

COURSE SYLLABUS AND COURSE REQUIREMENTS 2022-2023 II

<i>Course title</i>	<i>Artificial Intelligence 2</i>
<i>Course Code</i>	IVM436AL
<i>Hours/Week: le/pr/lab</i>	1/1/0
<i>Credits</i>	5
<i>Degree Programme</i>	Computer Science Engineering MSc
<i>Study Mode</i>	Part-time
<i>Requirements</i>	Final Exam
<i>Teaching Period</i>	2022-23/2
<i>Prerequisites</i>	Artificial Intelligence 1
<i>Department(s)</i>	System and Software Technologies
<i>Course Director</i>	
<i>Teaching Staff</i>	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 in 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.				
3.	Artificial intelligence, Machine learning	#2/2	Homework 1	8 th week (31.03 23:59)
4.	Linear regression, artificial neuron	#2/3		
5.				
6.	Regression	#2/4		
7.				
8.	Logical regression, classification	#2/5	Homework 2	13 th week (05.05 23:59)
9.	Holiday			
10.				
11.	Clustering	#2/6		
12.	Evolutional algorithms	#2/7		
13.				
14.	Complex neural nets and applications	#2/8		
15.				

PRACTICE, LABORATORY PRACTICE

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

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

ASSESSMENT

Cells of the appropriate type of requirement is to be filled out (course-units resulting in mid-term grade or examination). Cells of the other type can be deleted.

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.] Mitchell T.:Machine Learning, McGraw-Hill, 1997
- [4.] Multilayer feedforward networks are universal approximators ([https://doi.org/10.1016/0893-6080\(89\)90020-8](https://doi.org/10.1016/0893-6080(89)90020-8))
- [5.] A general regression neural network (<https://doi.org/10.1109/72.97934>)
- [6.] Universality of deep convolutional neural networks (<https://doi.org/10.1016/j.acha.2019.06.004>)
- [7.] A Recurrent Neural Network that Learns to Count (<https://doi.org/10.1080/09540099911634>)