SYLLABUS

Name: ***Theory and application on deep learning (AESAu-A>SI7C-TAob24)***
Name in Polish:
Name in English: ***Theory and application on deep learning***

Information on course:

Course offered by department: Faculty of Automatic Control, Electronics and Computer Science
Course for department: Silesian University of Technology

Default type of course examination report:

ZAL

Language:

English

Short description:

Course objectives: This course aims to enable students to master the basic theories, and models of deep learning, cultivate students' innovative thinking and practical hands-on abilities, and lay a foundation for their subsequent research and work in related fields

Description:

ECTS: 2
Total workload: 50 (30 contact hours / 20 student's own work hours)
Lecture: 15h
Laboratory: 15h
Student's own work: preparation for classes

Lecture
1. Introduction to deep learning: overview; brief history; hardware and software requirement.
2. Keras and TensorFlow
3. Pytorch for deep learning
4. Fundamentals of machine learning
5. Working with keras: A deep dive
6.Deep learning for computer vision
7. Generative deep learning
8. Review of the course
Laboratory
1. Preliminaries on neural network: Data representation; Tensor operations; Gradient-based optimization.
2. Classification and regression
3. Pretrained networks
4. The universal workflow of machine learning
5.Working with pytorch: Using a network to fit the data
6. Deep learning for timeseries
7. Deep learning for text

Bibliography:

Primary sources:
1.Stevens, Eli, Luca Antiga, and Thomas Viehmann. Deep learning with PyTorch. Manning Publications, 2020.
2.Chollet, Francois, and François Chollet. Deep learning with Python. Simon and schuster, 2021.

Learning outcomes:

Knowledge: knows and understands
the basic theories, algorithms, and models of deep learning （KIA_W1, KIA_W2, KIA_W10）
•Skills: can
solve basic deep learning problems using TensorFlow or PyTorch. (KIA_U1, KIA_U2, KIA_U5, KIA_U10, KIA_U11, KIA_K1)

Assessment methods and assessment criteria:

This course mainly guides students to understand the basic principles and processes of deep learning, and to understand and master basic programming skills through practice. This course assesses students' learning through programming exercises, quizzes and final exams, and the comprehensive score is divided into three levels: 1) comprehension and mastery (very good); 2) Basic understanding and basic mastery (good); 3) Not understanding and not mastering (bad).

Course credits in various terms:

<without a specific program>

Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	2	2024/2025-Z	