COURSE OUTLINE

DEEP LEARNING AND DIGITAL CULTURE APPLICATIONS

1. GENERAL

SCHOOL	CLASSICS AND HUMANITIES
DEPARTMENT/UPS	HUMANITIES / DIGITAL APPLICATIONS IN ARTS AND CULTURE
LEVEL OF STUDIES	UNDERGRADUATE – LEVEL 6

COURSE CODE	XXXXX	**SEMESTER**	7TH

COURSE TITLE	DEEP LEARNING AND DIGITAL CULTURE APPLICATIONS

TEACHING ACTIVITIES _If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits._	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
	3	5
Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.		

COURSE TYPE _Background, General Knowledge, Scientific Area, Skill Development_	SCIENTIFIC AREA
PREREQUISITES:	NO
TEACHING & EXAMINATION LANGUAGE:	GREEK
COURSE OFFERED TO ERASMUS STUDENTS:	YES
COURSE URL:	https://eclass.duth.gr/courses/XXXXXX/

2. LEARNING OUTCOMES

Learning Outcomes

Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.

Upon successful completion of the course, participants will be able to:

- Understand the fundamental principles of deep learning, key concepts of neural networks, data processing, and machine learning frameworks.
- Identify cultural heritage projects suitable for artificial intelligence solutions.
- Apply deep learning techniques for digitizing cultural artifacts.
- Analyze literary sources through deep learning models.
- Evaluate the impact of artificial intelligence on cultural institutions.
- Develop skills in managing cultural data.

General Skills

Name the desirable general skills upon successful completion of the module

Search, analysis and synthesis of data and information, ICT Use	_Project design and management_
	Equity and Inclusion
Adaptation to new situations	_Respect for the natural environment_
Decision making	_Sustainability_
Autonomous work	_Demonstration of social, professional and moral responsibility and sensitivity to gender issues_
Teamwork	
Working in an international environment	_Critical thinking_
Working in an interdisciplinary environment	_Promoting free, creative and inductive reasoning_
Production of new research ideas	

- Search, analysis and synthesis of data and information, ICT Use
- Autonomous work
- Teamwork
- Equity and Inclusion
- Demonstration of social, professional and moral responsibility and sensitivity to gender issues
- Promoting free, creative and inductive reasoning

3. COURSE CONTENT

1. Introduction to Deep Learning and Cultural Heritage
   - o Overview of the basic principles of deep learning
   - o The role of artificial intelligence in cultural heritage preservation
   - o Examples of deep learning applications in museums, archives, and cultural institutions
2. Neural Networks: Understanding the Basics
   - o Introduction to neural networks and their structure
   - o Key concepts: neurons, layers, activation functions
   - o Simple applications in cultural projects
3. Convolutional Neural Networks (CNNs) for Image Processing
   - o Understanding CNNs and their applications in image recognition
   - o Digitizing cultural artifacts and art
   - o Case studies: Art restoration and virtual exhibitions
4. Natural Language Processing (NLP) in Literary Sources
   - o How NLP works and its importance in analyzing literary sources
   - o Text classification and sentiment analysis in cultural texts
   - o Case study: Using deep learning for the translation of ancient scripts
5. Deep Learning for Audio and Music Archives
   - o AI applications in the preservation of audio and music archives
   - o Sound recognition and analysis in cultural heritage
   - o Enhancement and restoration of old recordings
6. Generative Adversarial Networks (GANs) in Cultural Applications
   - o Introduction to GANs and their creative applications
   - o AI-generated art and reconstructions of historical artifacts
7. Virtual and Augmented Reality in Museums
   - o Using deep learning to enhance VR/AR experiences in museums
   - o Interactive storytelling through AI
   - o Case studies: Virtual museum tours
8. Deep Learning for Image Restoration and Enhancement
   - o Techniques for restoring and enhancing cultural images and videos
   - o Application in archives of historical photos and films
9. Data Management in AI Cultural Projects
   - o Managing and curating large cultural datasets
10. Creating Virtual Museums with Artificial Intelligence
    - o Step-by-step process of creating a virtual museum using AI
    - o Customizing the user experience through deep learning
    - o Examples of AI-powered virtual exhibitions
11. Collaborative AI Projects in Cultural Heritage
    - o Interdisciplinary collaborations between AI and culture
    - o Examples of successful collaborative projects
12. Deep Learning for Cultural Site Reconstructions
    - o Using deep learning for 3D representation of historical buildings and sites
    - o Creating virtual reconstructions of cultural monuments
    - o Example: Archaeological sites in virtual environments
13. Conclusions – Feedback

4. RNING & TEACHING METHODS - EVALUATION

TEACHING METHOD *Face to face, Distance learning, etc.*	• Classroom lectures • Workshops • Active learning (hands-on learning) – Experiential learning • Collaborative learning
USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT) *Use of ICT in Teaching, in Laboratory*	• Use of ICT in Teaching and Communication with Students • PPT presentations • Use of digital tools and platforms

	Teaching materials, announcements, and communication via the eClass platform
Education, in Communication with students	• Teaching materials, announcements, and communication via the eClass platform • Student study of supporting materials related to the course content • Communication with students via email

TEACHING ORGANIZATION	**Activity**	**Workload/semester**
The ways and methods of teaching are described in detail.	Lectures	26
Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research & analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.	Workshops	13
	Final Project	30
	Weekly Projects	38
	Study	40
	Final Exam	3
The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.	Total	150

STUDENT EVALUATION	Formative
Description of the evaluation process	
Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report, Clinical examination of a patient, Artistic interpretation, Other/Others	Weekly Projects: 40% Final project: 30% Final Exam: 30%
Please indicate all relevant information about the course assessment and how students are informed	

5. SUGGESTED BIBLIOGRAPHY

Goodfellow, I., Bengio, Y., Courville, A. 2016. *Deep Learning.* MIT Press

Ekman, M. 2021. *Learning Deep Learning*. Addison Wesley

Kelleher, D. J. 2019. *Deep Learning*. MIT Press

Raschka, S., Mirjalili, V. 2019. *Python Machine Learning. Machine Learning and Deep Learning with Python, Scikit-Learn, and Tensorflow* 2, Packt Publishing

Sejnowski, T. J. 2018. *The Deep Learning Revolution*. MIT Press

Yong Jin, D. 2021. *Artificial Intelligence in Cultural Production. Critical Perspectives on Digital Platforms*. Routledge

ANNEX OF THE COURSE OUTLINE

Alternative ways of examining a course in emergency situations

Teacher (full name):	XXXX
Contact details:	XXXX
Supervisors: (1)	YES
Evaluation methods: (2)	Weekly Projects: 40% Final project: 30% Final Exam: 30%
Implementation Instructions: (3)	The written exams (both mid-term and final) will be conducted via the eClass platform on a date and time that will be announced in advance. Students will be informed of the exam duration and content well ahead of the scheduled exam. The assignment must be submitted through eClass by a specified deadline.

(1) Please write YES or NO
(2) Note down the evaluation methods used by the teacher, e.g.
  ➢ *written assignment* or/and exercises
  ➢ written or oral examination with distance learning methods, provided that the integrity and reliability of the examination are ensured.
(3) In the **Implementation Instructions** section, the teacher notes down clear instructions to the students:

a) in case of **written assignment and / or exercises:** the deadline (e.g. the last week of the semester), the means of submission, the grading system, the grade percentage of the assignment in the final grade and any other necessary information.
b) in case of **oral examination with distance learning methods:** the instructions for conducting the examination (e.g. in groups of X people), the way of administration of the questions to be answered, the distance learning platforms to be used, the technical means for the implementation of the examination (microphone, camera, word processor, internet connection, communication platform), the hyperlinks for the examination, the duration of the exam, the grading system, the percentage of the oral exam in the final grade, the ways in which the inviolability and reliability of the exam are ensured and any other necessary information.
 c) in case of **written examination with distance learning methods**: the way of administration of the questions to be answered, the way of submitting the answers, the duration of the exam, the grading system, the percentage of the written exam of the exam in the final grade, the ways in which the integrity and reliability of the exam are ensured and any other necessary information.
There should be an attached list with the Student Registration Numbers only of students eligible to participate in the examination.