GR25624 Advanced Machine Learning/Deep Learning

Fall 2025
Department of Intelligent Information Convergence
Chonnam National University

Course Info	GR25624 Advanced Machine Learning/Deep Learning Graduate-level major elective
Instructor	Hyung-Il Kim (Web) [Email: hyungil.kim@jnu.ac.kr] from the School of ECE Engineering Building #6-717 (ext. 1762)
Class Meetings	Tuesday 19:30-22:30 Engineering Building #6-106
Office Hours	Google calendar appointment slots (Link)
Class Objectives	This course aims to review the fundamental theories of machine learning and deep learning, and to analyze recent advancements such as generative AI and multimodal learning based on research papers.
Prerequisites	Familiarity with basic concepts in machine learning, deep learning, and linear algebra will be helpful, though not mandatory.
Textbook	Lecture notes prepared by the instructor and recent papers published in venues such as NeurIPS, CVPR, ECCV, ICCV, ICML, ICLR, ACL, etc.
Topics	Core and advanced ML/DL concepts, generative models, multimodal learning, AI applications, and ethics.
Evaluation	Homework (40%), Final Presentation (40%), Exam (20%) The specific evaluation criteria and percentages are subject to change.
Lecture	This course consists of the instructor's introduction to fundamental techniques and seminal papers in deep learning and machine learning, combined with student-led presentations of recent research articles.

Homework Presentation on the listed papers and recent technologies
(20 min for presentation, 10 min for Q&A)

Reading List https://hikimece.github.io/vcl/courses/gr25624/

Final Presentation Students will individually present a problem from their research or area of interest and propose a solution using machine learning and deep learning techniques learned during the semester

Schedule The following course schedule is subject to change depending on the progress of course.

Week	Contents	Homework
1	Course Introduction & Overview of ML/DL	
2	Review of Core Machine Learning Concepts	
3	Foundations of Deep Learning	
4	Convolutional Neural Networks (CNNs)	
5	Sequence Modeling & Transformers	
6	Overview of Generative AI	
7	Generative Models (GANs, VAEs)	
8	Midterm exam	
9	Large Language Models (LLMs)	
10	Multimodal Learning: Vision, Audio, Text	
11	Foundations of Multimodal Models	
12	AI in Physical World (Robotics, Embodied AI)	
13	Ethics, Fairness, and AI Safety	
14	Final presentation	
15	Final exam	