Syllabus

Course Code	CPE378
Course Name	Machine Learning
Semester/Year	2/2024
Course Prerequisite	
Class meeting	Tuesday 9.00-12.00 Room 1114
Class website	https://leb2.kmutt.ac.th
Course Instructor	Assc.Prof.Dr. Peerapon Siripongwutikorn **Email**: peerapon.sir@kmutt.ac.th **Facebook**: Peerapon Siripong
Office hours	By appointment
Course Description	Theoretical basis of machine learning through examples and hands-on coding exercises. Machine learning techniques for supervised learning, unsupervised learning, and reinforcement learning. Statistical learning, Model training, Kernel machines, Regression and Generalized linear models, Tree and Ensemble models, Dimensionality reduction, Clustering, Neural network, Deep learning and applications in vision and representation learning, Anomaly detection.
Course Learning Outcomes (CLOs)	After completing this course, the student should be able to CLO1: Demonstrate mastery in concepts and details of supervised learning algorithms. CLO2: Demonstrate mastery in concepts and details of unsupervised and reinforcement learning algorithms. CLO3: Implement machine learning models and workflows.
Teaching Method	Lecture, in-class exercises
Evaluation	Midterm Exam 30% Final Exam 35% Project 20% Homework and assignments 15% A: ≥ 85, B+: [84,80], B: [79,75], C+: [74,65], C: [64,55], D+: [54,50], D: [49,45], F: < 45 The instructor reserves the right to change the grading policy as deemed appropriate.
Key references	• G. James, et.al., Introduction to Statistical Learning with Application with Python, 2023 • A. Geron, Hands-On Machine Learning with Scikit-Learn & Tensorflow, O'Reilly, 2019
Class policies	**Assignments** are due in one week before class in LEB2. **Late submissions** are only accepted under reasonable excuses and explicit permission from the instructor. No submission is accepted after the solution has been posted. **Posted solutions** will be brief and does not show routine works. You should attempt to work out detailed solutions on your own. **Academic integrity** is strictly enforced.

Course Schedule

The following topics will be covered in our schedule. The schedule may slightly change, depending on our progress in the course.

Date	Topic
Jan 14	Fundamental concepts in machine learning
Jan 21	Statistical Learning (1): Logistic regression
Jan 28	Statistical Learning (2): Discriminant analysis, Naives Bayes
Feb 4	Support Vector Machines: Linear and Nonlinear SVM and Regression
Feb 11	Tree-based models: Decision tree and Regression tree
Feb 17 - 21	1st University Exam Period
Feb 25	Ensemble models
Mar 4	Neural networks
Mar 11	Deep learning
Mar 18	Dimensionality reduction: PCA, Manifold learning
Mar 25	Clustering (1): Dissimilarity measures, K-means clustering, Cluster evaluation
Mar 31 – Apr 18	2nd University Exam Period and school break
Apr 22	Clustering (2): Gaussian mixture model, Hierarchical clustering, Density-based clustering
Apr 29	Anomaly detection
May 6	Reinforcement learning
May 13	Project presentations
May 22 - 30	3rd University Exam Period