COURSE OUTLINE

(1) GENERAL

SCHOOL	Engineering		
DEPARTMENT	Electrical and Computer Engineering		
LEVEL OF STUDY	Undergraduate		
COURSE UNIT CODE	7.026	**SEMESTER**	7th
COURSE TITLE	Multimedia Technology – Sound, Image, Video		

COURSEWORK BREAKDOWN	**TEACHING WEEKLY HOURS**	**ECTS Credits**
Theory (Lectures)	2	2
Tutorial/Exercises	1	1
Laboratory Exercises	1	1
TOTAL	**5**	**4**

COURSE UNIT TYPE	Specialized general knowledge/Skills development
PREREQUISITES	6.004 Digital Signal Processing
LANGUAGE OF INSTRUCTION/EXAMS	Greek
COURSE DELIVERED TO ERASMUS STUDENTS	Yes
WEB PAGE (URL)	https://eclass.hmu.gr/courses/ECE199/

(2) LEARNING OUTCOMES

Learning Outcomes

The aim of the course is the critical understanding of multimedia collection, representation, processing and management techniques, as well as the acquisition of basic and advanced knowledge in matters of digitization and compression of audio, image and video.

Main learning outcomes include:

1. Knowledge of the basic terminology found in scientific texts in the field of multimedia.
2. Critical understanding of the fundamental principles of multimedia content compression (audio, image and video).
3. Knowledge of multimedia information creation & processing techniques and skills of handling specialized software packages for its processing.
4. Familiarity with technical specifications (e.g., ISO, ITU).

General Skills

- Search, analysis and synthesis of data and information, using the necessary technologies
- Decision making
- Autonomous work
- Promoting creative and inductive/deductive thinking

(3) SYLLABUS

Theoretical Lecture Units

- Multimedia - Text, audio, image, video, animation. Categories and characteristics of multimedia applications.
- Information digitization - sampling, quantization, compression / encoding.
- General principles of compression. Lossy vs Lossless compression. Entropy and source encoding, RLE, differential or predictive coding. Vector quantization, Transformation encoding.
- Symmetry and asymmetry of compression techniques.
- Compression / encoding standards: PCM, DPCM, APCM, linear and logarithmic coding.

- Sound. Capture and audio compression techniques, MIDI, DCT, MP3.
- Image. Capture and image compression techniques (GIF, JPEG). Vector image.
- Video. Capture and video compression techniques (MPEG, MPEG2, MPEG4, H.264). Animation.
- Large capacity storage media and storage systems.

Laboratory Exercises

- Audio modulation and editing techniques.
- Image modulation, editing techniques, filtering tools.
- Video editing and tools.

(4) TEACHING METHODS - ASSESSMENT

MODE OF DELIVERY	In-Class Face-to-Face
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY	▪ Use of ICTs in lecturing ▪ Use of ICTs for the communication with students via the e-class platform
EACHING ORGANIZATION	**Method description/Activity** / **Semester Workload** Lectures: 39 Exercises: 13 Non-guided personal study: 68 **Total Contact Hours**: **120**
ASSESSMENT METHODS	Assessment Methods: 1. Individual laboratory exercises that require completion of concepts and combination of techniques taught (20%) 2. Written mid-term with short answer questions and problem solving (20%) 3. Written final exam with short answer questions and problem solving (60 %) Current course assessment details are posted in eclass.

(5) RECOMMENDED BIBLIOGRAPHY

Relevant English Texts:

- *Fundamentals of Multimedia, Ze-Nian Li, M.S. Drew, J. Liu, 2nd ed., Springer Berlin Heidelberg, 2014, ISBN:9783319052892.*
- *Multimedia Systems: Algorithms, Standards, and Industry Practices, P. Havaldar and G. Medioni, Cengage Learning, 2009, ISBN: 9781418835941.*
- *Multimedia Systems, R. Steinmetz and K. Nahrstedt, Springer Berlin Heidelberg, 2014, ISBN: 9783662088791.*

Internet Sources:

- *http://www.jpeg.org*
- *http://www.mpeg.org*