

■ CE88 - Multimedia Technology

GENERAL

SCHOOL	EXACT SCIENCES		
DEPARTMENT	MATHEMATICS		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	CE88	SEMESTER	H
COURSE TITLE	MULTIMEDIA TECHNOLOGY		
INDEPENDENT TEACHING ACTIVITIES	WEEKLY TEACHING HOURS	ECTS	
Lectures	4	6	
COURSE TYPE	Skills Development		
PREREQUISITE COURSES	-		
LANGUAGE OF TEACHING AND EXAMINATIONS	Greek/English		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	YES		
COURSE WEBSITE (URL)	http://eclass.uowm.gr/		

LEARNING OUTCOMES

Learning Outcomes
<p>The aim of the course is to familiarize students with the basic concepts governing multimedia technologies, as well as their organized contact with techniques and tools used to create, develop and complete modern multimedia applications and digital games (video games).</p> <p>With the successful completion of the course, the student will be able to:</p> <ul style="list-style-type: none"> • understand the basic concepts related to Multimedia Technologies, • understand the special characteristics, standards and technologies related to the various means of information representation (Text, Image, Sound, Animation,

Video) and become familiar with their basic coding techniques in multimedia applications,

- become familiar with the tools and special software for creating multimedia applications,
- become familiar with multimedia project management and development methodologies and how they are used to ensure the successful completion of multimedia applications,
- distinguish the key roles in a real project or multimedia application case study and appreciate the role of stakeholders in project implementation,
- identify the particular problems that arise during the development of multimedia applications and study ways of solving them,
- understand the network requirements of multimedia systems as well as the switching and playback technologies of multimedia applications on the Internet with a guaranteed quality of service,
- collaborate with fellow students to create and present a case study of an interactive multimedia application.

General Competencies

- Independent Work.
- Team work.
- Project Planning and Management.
- Criticism and self-criticism.
- Promotion of free, creative and inductive thinking.

CONTENT OF THE COURSE

The course is an introduction to methods, tools and techniques for creating and manipulating multimedia content (text, hypertext, voice, sound, graphics, images and video), for content retrieval and for multimedia communications. It includes issues of algorithms, standards, and protocols underlying multimedia signal and multimedia information handling techniques and multimedia communications. It focuses on presenting the concepts and characteristics of multimedia systems, describes the media that make up multimedia applications, analyzes theories and techniques for transforming media into a digital format suitable for processing, and finally lists requirements and techniques for transitioning multimedia applications to the Internet. Subsequently, methodologies for designing, developing, and implementing multimedia applications, including digital games, are taught.

Through laboratory exercises and practical exercises, as well as team work, the concepts of theory are applied in practice, which cover the material extensively.

More specifically, the content of the course covers the following topics:

- Introduction. What is multimedia? Structure, general characteristics and properties of Multimedia Systems. Classifications of Multimedia Systems and Applications. Interaction and Interactive Multimedia. Hypermedia. Structure and key features Adaptive Hypermedia Systems, Hypermedia in Education.
- Digital representation of Information. Digitization techniques.

- Basic methods of signal compression/coding. Coding principles and data compression techniques. Lossy and lossless compression algorithms. Entropy and source coding. Categories of compression methods. Text, Image, Audio, Animation and Video Compression Techniques (JPEG, MPEG).
- Digital Text. Representation, input, editing and printing of text. Markup Languages. Text and multimedia applications.
- Digital Image. Color representation and color models. Basic concepts of digital imaging. File types of bitmap images and vector graphics. Image capture and digitization. Image compression techniques. Digital image processing and vector graphics.
- Digital Audio. Sound characteristics. Audio capture and digitization. Digital Audio File Types. Coding methods and audio compression techniques. Audio and multimedia applications. MIDI. Digital audio processing. Digital Audio Sharing.
- Digital Video. Basic Video and Broadcast Video Features. Video capture and digitization. Video sampling and quantization. Digital video file types. Video file compression techniques (MPEG). Video coding standards (H.264, H.265). Video retrieval and playback. Digital video editing. Digital video sharing.
- 2-D and 3-D graphical and synthetic animation (design animation). Principles of Animation, 2-D graphic and synthetic movement (2D animation). 3-D graphic and synthetic movement (3D animation). Applications of 3D animation. Virtual Reality (Virtual Reality). Augmented Reality.
- Development of Multimedia Applications. Work phases (Analysis, Design, Production, Control/Evaluation, Distribution). Production group. Multimedia Application Development Methodology and Tools. Resource Management in Multimedia Systems.
- Multimedia and Internet. Distributed Multimedia Systems. Multicast and media streaming technology. Online distribution of multimedia content. Network services and protocols for multimedia communications. Video conference. Best effort services and guaranteed service quality. Transmission of multimedia content via 4G/5G mobile networks.

TEACHING AND LEARNING METHODS - EVALUATION

TEACHING METHOD	In the classroom and computer lab.	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	Use of specialized software for editing and writing multimedia applications. Use of e-class. Communication through face-to-face discussions and e-mails.	
TEACHING ORGANIZATION	Activity	Semester Workload
	Lectures	26 hours

	Laboratory Exercises	26 hours
	Small individual works	15 hours
	Team project	13 hours
	Individual Study	70 hours
	Course Total (25 hours per ECTS)	150 hours
STUDENT EVALUATION	<p>Written final exam (100%) in the Greek language, which includes:</p> <ul style="list-style-type: none"> -Multiple choice test, -Short Answer Questions, -Problem solving, -Comparative evaluation of theory elements. <p>During the semester, five individual assignments, as well as a larger group case study assignment covering several subject areas simultaneously, are given to students.</p>	

RECOMMENDED BIBLIOGRAPHY

1. Multimedia Use and Programming, 3rd Edition, Yue-Ling Wong, Gkiourda Publications, Athens, 2018. (Greek)
2. Multimedia Technology: Modern Multimedia Tools, G. Styliaras, V. Dimou, D. Zeugolis, Tziola Publications, Thessaloniki, 2019. (Greek)
3. Multimedia Analytical Guide, 8th Edition, Tay Vaughan, Gkiourda Publications, Athens, 2012. (Greek)
4. Multimedia Systems, Algorithms, Standards & Applications, Parag Havaladar & Gerard Medioni, Broken Hill Publishers LTD, Nicosia, 2012.
5. Multimedia Technology: Theory and Practice, S.N. Dimitriadis, A.S. Pomportsis & E.G. Triantaphyllou, Tziola Publications, Thessaloniki, 2004. (Greek)
6. Multimedia Technology and Multimedia Communications, G.B. Xylomenos & G.K. Polyzos, Kleidarithmos Publications, Athens, 2009. (Greek)
7. Multimedia Technologies: Theory, Hardware, Software, F. Lazarinis, Kleidarithmos Publications, Athens, 2007. (Greek)