*Recommended template: “Course Description, Syllabus, Course Requirements”*

course syllabus and course requirements   
academic year 2022./2023. semester 1.

| Course title | Elements of AI |
| --- | --- |
| **Course Code** | **IVB464AN** |
| **Hours/Week: le/pr/lab** | **0/2/0** |
| **Credits** | **2** |
| **Degree Programme** | **Electrical Engineering BSc, Biomedical Engineering MSc, Computer Engineering BSc, Computer Engineering MSc** |
| **Study Mode** | **full-time** |
| **Requirements** | **midterm grade** |
| **Teaching Period** | **fall** |
| **Prerequisites** | **-** |
| **Department(s)**  **Course Director** | **Department of Automation** |
| **Teaching Staff** | **Kisander Zsolt** |
|  |  |

course description

*A short description of the course (max. 10 sentences).*

*Neptun: Instruction/Subjects/Subject Details/Basic data/Subject description*

Introduction to data science, machine learning and neural network frameworks.

syllabus

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

1. **goals and objectives**

*Goals, student learning outcome.*

*Neptun: Instruction/Subjects/Subject Details/Syllabus/Goal of Instruction*

The aim of this subject is to give an overview about the current state-of-art artificial intelligence systems and tools.

1. **course content**

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

|  | TOPICS |
| --- | --- |
| LECTURE |  |
| PRACTICE | *Historical background of AI*  *Taxonomy of learning systems*  *Mathematical background of machine learning and artificial intelligence algorithms*  *Properties and structure of synthetic and real-world data*  *Classification versus regression*  *Modern ML and AI tools*  *sklearn*  *Tensorflow*  *Torch*  *Practical AI applications* |
| laboratory practice |  |

**DETAILED SYLLABUS AND COURSE SCHEDULE**

*academic holidays included*

| PRACTICE, LABORATORY PRACTICE | | | | |
| --- | --- | --- | --- | --- |
| week | **Topic** | **Compulsory reading; page number**  **(from … to …)** | **Required tasks (assignments, tests, etc.)** | **Completion date, due date** |
| 1. | Orientation, presenting the requirements |  |  |  |
| 2. | Python programming basics |  |  |  |
| 3. | Commonly used Python packages and their features |  |  |  |
| 4. | Data loading, organising and saving procedures |  |  |  |
| 5. | Data visualisation packages and figure types |  |  |  |
| 6. | Data exploration and preprocessing |  |  |  |
| 7. | Unsupervised methods |  |  |  |
| 8. | Supervised methods |  |  |  |
| 9. | Break |  |  |  |
| 10. | Artificial Neural Networks |  |  |  |
| 11. | Convolutional Neural Networks |  |  |  |
| 12. | Recurrent Neural Networks |  | homework | 15th week |
| 13. | NLP models |  |  |  |
| 14. | Summary |  |  |  |
| 15. | Grading |  |  |  |

1. **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.)*

attendance sheet

**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 resulting in mid-term grade*** *(PTE TVSz 40§(3))*

***Mid-term assessments, performance evaluation and their ratio in the final grade*** *(The samples in the table to be deleted.)*

| **Type** | **Assessment** | **Ratio in the final grade** |
| --- | --- | --- |
| *Homework* | *max 10 points* | *100%* |
|  |  |  |
|  |  |  |
|  |  |  |

***Opportunity and procedure for re-takes*** (PTE TVSz 47§(4))

*The specific regulations for improving grades and resitting tests must be read and applied according to the general Code of Studies and Examinations. E.g.: all tests and assessment tasks can be repeated/improved 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.*

New homework project given on the 15th week, with a deadline of the end of the first exam week.

***Grade calculation as a percentage***

*based on the aggregate performance according to the following table*

| **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.

1. **Specified literature**

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

**compulsory reading and availability**

Practice notebooks and the official documentations of the used packages.