COURSE OUTLINE

(1) GENERAL

SCHOOL	Engineering		
DEPARTMENT	Electrical and Computer Engineering		
LEVEL OF STUDY	Undergraduate		
COURSE UNIT CODE	8.025	**SEMESTER**	8th
COURSE TITLE	Game Design & Development		

COURSEWORK BREAKDOWN	**TEACHING WEEKLY HOURS**	**ECTS Credits**
Theory (Lectures)	4	3
Tutorial/Exercises	1	1
TOTAL	**5**	**4**

COURSE UNIT TYPE	Deepening / Consolidation of specialty knowledge
PREREQUISITES	
LANGUAGE OF INSTRUCTION/EXAMS	Greek
COURSE DELIVERED TO ERASMUS STUDENTS	YES
WEB PAGE (URL)	https://eclass.hmu.gr/courses/ECE173/

(2) LEARNING OUTCOMES

Learning Outcomes

The course deals with the design and development of games and especially serious games. Serious Games are games that do not have entertainment as their primary purpose but rather educational, awareness, training, advertising or other "serious" purposes that benefit from the engaging environment provided by the games to motivate users. Serious games are commonly used in defense, health, training, education, energy and other areas in which an engineer is active.
Students will go through all the steps of developing a game, selecting the idea and engaging it with learning objectives in developing and testing the original game in an environment that requires not only programming skills. The curriculum will allow students to understand the process of idealizing, designing, developing, testing, and delivering a game.

The aim of the course is to enable students to understand the process of conceiving, designing, developing, testing and delivering a serious game.

At the end of the course, students will be able to:

- Understand the basic concepts of game culture and digital game theory,
- Analyze game classifications and identify the specific characteristics of each type of game,
- Analyze, perform tests and record user needs and turn them into serious games,
- Understand and apply game methodologies,
- Understand the concepts related to the game, the flow of games, interactive storytelling, narration and their application in practice with the aim of developing an "addictive" game,
- They can refer to the main game tools (game editors, game engines) that are available for game development and identifying the best ones for a specific purpose,
- Conceive the idea, design, development, test and deliver a game.

General Skills

- Adaptation to new situations,
- Decision making,
- Autonomous Work,
- Teamwork,
- Project Planning and Management,
- Work in an interdisciplinary environment,

- Promoting free, creative and inductive thinking

(3) SYLLABUS

Theoretical Lecture Units

Module 1: Introduction

- **Chronology**
  Brief history of audiovisual narration (theater, painting, photography, comics, cinema, animation, television). Aesthetic movements. The evolution of storytelling in the digital world (theme parks, role playing games, multimedia games)
- **Basic Principles of Audiovisual Narration**
  Brief history of audiovisual narration (theater, painting, photography, comics, cinema, animation, television). Aesthetic movements. The evolution of storytelling in the digital world (theme parks, role playing games, multimedia games)

Module 2: Analysis - Design - Art-Production

- **GAME WORLD DESIGN**
  World Design,
  Environment Design,
  Multi-player Design,
  Concept Artists
  Creative Directors
- **STORYLINE DESIGN**
  Level Design
  Mission Design
- **CHARACTERS DESIGN**
  character artist,
  combat systems design,
  animator,
  motion capture artist, and
  character rigger.
- **LOOK AND FEEL**
  Cinematics Design or FX artist (effects artist)
- **Game Manual**
- **CONTENT – GAME – SCRIPT WRITING**
  understanding the narrative and incidental writing needs of the game,
  collaborating with mission designers to fuse their ideas with the storyline,
  proofreading and rehearsing with actors and directors, and
  communicating directly with the cinematics department.
- **SOUND OR AUDIO DESIGN (recording and crafting audio to sync with animations in a game)**
  sound effects,
  music,
  ambient sound, and
  voices
- **QUALITY ASSURANCE DESIGN**
  Performed by:
  - game testers,
  - design analysts,
  - software quality assurance engineers,
  - beta game testers, or
  - video game testers

  To discover and document:

- defects,
- bugs, or glitches with game software.

Module 3: Programming and Development

- Game Algorithms and Logic Programming
- Tools and Languages for making games
- Game engines,
- Operating systems and game implementation
- Development of diffuse computing (AR) games
- Game Oriented Programming
- Artificial Intelligence
- Multiplayer & Computer Networked Gaming

Module 4: Verification & Validation

- **Validation and Verification:** The concepts of software validation and verification and their differences. Description of the program control process Explanation of static analysis as a verification technique,
- **Game Testing:** The control techniques used to find program errors,
- **Quality Assurance** Testing

Laboratory Exercises

- In the laboratory part of the course students have the opportunity to practice the concepts of theory by using exercises that cover the material extensively and cultivate correct programming skills for flexible & agile software development.

(4) TEACHING METHODS - ASSESSMENT

MODE OF DELIVERY	In-Class Face-to-Face
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY	▪ Use of ICTs in lecturing ▪ Specialized Software for analysis, design and implementation of games. ▪ Use of ICTs for the communication with students via the e-class platform
TEACHING ORGANIZATION	

Method description/Activity	Semester Workload
Lectures	24
Tutoring	11
Small individual exercises	20
Teamwork Project with case study	35
Non-guided personal study	30
Total Contact Hours	**120**

ASSESSMENT METHODS	**Assessment Language: Greek** All announcements for the course regulations and complementary reading material are permanently posted in the course web page. The course grade incorporates the following evaluation procedures: **Theory:** Final written examination in the whole material (100%). The exam includes theory questions (from 3 to 5) and practice exercises (from 1 to 2). **Laboratory:** The final grade consists of written laboratory work (10%), project preparation (50%) and final exam (40%)

	The evaluation criteria are announced to the students at the beginning of each semester and are posted on the course website in the open e-class LMS.

(5) RECOMMENDED BIBLIOGRAPHY

-Recommended Bibliography:

- *Learn Unity for Windows 10 Game Development, Κωδικός Βιβλίου στον Εύδοξο: 75488229, Έκδοση: /2016, Συγγραφείς: Sue Blackman / Adam Tuliper, ISBN: 9781430267577*
- *Learn Unity for Android Game Development, Κωδικός Βιβλίου στον Εύδοξο: 75488228, Έκδοση: 1st ed./2017, Συγγραφείς: Adam Sinicki, ISBN: 9781484227046,*
- *Learn Unity 2017 for iOS Game Development [electronic resource], Κωδικός Βιβλίου στον Εύδοξο: 75488227, Έκδοση: 2nd ed./2017, Συγγραφείς: Allan Fowler / Philip Chu, ISBN: 9781484231746*
- *Polished Game Development, Κωδικός Βιβλίου στον Εύδοξο: 75490719, Έκδοση: /2016, Συγγραφείς: Steven Goodwin, ISBN: 9781484221228*
- *Mostly Codeless Game Development, Κωδικός Βιβλίου στον Εύδοξο: 75489336, Έκδοση: 1st ed./2017, Συγγραφείς: Robert Ciesla, ISBN: 9781484229705*
- *Evolutionary Optimization and Game Strategies for Advanced Multi-Disciplinary Design, Κωδικός Βιβλίου στον Εύδοξο: 73263415, Αριθμός τόμου: 75, Έκδοση: /2015, Συγγραφείς: Jacques Periaux / Felipe Gonzalez / Dong Seop Chris Lee, ISBN: 9789401795203*
- *Advanced Game Design with HTML5 and JavaScript, Κωδικός Βιβλίου στον Εύδοξο: 73261389, Έκδοση: /2015 Συγγραφείς: Rex Spuy ISBN: 9781430258018*
- *Serious Games Analytics, Κωδικός Βιβλίου στον Εύδοξο: 73266598, Έκδοση: /2015, Συγγραφείς: Christian Sebastian Loh / Yanyan Sheng / Dirk Ifenthaler, ISBN: 9783319058344*
- *Serious Games Interaction and Simulation, Κωδικός Βιβλίου στον Εύδοξο: 75492361, Αριθμός τόμου: 176, Έκδοση: /2017, Συγγραφείς: Carlos Vaz de Carvalho / Paula Escudeiro / Ant?nio Coelho, ISBN: 9783319510552*
- *Serious Games and Edutainment Applications, Κωδικός Βιβλίου στον Εύδοξο: 75492360, Έκδοση: /2017, Συγγραφείς: Minhua Ma / Andreas Oikonomou, ISBN: 9783319516455.*

Relevant Scientific Journals:

- *Schell, J. (2014). The Art of Game Design: A book of lenses. AK Peters/CRC Press.*
- *Salen, K., Tekinbaş, K. S., & Zimmerman, E. (2004). Rules of play: Game design fundamentals. MIT press.*
- *Jenkins, H. (2004). Game design as narrative. Computer, 44(53), 118-130.*
- *El-Nasr, M. S., Drachen, A., & Canossa, A. (2016). Game analytics. Springer London Limited.*
- *Bethke, E. (2003). Game development and production. Wordware Publishing, Inc..*
- *Michael, D. R., & Chen, S. L. (2005). Serious games: Games that educate, train, and inform. Muska & Lipman/Premier-Trade.*