| INSTITUTION | NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS | | | | |
|---|---|---|---|---|---|
| SCHOOL | SCHOOL OF SCIENCE | | | | |
| DEPARTMENT | INFORMATICS AND TELECOMMUNICATIONS | | | | |
| COURSE LEVEL | GRADUATE | | | | |
| COURSE TITLE | **Deep Learning for Natural Language Processing** | | | | |
| COURSE CODE | **C15** | **Semester** | **3** | **ECTS** | **6** |
| TEACHING HOURS per week | **THEORY** 2 | **SEMINAR** | | **LABORATORY** | 1 |
| URL | | | | | |

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### COURSE CONTENT

Deep learning techniques are applied across many NLP task for end-to-end training of various types and architectures of neural networks. The course will cover language models, word vector representations, recurrent neural networks, long-short-term-memory models, convolutional neural networks as well as some very novel models involving attention mechanisms. Along with the lectures the students will be provided with programming assignments to learn how to implement and employ deep neural networks on practical problems.

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### STUDENT LEARNING OBJECTIVES

Upon successful completion of the course the student will be able to:

- Describe various types of neural networks and how they can be applied in more deep architectures
- Implement deep learning architectures employing different types of neural networks for tackling various NLP tasks

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### 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:<br>- Courseware<br>- Announcements<br>- Assignments<br>- Student groups<br>- Email communication |

**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,*

| Activity | Student Workload (hours) |
|---|---|
| Lectures | 39 |
| Teamwork small projects assignments | 60 |
| Independent Study | 51 |
| *Total Course* | *150* |

| | | |
|---|---|---|
| *Developing a project,*<br>*Individual / group work*<br>*Telework (reference to tools) etc.*<br><br>*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* | ***(25 hours of workload per unit of credit)*** | |

**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.*

Describe explicitly methods, evaluation tools and provided feedback.
The table below is supplemented accordingly.

| Assessment methods | Number | Percentage |
|---|---|---|
| Laboratory | 2 | 60% |
| Final work | 1 | 40% |

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| **LITERATURE AND STUDY MATERIALS / READING LIST** |
|---|
| Speech and Language Processing, Dan Jurafsky and James H. Martin, https://web.stanford.edu/~jurafsky/slp3/<br>Applied Natural Language Processing in the Enterprise, Ankur A. Patel, Ajay Uppili Arasanipalai, O'Reilly Media, Inc., 2021<br>Learning Deep Learning: Theory and Practice of Neural Networks, Computer Vision, NLP, and Transformers using TensorFlow, Magnus Ekman, Addison-Wesley Professional, 2021<br>Hands-On Natural Language Processing with PyTorch 1.x, Thomas Dop, Packt Publishing, 2020<br>https://bharathgs.github.io/Awesome-pytorch-list/#tutorials--examples<br>https://pytorch.org/tutorials/beginner/nlp/deep_learning_tutorial.html#sphx-glr-beginner-nlp-deep-learning-tutorial-py |