COURSE SYLLABUS AND COURSE REQUIREMENTS
2022-2023 II

Course title	*Artificial Intelligence 2*
Course Code	IVM436AN
Hours/Week: le/pr/lab	1/1/0
Credits	5
Degree Programme	Computer Science Engineering MSc
Study Mode	*Full-time*
Requirements	Final Exam
Teaching Period	2022-23/2
Prerequisites	Artificial Intelligence 1
Department(s)	System and Software Technologies
Course Director	
Teaching Staff	*Tamas Storcz*

COURSE DESCRIPTION

A short description of the course (max. 10 sentences).
Neptun: Instruction/Subjects/Subject Details/Basic data/Subject description

Provide a brief insight into machine learning systems. Students will meet main groups of data driven machine learning methods and their application.

SYLLABUS

Neptun: Instruction/Subjects/Subject Details/Syllabus

1. GOALS AND OBJECTIVES

Goals, student learning outcome.
Neptun: Instruction/Subjects/Subject Details/Syllabus/Goal of Instruction

Let students meet a test machine learning model theories, applications and limitations.

2. COURSE CONTENT

Neptun: Instruction/Subjects/Subject Details/Syllabus/Subject content

TOPICS	
LECTURE	1. *Search algorithms and artificial intelligence* 2. *Linear regression, artificial neuron* 3. *Regression* 4. *Classification* 5. *Clustering* 6. *Evolutional algorithms* 7. *Complex neural networks*
PRACTICE	1. *Development environment* 2. *Python language* 3. *Scientific data handling and visualization is python* 4. *Regression models* 5. *Classification models* 6. *Clustering models* 7. *Evolutional algorithms* 8. *Complex neural networks and applications*

DETAILED SYLLABUS AND COURSE SCHEDULE

ACADEMIC HOLIDAYS INCLUDED

LECTURE

week	Topic	Compulsory reading; page number (from … to …)	Required tasks (assignments, tests, etc.)	Completion date, due date
1.	…	…	…	…
2.	Python programming	#2/1		
3.	Artificial intelligence, Machine learning	#2/2	Homework 1	8th week (31.03 23:59)
4.	Linear regression, artificial neuron	#2/3		
5.	Linear regression showcase			
6.	Regression	#2/4		
7.	Convolutional neural networks			
8.	Logical regression, classification	#2/5	Homework 2	13th week (05.05 23:59)
9.	Holiday			
10.	Pollack expo			
11.	Clustering	#2/6		
12.	Evolutional algorithms	#2/7		
13.	Homework presentations			
14.	Complex neural nets and applications	#2/8		
15.	Homework presentations			

PRACTICE, LABORATORY PRACTICE

week	Topic	Compulsory reading; page number (from … to …)	Required tasks (assignments, tests, etc.)	Completion date, due date
1.				
2.	Pycharm, Python programming	#1/1		
3.	git, Jupyter notebook	#1/2-3		
4.	Handling and visualizing data in python	#1/4-5		
5.	Linear regression showcase			
6.	Regression models	#1/6		
7.	Convolutional neural networks			
8.	Classifier models	#1/7		
9.	Holiday			
10.	Pollack expo			
11.	Clustering models	#1/8		
12.	Evolutional algorithms	#1/9		
13.	Homework presentations			
14.	Complex neural network applications	#1/10		
15.	Homework presentations			

3. ASSESSMENT AND EVALUATION

(Neptun: Instruction/Subjects/Subject Details/Syllabus/Examination and Evaluation System)

ATTENDANCE

In accordance with the Code of Studies and Examinations of the University of Pécs, Article 45 (2) and Annex 9. (Article 3) a student may be refused a grade or qualification in the given full-time course if the number of class absences exceeds 30% of the contact hours stipulated in the course description.

Method for monitoring attendance *(e.g.: attendance sheet / online test/ register, etc.)*

On-line tests

Course-unit with final examination

Mid-term assessments, performance evaluation and their weighting as a pre-requisite for taking the final exam
(The samples in the table to be deleted.)

Type	Assessment	Weighting as a proportion of the pre-requisite for taking the exam
1. Homework 1	5 points	50%
2. Homework 1	5 points	50%

Requirements for the end-of-semester signature
(Eg.: mid-term assessment of 40%)

Submit both homeworks before submission deadline, both must be evaluated to minimum 40%

Re-takes for the end-of-semester signature (PTE TVSz 50§(2))

The specific regulations for grade betterment and re-take must be read and applied according to the general Code of Studies and Examinations. E.g.: all the tests and the records to be submitted can be repeated/improved each at least once every semester, and the tests and home assignments can be repeated/improved at least once in the first two weeks of the examination period.

Homework resubmission before resubmission deadline

Type of examination (written, oral): ……written…….

The exam is successful if the result is minimum 40 %. *(The minimum cannot exceed 40%.)*

Calculation of the grade (TVSz 47§ (3))

The mid-term performance accounts for **0** %, the performance at the exam accounts for **100** % in the calculation of the final grade.

Calculation of the final grade based on aggregate performance in percentage.

Course grade	Performance in %
excellent (5)	85 % …
good (4)	70 % ... 85 %
satisfactory (3)	55 % ... 70 %
pass (2)	40 % ... 55 %
fail (1)	below 40 %

The lower limit given at each grade belongs to that grade.

4. SPECIFIED LITERATURE
In order of relevance. (In Neptun ES: Instruction/Subject/Subject details/Syllabus/Literature)

COMPULSORY READING AND AVAILABILITY

[1.] Course Jupyter Notebooks
[2.] Course slides

RECOMMENDED LITERATURE AND AVAILABILITY

[3.] Multilayer feedforward networks are universal approximators (https://doi.org/10.1016/0893-6080(89)90020-8)
[4.] A general regression neural network (https://doi.org/10.1109/72.97934)
[5.] Universality of deep convolutional neural networks (https://doi.org/10.1016/j.acha.2019.06.004)
[6.] A Recurrent Neural Network that Learns to Count (https://doi.org/10.1080/09540099911634)