

Syllabus [2025Year 2 Term]

Course Information

Course Title	Basic and Applications of Machine Learning	Credits	3
Course Code	524990-1	Required/Elective (For Undergraduate Courses)	Selective majors
Department or Major	Department of Mobile Systems Engineering	Language	English
Methods of Teaching		Lecture Room	월9,10,11,12,13,14
Time Allotment	Lecture(3) Experiments(0) Trainging & Practice(0) Performance(0) Designing & Planning(0)	Cyber Lectures	
Course Type			
Cyber Lectures Preview			

Lecturer

Lecturer	Name	Kyu-haeng Lee	Rank	Assistant Professor	Final Academic Degree	공학박사
	Department & college	Department of Mobile Systems Engineering		Office	International Hall 603	
	Office Phone Number	—		e-mail	kyuhaeng.lee@dankook.ac.kr	
	Field of Interest					

Course Summary

Course Description	Machine learning enables computers to perform various useful functions by imitating human intelligence. Thanks to statistics, fast computing performance, and intelligent optimization algorithms, the number of systems applied with machine learning keeps increasing, and the interest in machine learning keep growing. This course is an introduction to machine learning and will cover the most essential applications and theories of machine learning.
Description Related Courses	– Prerequisite: Linear Algebra, Statistical Prob., Programming – Related Courses: Pattern Recognition, Deep Learning
Course Goals	– To understand the overall process of machine learning – To understand the principles of learning algorithms – To identify machine learning applications and challenges – To write machine learning programs

Projected Results	<ul style="list-style-type: none"> - Inspiring interest in machine learning - Experience of writing machine learning programs
Percentage of the original language classes(%)	
Cyber Lectures Preview	

Syllabus

Times	Lecture Topic	Lecture Goals	Lecture Methods	Assignments
1	Introduction	<ul style="list-style-type: none"> - Course Syllabus - Introduction to Machine Learning 	강의,	
2	Math for Machine Learning	<ul style="list-style-type: none"> - Review of Linear Algebra - Review of Prob. Theory 	강의,	
3	Linear Regression I	<ul style="list-style-type: none"> - Model Representation - Gradient Descent 	강의,	
4	Linear Regression II	<ul style="list-style-type: none"> - LR with Multiple Variables - Normal Equation 	강의,	
5	Logistic Regression	<ul style="list-style-type: none"> - Classification Problem - Decision Boundary 	강의,	
6	Logistic Regression	<ul style="list-style-type: none"> - Multiclass Classification 	강의,	
7	Regularization	<ul style="list-style-type: none"> - Overfitting - Regularization 	강의,	
8	Mid-term Exam		강의,	
9	Neural Networks	<ul style="list-style-type: none"> - Neurons and the brain - Neural Network Model - Widely used models 	강의,	
10	Neural Networks	<ul style="list-style-type: none"> - Cost Function - Forward/Back Propagation - Advanced training methods 	강의,	
11	SVM	<ul style="list-style-type: none"> - SVM Overview - Linear Hard margin SVM - Exercise 	강의,	
12	SVM	<ul style="list-style-type: none"> - Soft-margin SVM - Kernel methods 	강의,	

Times	Lecture Topic	Lecture Goals	Lecture Methods	Assignments
13	SVM	- Performance evaluation of classifiers	강의,	
14	Clustering	- K-means Algorithm - EM Algorithm - Evaluation of clustering algorithms	강의,	
15	Final Exam (or Project)		강의,	

Methods of Grading

sequence	Description	Percentage	Details
1	Mid-tem Exam	30%	
2	Final-exam	30%	
3	Pop Quizzes	0%	
4	Assignments	30%	
5	Reports	0%	
6	Presentations & Discussions	0%	
7	Attendance	10%	
8		0%	
9	Others	0%	
All		100%	

Core of Value

핵심가치	전공역량	역량정의	역량구분	값(%)
혁신 (Discovery)	창의적문제해결 (Creative problem-solving)	주어진 상황과 문제를 창의적으로 해결할 수 있는 능력		0%
혁신 (Discovery)	도전 (Challenging)	전공 지식을 새로운 분야와 융합하고 아우를 수 있는 능력		0%
혁신 (Discovery)	지식융합 (Knowledge convergence)	새로운 분야를 개척하거나 도전적으로 임할 수 있는 능력		0%
헌신 (Dedication)	세계시민 (Universal value)	세계 공동체 구성원으로 전공자로서 국제적 이슈에 대응할 수 있는 능력		0%
헌신 (Dedication)	상호협력 (Cooperation)	공동의 목적 달성을 위해 타인과 상호협력을 할 수 있는 능력		0%

핵심가치	전공역량	역량정의	역량구분	값(%)
헌신 (Dedication)	공동체 (Sense of community)	공동체의 구성원으로서 필요한 태도와 윤리의식을 가질 수 있는 능력		0%
능동 (self-Determination)	자기주도 (Self-Managing)	주어진 상황과 문제를 주도적이고 능동적으로 해결할 수 있는 능력	부역량	0%
능동 (self-Determination)	지식활용 (Knowledge application)	주어진 상황과 문제에 대해 논리적으로 파악하고 분석할 수 있는 능력	부역량	0%
능동 (self-Determination)	논리적사고 (Logical thinking)	전공관련 지식을 필요에 따라 다양하게 적용하고 활용할 수 있는 능력	주역량	0%
능동 (self-Determination)	의사소통 (Articulation)	대화를 통해 다양한 의견을 조율하고 합의를 이끌어 낼 수 있는 능력		0%

Textbook(s) & References

Description	Title	Author	Publisher
Required Textbook	강의자료 배포 (특정 주교재 없음)	-	-
Recommended Textbook	Pattern Recognition and Machine Learning	Christopher Bishop	Springer
Recommended Textbook	기계학습	오일석	한빛아카데미

Memo