Course: Neural Networks & Deep Learning — credits: 5

Course code	SEVM26NNDL
Name	Neural Networks & Deep Learning
Study year	2026-2027
ECTS credits	5
Language	English
Coordinator	S.S. Ahmed
Modes of delivery	Lecture Project-based learning
Assessments	Neural Networks & Deep Learning - Assignment

Learning outcomes

At the end of this module the student:

- utilizes the fundamental principles of neural networks and deep learning, including architectural components, training procedures, and objective functions to implement, train, and evaluate neural network models using a modern deep learning framework such as PyTorch.
- designs and justifies neural network architectures appropriate to a given problem, considering data characteristics and task requirements.
- assesses and improves model performance using appropriate evaluation metrics, hyperparameter tuning, and systematic troubleshooting.
- applies deep learning techniques to different data modalities, such as structured, image-based, or sequential data, using architectures such as convolutional or recurrent networks.
- designs and executes an end-to-end deep learning project, including data preparation, model development, validation, and communication of results, for tasks such as classification, prediction, or anomaly detection.

Content

The module covers the following topics:
neural network fundamentals, deep learning workflows & implementation, model architectures (e.g. feedforward, convolutional, recurrent), training and optimization strategies, hyperparameter tuning, evaluation metrics and performance analysis, feature and representation learning, and project-based application to tasks such as classification, prediction, or anomaly detection.

Included in programme(s)

Smart Systems Engineering

School(s)

Engineering, Life Sciences & ICT

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