COURSE DESCRIPTION

1. GENERAL

SCHOOL	MUSIC AND AUDIOVISUAL ARTS		
DEPARTMENT	AUDIO AND VISUAL ARTS		
LEVEL	Undergraduate		
COURSE CODE	AVA846	**SEMESTER**	8th
COURSE TITLE	Virtual and Augmented Reality Environments		
INDEPENDENT TEACHING ACTIVITIES		**WEEKLY TEACHING HOURS**	**ECTS**
Lecture, Hands-on Lab		4	7
COURSE CATEGORY	Deepening Knowledge		
COURSE TYPE	Elective		
PREREQUISITES	Συνέντευξη, Φάκελος Εργασιών		
LANGUAGE OF TEACHING and EXAMINATIONS	Greek		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	YES (In English)		
URL	https://avarts.ionio.gr/en/studies/undergraduate/courses-descriptions/ava846/		
ECLASS	https://opencourses.ionio.gr/modules/contact/index.php?course_id=150		

2. TEACHING RESULTS

Teaching Results

Upon successful completion of the course, students will be able to: understand the theory of user perception and interaction in virtual-augmented reality environments, to design methods of interaction and visualization, make use of existing technologies and methodologies, develop and integrate content into these environments; to design and implement virtual-augmented reality environments and apply them to serve specific purposes (education, arts, entertainment, etc.).

General Skills

- Seek, analyze and synthesize data
- Autonomous work
- Team work
- Project design and management
- Freedom of thought

3. CONTENT

The course examines the theoretical and technological foundations of the field of mixed reality and examines in particular the particular parameters on the basis of which virtual and augmented reality systems are designed and implemented, through the achievement of authentic 3D audio-visual representation and mixing between the real and the virtual. Furthermore, the interaction techniques between the user and these systems are analyzed and special emphasis is placed on their applications in the field of modern digital arts and in the field of software application development in fixed and portable computing environments.

Week 1: Introduction to virtual and augmented reality environments. Demonstration of virtual and augmented reality environments.

Week 2: Anatomy of virtual-augmented reality environments. Equipment, immersion, interaction. Introduction to virtual-augmented reality application development environments.

Week 3: Immersion in virtual reality environments. Content development for virtual-augmented reality environments.

4th Week: Forms of interaction (embodied, tangible) in virtual-augmented reality environments. Technologies and

equipment. Application development for virtual-augmented reality environments. Learning development environments (Unity3D, AR toolkit, Vuforia).

Week 5: Content of virtual-augmented reality applications. Content and interaction in virtual-augmented reality applications.

6th Week: Virtual-augmented reality systems and positioning, movement and interaction technologies. Implementation of positioning, movement and interaction mechanisms.

7th Week: Study and design of interaction methods in virtual reality environments. Implementation of interaction methods in virtual reality environments.

8th Week: Study and design of interaction methods in augmented reality environments. Implementation of interaction methods in augmented reality environments.

9th Week: Imaging issues, technologies and methodologies: rendering, overlaying, 3D stereoscopic vision. Design of virtual reality facilities.

Week 10: Designing Integrated Virtual Reality Systems.
Design of integrated virtual reality systems - laboratory application.

Week 11: Virtual and augmented reality: specific applications (science, health, business, construction, arts, culture, entertainment, games, movies, education, etc.). Case studies.

Week 12: Application of virtual and augmented reality environments for special purposes. Virtual reality and its effects (users, education, entertainment, society, economy).

Week 13: Methods of dealing with negative effects of virtual-augmented reality applications (isolation, violence and addiction). Legal and ethical issues in augmented reality.

4. TEACHING AND LEARNING METHODS - EVALUATION

TEACHING METHOD	Lectures
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	Enhanced by multimedia content. The learning process is supported by the asyncrhonous e-learning platform e-class.
TEACHING STRUCTURE	Activity — Semester Workload Lectures — 26 Lab Practice — 26 Literature Study and Analysis — 80 Practice and Preparation — 43 **Course Total** (ECTS: 7) — **175**
EVALUATION OF STUDENTS	The evaluation of the students' progress is done by using individual compulsory assignments which consist of a theoretical and a practical part in accordance with the organization and modules of the course. Papers are graded in terms of quality, scientificity and scope of implementation, adherence to guidelines and completeness of the presentation with which they complete their delivery presenting their research results.

5. BIBLIOGRAPHY

Lepouras, G., Antoniou, A., Platis, N., Charitos, D., 2015. Development of virtual reality systems. [elec. bibl.] Athens: Association of Greek Academic Libraries. Available at: http://hdl.handle.net/11419/2546

Gerard Jounghyum. Designing virtual reality systems: the structured approach. London: Springer, c2005.

Kipper, Gregory. Augmented reality : an emerging technologies guide to AR. Amsterdam ; Waltham, MA : Syngress, c2013.

Also, students can consult:

Vosinakis, S., 2015. Virtual worlds. [elec. bibl.] Athens: Association of Greek Academic Libraries. Available at: http://hdl.handle.net/11419/3187