



## Course Module Description

### General module information

Title: Sound processing

Type: Course module

Language of instruction: English

Location of the lecture: Campus Copenhagen

ECTS points: 5 ECTS

Period: 1 September 2022 — 31 January 2023

### Placement

1st semester, M.Sc. in Sound and Music Computing

### Module coordinator

[Stefania Serafin](#) (coordinator), [Judi Stærk Poulsen](#) (secretary)

### Academic content and relationships to other modules/semesters

The formal study plan description of the module can be found here:

<https://moduler.aau.dk/course/2022-2023/MSNSMCM1202?lang=da-DK>

The Sound processing course module introduces sound technology in terms of sound synthesis and digital audio effects. To understand how such systems are built, it is of utmost importance to understand basic concepts regarding acquisition and manipulation of sounds. The course module therefore covers:

- The concepts of digital sampling, quantization, and reconstructions of audio signals and related technical specifications
- Implementations of filters that can change the characteristics of acquired audio signals
- Delay lines and delay based effects which are key ingredients in many other audio effects as well (e.g., flanger, vibrato, chorus, echo)
- Different types of modulation such as amplitude and frequency modulation, which are commonly used in audio effects.
- Reverberation of sound in rooms to understand how artificial reverb effects can be built.
- Introduction to transforms, such as the Z- transform and Fast Fourier transform, which enables analysis and manipulation of sounds in the frequency domain

Learning about these concepts is also of great relevance to the semester theme, i.e., foundations of sound and music computing. These basics are then used as a foundation to introduce a number of widely used and important audio effects such as delay, flanger, vibrato, chorus, modulation, and reverb.

### Objectives and learning goals

Based on the material covered in the course, the first goal is that the student should be able to apply digital filters to sound and music signals, since this is key to build advanced audio effects. The student should also be able to evaluate whether the filter is functioning as desired, e.g., by applying the fast Fourier transform. The second goal is that the student should be able to design, implement, and analyze the covered digital audio effects such as delay, flanger, vibrato, chorus, modulation, and reverb.

### Extent and expected workload

Sound processing is a 5 ECTS course, corresponding to a total workload of 140 hours. The workload is expected to be distributed as:

- Lectures: 25 hours
- Exercises: 30 hours
- Preparation: 45 hours
- Mini project: 40 hours

### Pre-requisites for participation

See the module description (find the link above) for any further detail on pre-requisites.



## Examination

Modality and duration: Individual oral exam based on submitted mini project. The duration will be 15 minutes followed by 5 minutes deliberation.

Assessment: In accordance with the 7-point grading scale

Pre-approved aids: Mini project report and slides for presentation of same

Prerequisites for participation: None

Further detail on the exam: In the beginning of the exam the student will do an approximately 5 minutes presentation of the mini project, after which the examiner will ask follow-up questions within the topic of the mini-project and the entire curriculum. Both mini project and oral examination contribute to the final grade.