King Mongkut's University of Technology Thonburi
Faculty of Engineering, Department of Computer Engineering
Course Syllabus, 2/2021

Course	CPE 378 Machine Learning	**Credit Hours**	3(2-2-6)
Class Time	Thu. 9.00 - 12.00	**Class Room**	Online

Instructors Assoc. Prof. Dr. Peerapon Siripongwutikorn (peerapon.sir@kmutt.ac.th)
Assist. Prof. Dr. Santitham Prom-on (santitham.pro@kmutt.ac.th)
Dr. Unchalisa Taetragool (unchalisa.tae@mail.kmutt.ac.th)

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Course Materials
Slides, papers, and additional documents will be provided in-class and online.

Reference Textbooks
1. Introduction to Statistical Learning with Application with R (for Lecture 2)
2. Hands-On Machine Learning with Scikit-Learn & Tensorflow (for Lecture 3-4)
3. Deep learning with Python [Chollet, Francois]

Learning Outcome
Upon successful completion of this course, students will be able to:
- Understand the art and science of machine learning
- Demonstrate the ability to apply machine learning models to problems in different contexts
- Work in a team and gain hands-on experiences to construct machine learning models to solve complex problems

Grading

Homework/Assignment	20%
Final Project	20%
3 Midterm Exams	60% (20% each)

Tentative Course Outline and Schedule

Lecture 1	20-Jan	Introduction	**A. Unchalisa** Zoom Link Meeting ID: 940 5179 2187 Passcode: HDSML-2021
Lecture 2	27-Jan	Statistical Learning: Concepts, Bayes Classifier, LDA, QDA	**A. Santitham** Zoom Link Meeting ID: 997 6706 9375 Passcode: ml2022-1
Lecture 3	3-Feb	Training Models: Direct (OLS) and Iterative (Gradient Descent) Approaches	
Lecture 4	10-Feb	Support Vector Machine: Linear and Nonlinear SVM	
Lecture 5	17-Feb	Text Classification: Text Preprocessing, Feature Extraction and Modeling	
	24-Feb	**MIDTERM 1**	**TBA**
Lecture 6	3-Mar	Neural Networks and Deep Learning	**A. Unchalisa** Zoom Link Meeting ID: 940 5179 2187 Passcode: HDSML-2021
Lecture 7	10-Mar	Convolutional Neural Networks	
Lecture 8	17-Mar	Recurrent Neural Network	
Lecture 9	24-Mar	Reinforcement Learning	
	31-Mar	**MIDTERM 2**	**TBA**

Lecture 10	7-Apr	Dimensionality reduction: PCA and Kernal PCA, Multidimensional scaling, Non-linear manifold learning	**A.Peerapon** Zoom Link Meeting ID: 690 7948 2358 Passcode: cpe378ml
11-15 Apr		**Special Vacations**	
Lecture 11	21-Apr	Clustering (1): K-means, K-medoids, Kernel K-means, SOM	
Lecture 12	28-Apr	Clustering (2): Gaussian mixture model, Hierarchical clustering, Density-based clustering, Graph-based clustering	
Lecture 13	5-May	Latent models: Exploratory factor analysis, Independent component analysis	
	12-May	**MIDTERM 3**	**TBA**
Lecture 15	19-May	Final Project Presentation	