

COURSE OUTLINE

ARTIFICIAL INTELLIGENCE AND APPLICATIONS IN CULTURE

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	5 TH
COURSE TITLE	ARTIFICIAL INTELLIGENCE AND APPLICATIONS IN CULTURE		
TEACHING ACTIVITIES <i>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.</i>		TEACHING HOURS PER WEEK	ECTS CREDITS
		3	5
<i>Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.</i>			
COURSE TYPE <i>Background, General Knowledge, Scientific Area, Skill Development</i>	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:

- Define and explain the fundamental principles of AI, outline its historical development, and identify its main applications within the cultural sector.
- Analyse cultural research problems and apply algorithms to develop effective solutions.
- Select appropriate methodologies for addressing specific challenges in cultural research.
- Understand semantic networks, ontologies, and rule-based systems and their role in managing cultural information.
- Utilize expert systems and agent systems for analysing and processing cultural heritage data.
- Comprehend the functioning of machine learning models (supervised, unsupervised, and reinforcement learning) and recognize their applications in cultural heritage conservation.
- Apply artificial neural networks and deep learning methods to address complex cultural challenges.
- Explore the use of AI in digitization, restoration, and predictive conservation to protect and enhance cultural artifacts.
- Employ AI technologies for the recovery and translation of ancient texts, preservation of endangered languages, and semantic analysis of historical documents.
- Understand how AI supports the development of personalized digital guides, smart museums, and recommender systems, enriching the cultural experience.
- Recognize the ethical and social issues associated with the use of AI in cultural contexts.

General Skills

Name the desirable general skills upon successful completion of the module

<i>Search, analysis and synthesis of data and information,</i>	<i>Project design and management</i>
<i>ICT Use</i>	<i>Equity and Inclusion</i>
<i>Adaptation to new situations</i>	<i>Respect for the natural environment</i>

<i>Decision making</i> <i>Autonomous work</i> <i>Teamwork</i> <i>Working in an international environment</i> <i>Working in an interdisciplinary environment</i> <i>Production of new research ideas</i>	<i>Sustainability</i> <i>Demonstration of social, professional and moral responsibility and sensitivity to gender issues</i> <i>Critical thinking</i> <i>Promoting free, creative and inductive reasoning</i>
<ul style="list-style-type: none"> • Search, analysis and synthesis of data and information, ICT Use • Autonomous work • Teamwork • Promoting free, creative and inductive reasoning • Production of new research ideas • Working in an interdisciplinary environment 	

3. COURSE CONTENT

1. Introduction to Artificial Intelligence (AI): basic definitions, history, evolution of AI, overview of applications in culture contexts
2. Problem solving: problem description and solution search algorithms
3. Knowledge representation: semantic networks, ontologies, rule-based systems, semantic web
4. Knowledge systems: structure and function, expert systems, agent systems
5. Machine learning: Supervised learning, classification challenges, support vector machines, unsupervised learning, reinforcement learning
6. Artificial Neural Networks (ANNs) and deep learning: Basic architectures, training methods, iterative and convolutional neural networks.
7. AI for heritage preservation and protection: digitization, artwork restoration, predictive conservation techniques
8. Cultural linguistics and AI: natural language processing, preservation of endangered languages, recovery and translation of ancient texts, decoding of epigraphic signs, semantic analysis of historical texts.
9. AI and cultural tourism: personalised digital guides, recommender systems, smart museums, augmented reality and gamification.
10. Artwork analysis with AI: artwork authentication, chronological classification, style detection and artist identification.
11. Applications of AI in music and performing arts: analysis and synthesis of musical pieces, tracing the origin of traditional songs, recording and modelling of traditional dances.
12. Generative AI and its applications in culture: text generation and speech synthesis, generative artwork
13. Ethical issues and emerging trends in artificial intelligence: Digital twins in cultural heritage and related ethical considerations

4. LEARNING & TEACHING METHODS - EVALUATION

<p style="text-align: center;">TEACHING METHOD</p> <p style="text-align: center;"><i>Face to face, Distance learning, etc.</i></p>	<ul style="list-style-type: none"> • Lectures • Active learning (hands-on learning) - Experiential learning • Collaborative learning 												
<p style="text-align: center;">USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT)</p> <p style="text-align: center;"><i>Use of ICT in Teaching, in Laboratory Education, in Communication with students</i></p>	<ul style="list-style-type: none"> • Digital assessment tools • Online collaboration tools • Use of ICT in teaching and communication with students • PPT presentations • Teaching material, announcements and communication through the eClass platform • Communication with students via email 												
<p style="text-align: center;">TEACHING ORGANIZATION</p> <p style="text-align: center;"><i>The ways and methods of teaching are described in detail.</i></p> <p style="text-align: center;"><i>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.</i></p>	<table border="1"> <thead> <tr> <th style="text-align: center;"><i>Activity</i></th> <th style="text-align: center;"><i>Workload/semester</i></th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td style="text-align: center;">26</td> </tr> <tr> <td>Laboratory Exercise</td> <td style="text-align: center;">13</td> </tr> <tr> <td>Essay</td> <td style="text-align: center;">30</td> </tr> <tr> <td>Projects</td> <td style="text-align: center;">38</td> </tr> <tr> <td>Study and analysis of bibliography</td> <td style="text-align: center;">40</td> </tr> </tbody> </table>	<i>Activity</i>	<i>Workload/semester</i>	Lectures	26	Laboratory Exercise	13	Essay	30	Projects	38	Study and analysis of bibliography	40
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<p><i>The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.</i></p>	Written examination	3
	Total	150
<p>STUDENT EVALUATION</p> <p><i>Description of the evaluation process</i></p> <p><i>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</i></p> <p><i>Please indicate all relevant information about the course assessment and how students are informed</i></p>	<p>Formative</p> <p>Essay (compulsory): 50%</p> <p>Final written examination: 50%</p>	

5. SUGGESTED BIBLIOGRAPHY

- Aggarwal, C. C. (2018). Νευρωνικά δίκτυα και βαθιά μάθηση. Εκδόσεις Fountas.
- Fiorucci, M., Khoroshiltseva, M., Pontil, M., Traviglia, A., Del Bue, A., & James, S. (2020). Machine learning for cultural heritage: A survey. *Pattern Recognition Letters*, 133, 102-108.
- Pitas, I. (2022) *Artificial Intelligence Science and Society / Part A: Introduction to AI Science and Information Technology: Part A: Introduction to AI Science and Information Technology.*
- Russell, S. J., & Norvig, P. (2016). *Artificial intelligence: a modern approach.* Pearson.
- Tegmark, M. (2018). *Life 3.0: Being human in the age of artificial intelligence.* Vintage.
- Βλαχάβας, Ι., Κεφαλάς, Π., Βασιλειάδης, Ν., Κόκκορας, Φ., & Σακελλαρίου, Η. (2006). Τεχνητή νοημοσύνη. Γ Έκδοση. Γκιούρδας
- Παναγιωτακόπουλος, Χ., Τσαλίδης, Χ., Γάκης, Π., & Κόκκινος, Θ. (2022). Υπολογιστική γλωσσολογία [Προπτυχιακό εγχειρίδιο]. Κάλλιπος, Ανοικτές Ακαδημαϊκές Εκδόσεις. <https://dx.doi.org/10.57713/kallipos-127>

ANNEX OF THE COURSE OUTLINE

Alternative ways of examining a course in emergency situations

Teacher (full name):	XXXXXXXX
Contact details:	XXXXXXXX
Supervisors: (1)	YES
Evaluation methods: (2)	Essay (compulsory): 50% Final written examination: 50%
Implementation Instructions: (3)	The written exams 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.