INSTITUTION	NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS					
SCHOOL	SCHOOL OF SCIENCE					
DEPARTMENT	INFORMATICS AND TELECOMMUNICATIONS					
COURSE LEVEL	UNDERGRADUATE					
COURSE TITLE	**Artificial Intelligence II**					
COURSE CODE	C02		Semester	6	ECTS	6
TEACHING HOURS per week	THEORY	3	TUTORIAL	1	LABORATORY	
URL	https://eclass.uoa.gr/courses/DI517/ https://cgi.di.uoa.gr/~ys19					

COURSE CONTENT

The course concentrates on the study of deep learning techniques and their use in natural language processing.

Topics: introduction to machine learning, regression, perceptron, neural networks, backpropagation, word vectors, deep neural network training, word2vec and related models, language modeling and RNNs, vanishing gradients, LSTMs/GRUs, machine translation, seq2seq and attention, transformers, BERT and large language models (GPT family, GEMINI family etc.).

The programming exercises of the course are done using Python, SciKitLearn and PyTorch.

STUDENT LEARNING OBJECTIVES

Teaching-Learning Goals-Expected Learning Outcomes
Upon successful completion of the course the student will be able to:

- Solve natural language processing problems using deep learning techniques.
- Use machine learning models in other areas (e.g., Computer Vision).
- Carry out projects using modern deep learning programming frameworks such as PyTorch.

TEACHING AND LEARNING METHODS – ASSESSMENT

TEACHING METHOD	In Class (Face to Face)
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	Learning process supported by the e-class platform and piazza. Email communication Live transmission of lectures Ability to track recorded lectures Utilization of programming language Python and ML frameworks SciKitLearn and PyTorch.

TEACHING ORGANIZATION	
Describe in detail the way and methods of teaching: *Enhanced Lectures,* *Online Lectures,* *Seminars,* *Tutorial,* *Laboratory,* *Laboratory Exercise,* *Study & analysis of literature,* *Practice (Positioning),* *Interactive teaching,* *Developing a project,* *Individual / group work* *Telework (reference to tools) etc.* *Details of the student's study hours for each learning activity and hours of non-guided study are shown to ensure that the total workload at the semester corresponds to the ECTS*	<table><tr><th>Activity</th><th>*Student Workload* (hours)</th></tr><tr><td>Lectures</td><td>39</td></tr><tr><td>Tutorial</td><td>13</td></tr><tr><td>Homework</td><td>98</td></tr><tr><td></td><td></td></tr><tr><td>*Total Course (25 hours of workload per unit of credit)*</td><td>*150*</td></tr></table>

ASSESSMENT OF STUDENTS	
Description of the assessment process *Assessment Methods, Formative or Concluding, Multiple Choice Test, Quick Response Questions, Test Development Questions, Problem Solving, Written Work, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Other / Other* *Fully defined evaluation criteria are mentioned and if and where they are accessible to students.*	4 assignments with theoretical and programming exercises. <table><tr><th>Assessment methods</th><th>*Number*</th><th>*Percentage*</th></tr><tr><td>Homework</td><td>4</td><td>4*25=100%</td></tr><tr><td></td><td></td><td></td></tr></table>

LITERATURE AND STUDY MATERIALS / READING LIST

- Detailed slides presented in class and made available on the course Web page.

- Other material on the course Web page.