Course Outline (*please complete as appropriate*)

COURSE TITLE	Introduction to Intelligent System
NAME OF LECTURER	Jae Yun Jun Kim

COURSE DESCRIPTION

The main objective of this course is to guide students to have a solid basis on Machine Learning. The development of such basis is possible by designing the present course such that students will learn the theory, reason themselves on the learned topics (to deepen their knowledge), apply the theory by implementing it from scratch (programming in Python), and share the gained knowledge with their peers (to truly appropriate the knowledge). This course covers from the initial to intermediate levels of Machine Learning with applications in various domains (such as finance, robotics, biology, and more).

RECOMMENDED READINGS

TEACHING METHODS

Machine Learning from scratch: a theoretical and practical approach is a three-credit theoretical and practical course of face-to-face 45 hours over a period of 3 weeks. Each class lasts 3 hours, and there will be 5 classes per week (Monday through Friday). Each class will consist of two parts. During the first part (lecture), one or two problems will be defined first in word and, then, mathematically. Then, students will learn both mathematical and algorithmic (Machine Learning) approaches to solve these problems. On the other hand, during the second part (Lab Practice), students will implement the theoretical aspects learned during the first part, using Python. There will be homework to allow students to deepen their knowledge on the course topics.

ASSESSMENT METHODS

Homework/Quiz (50), Final Exam (50)

CLASS TOPICS *(each class is 3 hrs)*

1) Introduction to Machine Learning

- Machine Learning within the Artificial Intelligence framework
- Past, present, and future of Machine Learning
- Overview of Machine Learning

2) Supervised learning, unsupervised learning and reinforcement learning

- Regression
- Regularization
- Classification
- Clustering
- Dimensionality reduction
- Times series analysis
- Forecasting
- Fault detection
- Optimal control

3) Discriminative models and Generative models

- Distribution representation
- Feature extraction

- Data generation
- Hidden state estimation
- Encoding and decoding

SPECIAL COMMENTS