are
- CLICKS and POPS :
 - EFFECTS / NOISE REDUCTION-RESTORATION / AUTOMATIC CLICK REMOVER
 - OR : Auto-heal
- HUMMING : EFFECTS / NOISE REDUCTION-RESTORATION / DeHummer
- HISS : EFFECTS / NOISE REDUCTION-RESTORATION / Hiss Reduction (Process)
- ALSO :
 - HIGH PASS : Low frequency cut
EFFECTS RACK / FILTERS-EQ / PARAMETRIC EQUALIZER

LOW PASS : High frequency cut



Assignment 02 :

- Using mobile phone or other device, go out and record indoor and outdoor monologue/dialogue
+ use noise reduction techniques to increase recording quality

CLASS 04

Audition

Mastering and effects

- Demonstrations of the followings
- Explore effects rack

Using equalizers effects

To adjust frequencies

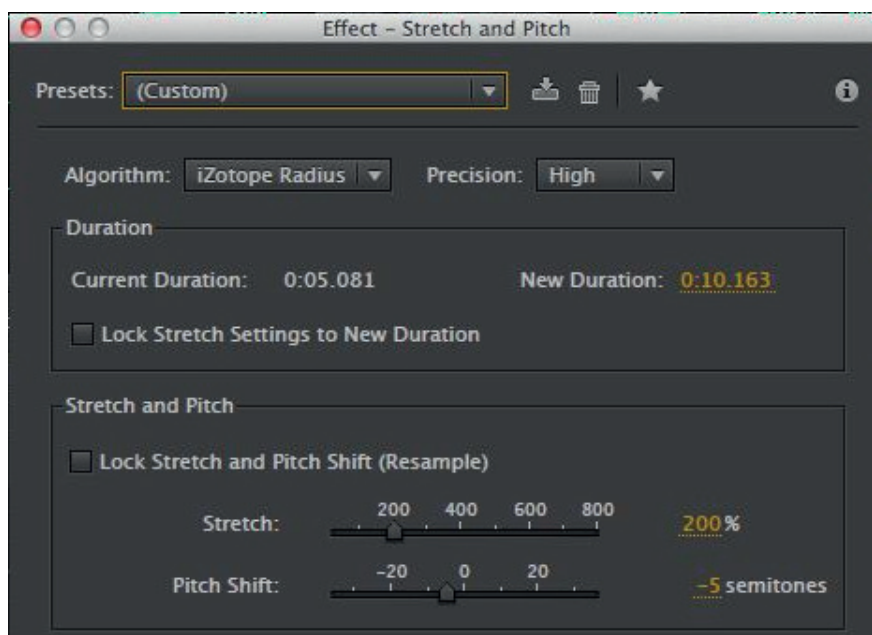
Using compressors & Dynamics + choir and flanger + echoes and delays effects

To create ambiance

Using phase modulator and distortions effects

Adjust tone and pitch

- In the effects rack
EFFECTS / TIME AND PITCH
EFFECTS / PITCH BENDER
- In the tracks properties (multitrack)



Assignment 03:

- Create a multitrack audio montage (1 to 3 minutes)
- Must be a sequence of event
- Must use ambiance music when relevant
- Must use ambiance background sounds
- Must use monologue and dialogue
- Must use stereo effects
- Sound must be cleaned when necessary
- Use compressors and other effects to create realistic ambiance

CLASS 05

Audition exam

Work shop

CLASS 06

Premiere

Presentation of the software

- Off-line editing software (difference between online/off-line)
- Editing (cuts, transitions, video, images, sounds...)
- Adjustments (colors, lightness, sharpen, speed...) + Effects (like Photoshop...)

Interrelations between Premiere and other Adobe softwares

- Allows to modify elements in original softwares (Photoshop...)
- Allows to modify sound in Audition + video in AfterEffects

Video editing project's work flow

- Transfer/capture footage to computer
- Importing footage (rushes) to software
- De-rushing (properly order/identify shot in folder) + selecting usable shots += What is a shot?
- Rough cut (order shots in the time-line) in several sequences/scenes += What is a sequence/scene
- Editing the scenes
- Sound correction/adjustment in Premiere (unwanted sounds, cuts/transitions...)
- Image adjustments in Premiere (light, color, speed, shaking...)
- Text, credits, subtitles creation
- Saving/exporting
- Post-processes (sound/image : Audition/AfterFX)

Initiation to Premiere

Creating a new project

- Name the project + location on the computer
- Importance of a clear folder structure (if files are renamed/moved : software won't find them anymore)
- Timecode (explain timecode)
- Captured settings (what are HDV/SD : dimensions + ratios)
- Many more settings to cover at a later time (especially working with low-res footage-doubles)

Presentation of the basic interface

- Project panel
- Preview (source) + Monitor (timeline's previews)
- Timeline
- Effects panel (folders + searchable)

The Project pannel

- Importing elements (video, images, sounds)
- Customizing view, creating folders, zoom, etc.
- Previewing elements by hovering
- Source preview

Creating a sequence

- Creating a sequence from Project panel
- Sequence configuration :
 - Naming the sequence
 - Available preconfigurations
 - Settings (explain) :
 - Editing modes
 - Frame rate
 - Image format (+ ratio + pixel ratio)
 - Interlaced/progressive + What are fields?
 - Other adjustments by default
- Saving the project

The timeline

- Video tracks
- Sound tracks
- Drag and drop footage from Project panel
- Modifying (or not) sequence setting when shot's and sequence's settings don't match

- Controls (play/stop/pause...)
- Scrubbing with the reading head
- Showing/hiding elements of a track
- Locking/selecting tracks
- Moving element on the timeline
- Modifying in/out point (shortening footage)

- Moving elements on another track
- Placing elements on top of each other (A/B editing)
- Cutting the footage (razor blade)
- Activating/unlocking synchronization
- Adjusting/cutting/moving sound track (length + position on the track)
- Adding sound elements in the timeline

Exercise : Edit a few shots on the timeline + use a background sound plus a few events sounds

Basic animation in Premiere

Effect options pannel

- Overview of options : position, scale, rotation, anchor point, opacity
- Explain : keyframe concept and tweening
- Effect options panel changes on selecting elements on the timeline

Animation options

- Creating a color matte (cache) from the Project panel :
 - Dragging the matte to the timeline
 - Resizing/moving/rotating/changing anchor point of the element by double-clicking in the monitor
- Animating position :
 - Creating 2 keyframes
 - Navigating the timeline using timecode
 - Modify start/end positions
 - Play the animation
- Animating other options : scale, rotation, anchor point, opacity

Creation of other elements from the Project panel

- Color bars with 12db tone + cinema leadings + countdown
- Black + transparent video + Timecode overlay

Creating and using text

- Text tool + panel
- Text options + Scrolling text

Export a movie

- FILE / EXPORT / media
- Source/output panel
- in/out points
- Choose format (lossless + lossy)
- Multiplex (mp4)
- Metadata

Assignment 4 :

- Create different decor and objects elements in Photoshop.
- Save the elements in PNG with transparency.
- Import the element to a Premiere project (HD).
- Create an animation using the elements created + text.
- Add ambiance and sound effects.
- Export as h.264/mp4

CLASS 07

Premiere

Other editing tools

- Ripple edit
- Rolling edit

Selecting shots from the Preview panel

- Previewing footage
- In/out points
- Adding selected shot to the timeline (2 options buttons)
- Bringing sound/image, image only, sound only.

Basic principle of cutting the shots

- Very intuitive, but some basic rules to apply
- As much as possible = straight cuts
- Cutting from one shot to another :
 - At least 15 degrees difference (angle)
OR change shot scale (e.g.: from medium to close shot)
 - Managing time factor
(if character exits / shot empty for 2 seconds = action in next shot takes consideration of the delay)
 - Jump cut (error/desired videoclip-like effect)
 - Respecting the axe (inverted positions)
- Cutting in movements :
 - Matching movement from one shot to the other (movement flow)
 - Cutting from a character exiting the shot (cut on the eyes)
- Using inserts :
 - To edit two shot difficult to matched
 - To suggest passage of time (changing sequence)
 - Sometimes sufficient = use of transitions

Using video transitions

- Often used to suggest passage of time
OR to change to another location/sequence
OR simultaneous action in another location/other characters
- Applying/adjusting transitions (Timeline AND select + Effect options)

Dissolve transitions

- Additive Dissolve transition
- Cross Dissolve transition
- Dip To Black/white transitions
- Film Dissolve transition
- Non-Additive Dissolve

Iris transitions

- Iris Box transition
- Iris Cross transition
- Iris Diamond transition
- Iris Round transition
- Page Peel transitions

Page Peel transition

- Page Turn transition

Slide transitions

- Center Split transition
- Push transition
- Slide transition
- Split transition

3D Motion transitions

- Cube Spin
- Flip Over

Wipe transitions

- Barn Doors Wipe transition
- Gradient Wipe transition
- Inset Wipe transition
- Wipe transition

Using audio transitions

Showing/adjusting the clips' keyframes rubber-band

- Right-click on track's element to the option
- Opacity
- Bézier curves
- Trajectory (position, scales, etc.)
- Speed

Adjusting/correcting sound

- Adjusting volume
- Adjusting channels' volume
- Panning
- Manual correction of soundtrack (slice/adjust)
- Adjusting in Audition

Using/adjusting effects

- Same as for Photoshop :
 - 1st Light (Levels/curves/exposure...)
 - 2nd Colors (white balance + adjustments/corrections / vibrance, balance, lumetri...)
 - 3rd Effects
- Noise and grain
- Color correction
- Distortion
- Aesthetics
- Generation
- Image
- Sharpen/blur
- Perspective
- Adjustments
- Transformation
- Transition
- Video

Plugins

- Example : Magic Bullet Look
- Various - can be downloaded + installed (free/paid)

Assignment 5:

- Using video shots, images and titles, create a video presentation of a city you love or would love to discover
- Use music, ambiance and sound effects as needed
- Use cuts, transitions and effects in a relevant way
- Export in h.264/mp4

CLASS 08

After Effects

Animation basics

Effects and corrections

Importing Photoshop composition

CLASS 09

After Effects

Using 3D elements + views

Creating using a 3D camera

Animating photoshop composition

Final project:

- Class shoots different shots outside using a DH camera to create a poursuite or any other idea.
- Every students, using the same footage, makes a movie using the softwares needed
- Export as h.264/mp4

CLASS 10

Workshop + help

CLASS 11

Final exam