AUDIO AND COMPUTER NETWORKS

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	0807.8.001.1	**SEMESTER**	2nd
COURSE TITLE	Audio and Computer Networks		

INDEPENDENT TEACHING ACTIVITIES if credits are awarded for separate components of the course	**WEEKLY TEACHING HOURS**	**CREDITS**
	0	6
Total	**0**	**6**

COURSE TYPE general background, special background, specialised general knowledge, skills development	Επιστημονικής Περιοχής, Εμβάθυνσης Γνώσεων
PREREQUISITE COURSES	None
LANGUAGE OF INSTRUCTION and EXAMINATIONS	English
OFFERED TO ERASMUS STUDENTS	Yes (in English)
COURSE WEBSITE (URL)	https://eclass.hmu.gr/courses/SMOT210/

2. LEARNING OUTCOMES

Learning outcomes

Upon successful completion of the course, students will be able to:
- Understand how computer networks function and are organized, and the use of applications over such networks
- Develop web applications that utilize audio data
- Understand the basic requirements of Networked Music Performance (NMP) systems
- Design and assemble a basic system for audio communication over a network
- Configure the parameters of audio communication systems according to the requirements of the use-case scenario

General Competences

The course aims to help students acquire the following general competencies:
- Searching for, analyzing, and synthesizing data and information, using the necessary technologies
- Decision-making
- Project design and management
- Working autonomously and working in teams
- Promoting free, creative, and inductive thinking

3. SYLLABUS

This course covers fundamental knowledge in computer networking technology and focuses on techniques for audio signal transmission, particularly in web audio applications. Specifically, its content includes:
- Introduction to computer networks and the services they provide
- Layered network architecture (OSI Model)
- Distributed networks and network topologies
- Network nodes (routers, repeaters, bridges, firewalls, etc.)
- Internet protocols (TCP/IP Suite)
- Structure of network packets
- Routing, switching, multiplexing
- Network reliability and quality characteristics (bandwidth, transmission time, packet loss)
- Specifications of a Networked Music Performance system
- Current Networked Music Performance systems
- Encoding of audio signals for transmission
- Packet recovery techniques for reliable delivery
- Acoustic echo cancellation techniques
- Exercises in assembling a Networked Music Performance system
- Network simulation exercises
- Packet routing monitoring exercises

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY Face-to-face, Distance learning, etc.	Face to face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY Use of ICT in teaching, laboratory education, communication with students	Programming using open-source software and Application Programming Interfaces, Learning Management System (e-class)
TEACHING METHODS The manner and methods of teaching are described in detail.	
STUDENT PERFORMANCE EVALUATION Description of the evaluation procedure	Written final examination, involving problem-solving and short-answer questions (60%). Group project (of at most 2-3 people) involving learning exercises (40%).

Activity	**Semester workload**
Lectures	26
Practice Exercises	26
Independent study	50
Ανάλυση Βιβλιογραφίας	38
Εξέταση - Εργασία	10
Course total	**150**

5. ATTACHED BIBLIOGRAPHY

1. Tanenbaum Andrew, Δίκτυα Υπολογιστών, 4η Έκδοση, ΕΚΔΟΣΕΙΣ ΚΛΕΙΔΑΡΙΘΜΟΣ ΕΠΕ, 2011, η5 έκδοση
2. Kurose, Ross, Computer Networking, A Top-Down Approach 6th Edition
3. Gabrielli Leonardo, Squartini Stefano, Wireless Networked Music Performance, Springer Briefs in Electrical and Computer Engineering, 2016
4. Ciccarelli Faulkner, Δίκτυα Υπολογιστών Εισαγωγή στη Σύγχρονη Τεχνολογία, , Εκδόσεις Μ. Γκιούρδας, 2005
5. Rottondi, C., Chafe, C., Allocchio, C., & Sarti, A. (2016). An overview on networked music performance technologies. IEEE Access, 4, 8823–8843. https://doi.org/10.1109/ACCESS.2016.2628440
6. Alexandraki C. & Akoumianakis D. (2010): Exploring New Perspectives in Network Music Performance: The DIAMOUSES Framework, Computer Music Journal, 34(2): 66-83