Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
INF 537		2	3	0	0	3	6

Prerequisites	
Admission Requirements	

Language of Instruction	English
Course Type	Elective
Course Level	Masters Degree
Objective	-This course aims to examine the mathematical foundations, modern architectures, and research-level engineering approaches of generative AI systems. Students gain an in-depth understanding of how large language models (LLMs), diffusion-based image generation systems, and retrieval/agent architectures are designed, trained, optimized, and evaluated.
Content	(Below) It can be found in the topics section.
References	Build a Large Language Model (From Scratch), Sebastian Raschka, September 2024

Theory Topics

Week	Weekly Contents
1	Deep Learning I
2	Deep Learning II
3	Probabilistic Language Models (Word2Vec, RNN, etc.)
4	The Mathematics of Attention
5	Deep Dive into Transformers
6	Large Language Model Training
7	Midterm Exam
8	Efficient Attention and the Long Context Problem
9	Instruction Tuning, RLHF and Alignment
10	Embedding Models and Semantic Space
11	Retrieval Augmented Generation (RAG) — Research Level
12	Agentic LLM Systems
13	Knowledge Graphs
14	Project Presentations