Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
IT 524	Artificial Intelligence and Deep Learning	2	4	0	0	3	8

Prerequisites	
Admission Requirements	

Language of Instruction	English
Course Type	Compulsory
Course Level	Masters Degree
Objective	This course aims to provide students with a comprehensive understanding of artificial intelligence and deep learning processes. Students will learn to understand machine learning and AI workflows, the importance of data, and how to translate objectives into system hyperparameters and inputs.
Content	The course begins with fundamental deep learning concepts, focusing on CNN and RNN architectures. It then covers reinforcement learning, genetic algorithms, Deep Q-Learning, and NEAT algorithms. Emphasis is placed on understanding AI applications, the importance of data, and hyperparameter optimization throughout the course.
References	- Sutton, R. S., & Barto, A. G. (2018). Reinforcement Learning: An Introduction - Stanley, K., & Miikkulainen, R. (2002). NEAT: NeuroEvolution of Augmenting Topologies - Online tutorials, research papers, and Python libraries such as PyTorch and TensorFlow

Theory Topics

Week	Weekly Contents
1	Introduction to AI and machine learning
2	Importance of data and preprocessing
3	Fundamental deep learning concepts
4	Convolutional Neural Networks (CNN)
5	CNN applications and advanced techniques
6	Recurrent Neural Networks (RNN)
7	RNN applications and optimization techniques
8	Introduction to reinforcement learning
9	Deep Q-Learning
10	Genetic algorithms
11	Project presentations and evaluation