Artificial intelligence - BMEEOFTDT85

I. Subject Specification

1. Basic Data

1.1 Title

Artificial intelligence

1.2 Code

BMEEOFTDT85

1.3 Type

Module with associated contact hours

1.4 Contact hours

Type	Hours/week / (days)
Lecture	2

1.5 Evaluation

Exam

1.6 Credits

3

1.7 Coordinator

name	Béla Paláncz
academic rank	Professor emeritus
email	palancz.bela@emk.bme.hu

1.8 Department

Department of Geodesy and Surveying

1.9 Website

https://epito.bme.hu/BMEEOFTDT85
https://fiek2.mywire.org/course/view.php?id=2495

1.10 Language of instruction

english

1.11 Curriculum requirements

Ph.D.

1.12 Prerequisites

Required previous subjects (need to be completed to register): Corresponding MSc subjects

1.13 Effective date

1 September 2022

2. Objectives and learning outcomes

2.1 Objectives

Practical and theoretical introduction to models and methods of machine and deep learning.

2.2 Learning outcomes

Upon successful completion of this subject, the student:

A. Knowledge

1. General, solid knowledge of the ML and DL techniques and their applications.

B. Skills

1. Finding the proper methods for the actual problem
2. Recognition the advantages and handicaps of the applied methods
3. Providing alternative solutions
4. Ability to evaluate real project
5. Select and using appropriate software

C. Attitudes

1.

D. Autonomy and Responsibility

1.

2.3 Methods

Lectures, electronic hand-outs, computer solution of practical problems

2.4 Course outline

Hét	**Előadások és gyakorlatok témaköre**
1.	Introduction. Artificial intelligence - Machine learning -

	Deep Learning. Tasks - Models - Learning Methods
2.	Methods of feature reduction 1: PCA -SVD - KL Decomposition - TLS - IC Analysis
3.	Methods of feature reduction 2: DFT - DWT - RBF Approximation - Autoencodig - Fractal Compression
4.	Classification: KNN - Logistic regression - Tree Based Models - SVM - Naive Bayes Classifier
5.	Clustering: KMeans - Hierarchical - Density Based Spacial - Sprectal
6.	Regression: KNN - Linear - Non-Linear - Robust - Symbolic - SVM
7.	Neural Networks Basic: Single and Multilayer Perceptron
8.	Hopfield Net and its applications
9.	Unsupervised Net and its applications
10.	Recurrent Network
11.	Features of Deep Learning - applications
12.	Convolutional Neural Network with applications
13.	Project work - consultation
14.	Project work - consultation

The above programme is tentative and subject to changes due to calendar variations and other reasons specific to the actual semester. Consult the effective detailed course schedule of the course on the subject website.

2.5 Study materials

Textbooks:

1. Awange - Paláncz - Lewis - Völgyesi: Mathematical Geosciences 2nd edition, Springer 2022
2. Awange - Paláncz - Völgyesi: Hybrid Imaging and Visualization Springer 2020

Online materials:

1. Electronic Lecture Notes

2.6 Other information

Website:

- www.wolframcloud.com/obj/palancz/Published/Artificial_Intelligence.nb

2.7 Consultation

The instructors are available for consultation during their office hours, as advertised on the department website. Special appointments can be requested via e-mail: oktato@mail.bme.hu

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This Subject Datasheet is valid for:

Inactive courses

II. Subject requirements

Assessment and evaluation of the learning outcomes

3.1 General rules

3.2 Assessment methods

Teljesítményértékelés neve (típus)	Jele	Értékelt tanulási eredmények
		A.1; B.1-B.5; C.1; D.1

The dates of deadlines of assignments/homework can be found in the detailed course schedule on the subject's website.

3.3 Evaluation system

Jele	Részarány
Összesen	**100%**

3.4 Requirements and validity of signature

3.5 Grading system

Érdemjegy	Pontszám (P)
jeles (5)	
jó (4)	
közepes (3)	
elégséges (2)	
elégtelen (1)	

3.6 Retake and repeat

3.7 Estimated workload

Tevékenység	Óra/félév
Összesen	

3.8 Effective date

1 September 2022

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