AUDIO AND MUSIC PROGRAMMING ENVIRONMENTS

COURSE OUTLINE

1. GENERAL			
SCHOOL	School of Music and Optoacoustic Technologies		
ACADEMIC UNIT	Department of Music Technology and Acoustics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	0807.3.004.1	**SEMESTER**	1st
COURSE TITLE	Audio and Music Programming Environments		

INDEPENDENT TEACHING ACTIVITIES if credits are awarded for separate components of the course	**WEEKLY TEACHING HOURS**	**CREDITS**
	0	7
Total	**0**	**7**

COURSE TYPE general background, special background, specialised general knowledge, skills development	Scientific area
PREREQUISITE COURSES	None
LANGUAGE OF INSTRUCTION and EXAMINATIONS	English
OFFERED TO ERASMUS STUDENTS	Yes (in English)
COURSE WEBSITE (URL)	

2. LEARNING OUTCOMES

Learning outcomes

By completion of this course, students will be familiar with the theoretical background required for understanding basic sonic algorithmic processes and will have gained skills to develop their first computer music synthesis and sonic interaction algorithms in (mainly, but not exclusively) graphical audio programming environments.

General Competences

The course aims at getting students acquainted with audio programming environments and providing them with the basic understanding and skills of audio programming. This can be considered as an introductory course in digital audio synthesis, as it covers rudimentary knowledge on digital sound and computer music. No prior computer programming skills are required.
More specifically, the course offers fundamental knowledge on the following subjects:
- computer music
- digital sound
- digital sound synthesis
- GUIs and audio interactive systems.

3. SYLLABUS

Theory:
• Introduction to audio programming environments and languages (graphical/modular versus textual)
• Bridging analog to digital sound
• Digital sound: sampling & quantization
• The concepts of Oscillators, Unit Generators, Wavetables and Signal flowcharts
• Interpolation functions over time for sound control (amplitude envelopes, glissandi)
• Stereo imaging and panning
• Additive synthesis (example: Bell by Jean-Claude Risset)
• LFOs for tremolo and vibrato
• Real-time sound control and interaction (mouse and MIDI controllers)
• Overview and comparison of audio programming environments
Laboratory/hands-on:
The laboratory component demonstrates the implementation of sound synthesis and control techniques introduced in the lectures, using widely adopted music programming environments (MaxMsp/PureData/SuperCollider).
• Familiarization with the architecture of the selected programming environment.
• Creation of complex sounds using additive synthesis.
• Spatial positioning (panning) of the sound image within the stereo field.
• Implementation of tremolo and vibrato techniques.
• Design of a graphical user interface (GUI).
• Use of mapping functions for parameter control.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY Face-to-face, Distance learning, etc.	Face-to-face (with other students or individually)
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY Use of ICT in teaching, laboratory education, communication with students	Provision of multimedia learning materials; support of the learning process through the asynchronous distance-learning e-Class platform.
TEACHING METHODS The manner and methods of teaching are described in detail.	**Activity** / **Semester workload** Theory / 2 Laboratory / 2 **Course total** / **4**
STUDENT PERFORMANCE EVALUATION Description of the evaluation procedure	The course is assessed as follows: **I. Midterm Assessment (MA) – 70% of the final grade** Development of a programming assignment in a sound and music programming environment during a laboratory session. **II. Final Assessment (FA) – 30% of the final grade** An individual theoretical assignment on a topic announced during the semester. Participation in both assessment components is mandatory. The final course grade is calculated as the weighted sum of the two components (MA ? 0.70 + FA ? 0.30) and must be at least **5.0** to pass the course. Active participation during class is also taken into consideration. The assessment criteria may be revised from one semester to another; however, they are made available to students through the course webpage and are announced at the beginning of the semester.

5. ATTACHED BIBLIOGRAPHY

- Books:
[1] Online course material and hand-outs ('E-class' online platform)
[2] Διαμαντόπουλος Τ., Η μουσική των υπολογιστών
[3] Λώτης Θ., Διαμαντόπουλος Τ., Μουσική πληροφορική και μουσική με υπολογιστές
[4] Roads C., The Computer Music Tutorial
[5] Dodge C., Jerse T., Computer Music: Synthesis, Composition, and Performance
[6] Collins N. & d'Escrivan J., The Cambridge Companion to Electronic Music
[7] Wilson S., Cottle D, Collins N., The Supercollider book

- Scientific journals:
[1] Computer Music Journal
[2] Leonardo

- Conferences:
[1] International Computer Music Conference (ICMC)
[2] Sound and Music Computing Conference (SMC)
[3] International Conference on New Interfaces for Musical Expression (NIME)