Module Specification

Audio Process Design and Implementation

Version: 2023-24, v3.0, 23 Mar 2023

Contents

Part 1: Information

Module title: Audio Process Design and Implementation

Module code: UFCFE4-30-2

Level: Level 5

For implementation from: 2023-24

UWE credit rating: 30

ECTS credit rating: 15

Faculty: Faculty of Environment & Technology

Department: FET Dept of Computer Sci & Creative Tech

Partner institutions: None

Field: Computer Science and Creative Technologies

Module type: Module

Pre-requisites: Introductory Audio Programming 2022-23

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module combines signal processing and plugin development. Students will learn how audio processes work and how to develop audio effects and synthesisers in C++, which can run in any DAW.

This is a challenging coding module which will help students develop a technical understanding that open doors to many opportunities in both the music and software industry. There are also many ways to develop software for musical creativity; many

popular and groundbreaking tracks are defined by their innovative use of technology to create new sounds and push what is possible with off-the-shelf technology.

Features: Not applicable

Educational aims: See Learning Outcomes

Outline syllabus: The syllabus includes:

Analysis of output characteristics of common musical instruments. Analysis of signal and structural characteristics of audio processes.

Design and implementation of modification and synthesis processes in detail, such as common studio effects, traditional and modern synthesis methods, and custom solutions to specific sonic requirements.

Relationships between written specifications, block diagrams, implementation techniques, and aural effects.

Object oriented design and implementation in the context of audio software.

Programming language syntax, libraries and tools. Data structures, algorithms, and architectures applied to audio processes.

Appropriate mathematical methods including functions for mapping and conversions, methods of processing discrete sampled values, lookup tables and generating signals.

Part 3: Teaching and learning methods

Teaching and learning methods: Discussion sessions and self-paced learning materials will enable students to acquire knowledge of the theoretical and conceptual aspects of audio process design and implementation, and an understanding of the application of theory to practical problems.

Supervised practical classes will be used to develop student understanding of the realisation of designs in software, the relationship between engineering forms and perceptual effects, and to acquire skills concerning software development and the use of the supporting software packages. As well as the practical sessions further efforts in finishing tasks, extending ideas, and development of knowledge will be required.

Support will also be provided via email and virtual learning environments.

The assignments will draw on the above approaches, but will require additional unsupervised learning to design, implement and debug audio processes in software which are more extended than those seen in the practicals. Efforts will typically increase from a low base at the start toward a maximum at the completion of assessment stages, rather than being evenly distributed.

Contact Hours:

Activity:
Contact time: 72 hours
Assimilation and development of knowledge: 148 hours
Exam preparation: 20 hours
Coursework preparation: 60 hours
Total study time: 300 hours

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Identify, describe, compare, select, modify, and combine audio modification, synthesis and control methods of all common types to construct theoretical solutions to problems using low-level elements, with regard to artistic and scientific requirements.

MO2 Convert between written specification, block diagram, and implementation forms of audio processes.

MO3 Identify and describe the perceptual, time and frequency domain effects of audio processes.

MO4 Select, combine, extend, implement and configure a specific subset of audio modification, synthesis and control methods in depth to achieve operational solutions to problems using low-level elements, with regard to artistic and scientific requirements.

MO5 Design, implement, test, debug and evaluate object oriented software in an audio context.

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 hours

Total = 300

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://uwe.rl.talis.com/modules/ufcfe4-30-2.html

Part 4: Assessment

Assessment strategy: The individual presentation and oral assessment will be used to establish students' understanding of the theory and implementation of processes described in lectures and reading materials. To achieve marks beyond a threshold level, a wider appreciation of the design, implementation and uses of audio processes in context beyond the taught examples will be necessary.

The assignments will be used to establish students' understanding of practical design and implementation of software audio processes. This will involve demonstrating an ability to create two extended pieces of work, the first in a group, the second individual, beyond the examples seen in lectures and practicals.

Formative assessment will be provided as part of the practical sessions. Group and individual feedback will be provided for the first and second assignments respectively. Cohort-wide feedback will be provided for the exam.

Marking of group assignment will include an opportunity for students to indicate individual contributions. Assessment criteria will be supplied with the assignment specification and in the presentation brief.

Assessment tasks:

Presentation (First Sit)

Description: Individual Presentation (10 mins) with oral assessment

Weighting: 25 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO3

Project (First Sit)

Description: Process design and software development assignment 1 (Group)

Weighting: 30 %

Final assessment: No

Group work: Yes

Learning outcomes tested: MO2, MO3, MO4, MO5

Project (First Sit)

Description: Process design and software development assignment 2 (Individual)

Weighting: 45 %

Final assessment: No

Group work: No

Learning outcomes tested: MO2, MO3, MO4, MO5

Presentation (Resit)

Description: Individual presentation (10 mins) with oral assessment

Weighting: 25 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO3

Project (Resit)

Description: Process design and software development assignment 1 (Group)

Weighting: 30 %

Final assessment: No

Group work: Yes

Learning outcomes tested: MO2, MO3, MO4, MO5

Project (Resit)

Description: Process design and software development assignment 2 (Individual)

Weighting: 45 %

Final assessment: No

Group work: No

Learning outcomes tested: MO2, MO3, MO4, MO5

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Audio and Music Technology {Foundation} [Sep][SW][Frenchay][5yrs] BSc (Hons) 2021-22

Audio and Music Technology [Frenchay] BSc (Hons) 2022-23

Creative Music Technology [Frenchay] BSc (Hons) 2022-23

Audio and Music Technology {Foundation} [Sep][FT][Frenchay][4yrs] BSc (Hons) 2021-22