MUSIC PRODUCTION
THEORY EXAM AND AUDIO PROJECT INFORMATION

THEORY EXAM – TOPICS LIST

The Theory Exam will feature about 65 multiple-choice questions on these topics:

- **Acoustics Basics and Digital Audio Recording** (dynamic and frequency range, speed of sound, sound power, sound pressure level and loudness, distance, sampling theory, digital audio)
- **Digital Audio Formats, Drivers and Plugins** (dynamic and frequency range, audio formats, word-clock and sync, audio driver architectures, plugin standards, VST2 vs VST3, 32- vs 64-bit OS and plugins, audio file formats)
- **Microphones and Stereo Recording** (technical specifications, condenser/dynamic/ribbon, polar patterns, stereo recording techniques, ITD & IAD, A-B, X-Y, ORTF, NOS, OSS, proximity effect, clipping and distortion, comb filtering, using multiple microphones, setup examples)
- **Audio Effects** (hardware vs software, native vs DSP, signal routing, effect groups description and parameters, filters and EQs, dynamic processors, modulation effects, reverb, delay, saturation, distortion, amp and speaker emulation, tape emulation, console channel strips)
- **Mixing and Mastering** (mixer, signal routing, pan and balance, insert and send/return FX, technical mix parameters, musical goals in a mix, places from where to start mixing, how to prevent instruments "fighting" with each other, positioning sounds in the stereo field, setting the stereo width, the mixdown, mastering tools and effects, mastering EQ and compression, multi-band compressor, brickwall limiter)
- **Automation** (analog consoles, digital consoles, digitally controlled analog consoles, VCA and motor-fader automation, total recall, snapshot automation, total automation, automation modes)
- **Acoustics and Studio Design** (soundproofing: mass principle, mass-spring-mass principle, room within a room construction, NC curves; acoustic control: acoustical requirements, room parameters, room shape and proportions, eigenmodi, room size and rev time, control room types and layouts)

The evaluation of the Theory Exam accounts for 40% of the final grade.

AUDIO QUESTS

The Audio Quest 1 and 2 account for 20% of the final grade. Details about the Quests are provided in a separate PDF.

AUDIO PROJECT – EVALUATION CRITERIA

The End-Of-Semester Audio Project accounts for the remaining 40% of the final grade will be evaluated from these aspects:

- Composition and Arrangement:
  - overall form and structure
  - choice of sounds and instruments
  - "quality" of the melodic and harmonic parts
  - stylistic elements (whether the used elements match the chosen music style)
- Complexity: number of tracks/instruments/parts
- Sound Design: use of innovative and complex synthesizer parts or mixing effects
- Live Elements: quality of the recording, editing and integration into the piece
- Mixing: balance, panorama, EQ, dynamics, use of reverb and delay effects to achieve depth
- Mastering: tonal balance, dynamics, saturation/distortion, limiting, master peak and loudness level

AUDIO PROJECT LENGTH AND COMPLEXITY

The audio project should be between 3 and 5 minutes long.

About the complexity: a piece for solo piano – beautiful as it might be – is not enough, nor is a piece for ac. guitar and vocals, or an EDM track featuring just a beat and a wobble bass.

Your audio project should be based on at least the following elements:

- one or 2 rhythm tracks (for example: 1 percussion and 1 drum loop, or 1 perc. loop + 1 programmed drum track)
- bass (for example: acoustic bass, e-bass, or synth bass)
- melody (for example: nylon or electric guitar, or a wind instrument such as flute/oboe/clarinet, or a synthesizer)
- chord elements (for example: piano, e-piano, Hammond organ, or synthesizer)
- additional elements (such as pads, effects, additional synth lines, etc.)

Total tracks: 12-16 (each drum sound counts as an element).

Apart from the drum and percussion tracks, that could be also based on WAV loops, the other elements should be VST instruments (with own programmed patterns and sequences), external MIDI synthesizers/samplers, or live instruments.

LIVE ELEMENTS AND SOUND DESIGN

At least one live recorded instrument or live recorded vocals are required. More are welcome :-)

It is recommended to integrate your own programmed synthesizer patches in the project, as well as plugin effect chains for creative sound design.

FORM AND STRUCTURE

The musical form must be clearly structured and feature at least 2 contrasting thematic ideas (A and B).

For example, this could be a rather standard song form with Intro and Coda:

- Intro
- AA (verse)
- B (refrain)
- Break (can be similar texture as intro)
- AA (verse)
- B (refrain)
- Coda (can be similar texture as intro and break)

Other possible forms:

- Theme with Variations: A - A' - A'' - A''' - A'''' ... (can be used for techno/trance/electronica)
- More complex song: Intro - A - A' - B - C (bridge) - break - A'' - A''' - B - B - C ...

MUSIC STYLE

Most music styles will be accepted including:

- pop/rock (song/ballade)
- hard rock
- heavy/death/trash metal
- rap/hip-hop/urban beats
- EDM, techno/trance/electronica
- jungle/drum'n bass
- chill-out/dub/downbeat
- dubstep
- folk/traditional
- world/ethnic
- orchestral/soundtrack

DAW SOFTWARE

The main mixing and mastering must be performed in Steinberg Cubase Pro or Avid Pro Tools. It is also possible to start a project in a different DAW (for example Logic Pro, Ableton Live, Propellerhead Reason, Reaper), then the tracks should be exported as WAV24 and imported into Cubase / Pro Tools for final mixing.

Proof of work with Cubase / ProTools must be presented, either in form of direct access to the project files on a mobile HD drive or USB-stick, or (if this is not possible) as screenshots of the project folder and of the open project window (with the tracks and elements clearly visible).

MIXING

Attention should be given to these aspects in the mix:

- balance between the elements (relative level of the tracks)
- panorama (position in the stereo field) and stereo width (tip: stereo dual panner)
- placement in the depth (using reverb and delays)
- placement in the frequency spectrum (choice of instruments and texture, and use of filters and equalizers).

Mixing tips:

- Do not try to mix everything “loud”! Some elements, such as melody or vocals as well as drums, should be more present than others such as chords, pads and effects.
- Panorama: distribute the elements across the stereo image in an exciting way, but leave main elements such as BD, SD, bass and melody/vocals in the middle.
- Depth: the dry/wet balance, or the amount of signal you send to reverb and delay effects, will affect the forward and back positioning of elements.
- Use at least a couple of reverbs (with different settings), or a reverb and a delay to give space to your mix.
- Do not go overboard with the equalizers: often less is more. If you have the feeling an element has too much bass or high frequencies, just use a shelving EQ. If you cut some frequencies, try a peak or a shelving, before you use a high and low cut.
- You can try chorus or other modulation effects (such as flanger and phaser) on background effects, vocals and “pads”.
- Keep the mix interesting by adding some new element after the middle break (often it is enough to add a small rhythmic element, like an additional tambourine, shaker or hi-hat, or an additional guitar or synth line).

MASTERING

Check out your output levels! When you mix, your peaks on the main stereo out should not exceed +3 / +4 dB over (before using the limiter). You can then add a compressor and brickwall limiter to reduce the gain of those peaks to -0.2 dB FS (standard for mastering).

The overall integrated loudness should be max -14 (Spotify) or max -12 LUFS (YouTube) according to the EBU R128 recommendation. The loudest passages (such as refrain) should not exceed -10 or -8 LUFS for short-term passages. You CAN of course master louder, but the result will just be more distortion, less dynamic range and that your track will be "pushed down" in loudness on most streaming platforms.

FILE NAMING POLICY, AUDIO FORMAT, DELIVERY METHOD

File naming policy: firstname_lastname_track-title_mix-or-master_date(DDMMYYYY).wav
For example: Nigel_Stanford_Cymatics_Master_20141112.wav

Audio File Format: the audio project must be delivered as stereo mixdown in WAV or AIFF file format, 44.1 kHz sample rate and 24-bit resolution. MP3 or other lossy file formats will not be accepted.

Project presentation: bring your audio project on a FAT32 or exFAT formatted USB-Stick using MBR (must be readable by both Windows and Mac OS X).

> Note: USB-Sticks formatted with Mac OSX "El Capitan" might not work under Windows, unless you access the advanced options. The Disk Utility advanced options of El Capitan are hidden. Please follow these steps to make them available:
>
> 1. Quit Disk Utility
> 2. Open the Terminal utility
> 3. Run the following Command: *defaults write com.apple.DiskUtility advanced-image-options 1*
> 4. Relaunch Disk Utility
>
> Now, just format your USB-Stick with MBR Partition (Master Boot Record) and exFAT file System.
> The USB-Stick now can mount in OSX & Windows.

Final project delivery: upload your audio file using WeTransfer (www.wetransfer.com) and send the download link to my email address (xenomorph@digitalnaturalsound.com)

File compression: ZIP is OK, WinRAR and other non-standard methods should be avoided.

DEADLINES

Project Presentation: the last lesson at the end of the semester in January.
Final project delivery (after feedback given during the presentation): 7th of February.