2020학년도 2학기 강의계획안 (Syllabus)

Course Title	Computational Geosciences and Optimization (계산지구과학 및 최적화)	Course No.	G17613-01
Department/ Major	Climate and Energy Systems Engineering (기후·에너지시스템공학과)	Credit/Hours	3.0 / 3.0
Class Time/ Classroom	Wednesday 8, 9 (Research Cooperation Bldg. B101 / 연구협력관 B101)		
Instructor	Name: Baehyun Min (민 배 현)	Department: Climate & Energy Systems Eng. (기후 · 에너지시스템공학과)	
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Office Hours/ Office Location	Hours: Please make an appointment via email or cyber campus Location: Office #404 at the Research Cooperation Bldg. (연구협력관 404호)		

Ⅰ. 교과목 정보 Course Overview

1. 교과목 개요 Course Description

본 교과목은 다양한 지구과학(지질, 해양, 기상) 분야에서 불확실성 분석을 위하여 활용하여 온 대리 모델, 최적화, 자료 동화, 기계학습 알고리듬 등을 소개하고, 수강생들이 본인 분야에서의 활용방안 탐색을 유도한다.

This course aims at training graduate students to practice a variety of algorithms covering surrogate modeling, optimization (global- and multi-objective optimization), data assimilation, and machine learning that have been utilized for modeling geosciences in the areas of subsurface, ocean, and atmosphere.

2. 선수학습사항 Prerequisites

N/A

3. 강의방식 Course Format

강의 Lecture	발표/토론 Discussion/Presentation	실험/실습 Experiment/Practicum	현장실습 Field Study	기타 Other
70%		30%		-

(위 항목은 실제 강의방식에 맞추어 변경 가능합니다.)

강의 진행 방식 설명 (explanation of course format): Powerpoint & Writing on the Whiteboard

4. 교과목표 Course Objectives

The course objective is to encourage students to apply the following techniques in their research area in Geoscience and Engineering:

- Uncertainty Quantification

- Proxy
- Optimization
- Data Assimilation
- Machine Learning

5. 학습평가방식 Evaluation System

중간고사 Midterm Exam	기말고사 Final Exam	발표 Presentation	리포트 Report	과제물 Assignments	참여도 Participation	기타 Others
30%	35%	20%	%	10%	5%	%

(위 항목은 실제 학습평가방식에 맞추어 변경 가능합니다.)

- 절대평가(Absolute Evaluation)
- 지각 1회 = 결석 0.5회. 지각 여부는 수업 시작시간을 기준으로 함.
- 결석 2회 이하는 최종 성적에 영향 없음
- 결석 2회 초과부터는 결석 1회당 최종 성적에서 1점씩 감점 (지각은 1회당 0.5점 감점)
- 결석 5회 초과는 F 학점 부여

"Absolute Evaluation" is the evaluation system of this course. You are encouraged to attend all class sessions. If you have any situation which prevents you from attending class (e.g., illness, family or personal issues, etc.), please let me know your absence via email or message at the Cyber Campus before class in advance. One or two absences do not affect your grade. If you miss three days or more, however, one absence deducts one point from your final score. Two late arrivals are equal to one absence. More than five absences will force you to be given F grade by the university regulation.

II. Course Materials and Additional Readings

1. 주교재 Required Materials

Lecture notes (강의노트)

2. 부교재 Supplementary Materials

TBD

3. 참고문헌 Optional Additional Readings

TBD

III. 수업운영규정 Course Policies

* For laboratory courses, all students are required to complete lab safety training.

Ⅳ. 주차별 강의계획 Course Schedule

Week	Date	Topics & Class Materials, Assignments (주요강의내용 및 자료, 과제)
1주차	09.02 (Wed.)	Introduction
2주차	09.09 (Wed.)	Software for Machine Learning: MATLAB
3주차	09.16 (Wed.)	Data Analysis
4주차	09.23 (Wed.)	Global Optimization
5주차	09.30 (Wed.)	No class (Chuseok)
6주차	10.07 (Wed.)	Global Optimization
7주차	10.14 (Wed.)	Multi-objective Optimization
8주차	10.21 (Wed.)	Multi-objective Optimization
9주차	10.28 (Wed.)	Midterm Examination
10주차	11.04 (Wed.)	Machine Learning
11주차	11.11 (Wed.)	Machine Learning
12주차	11.18 (Wed.)	Deep Learning: CNN
13주차	11.25 (Wed.)	Deep Learning: LSTM
14주차	12.02 (Wed.)	Deep Learning: Autoencoder
15주차	12.09 (Wed.)	Project Presentation
16주차	12.16 (Wed.)	Final Examination
보강1 (필요시) Makeup Classes	(요일, 장소)	TBD
보강2 (필요시) Makeup Classes	(요일, 장소)	TBD

Ⅴ. 참고사항 Special Accommodations

* 학칙 제57조에 의거하여 장애학생은 학기 첫 주에 교과목 담당교수와의 면담을 통해 출석, 강의, 과제 및 시험에 관한 교수학습지원 사항을 요청할 수 있으며 요청된 사항에 대해 담당교수 또는 장애학생지원센터를 통해 지원받을 수 있습니다.

According to the University regulation #57, students with disabilities can request special accommodation related to attendance, lectures, assignments, and/or tests by contacting the course professor at the beginning of semester. Based on the nature of the students' requests, students can receive support for such accommodations from the course professor and/or from the Support Center for Students with Disabilities (SCSD).

*** 강의계획안의 내용은 추후 변경될 수 있습니다.**

* The contents of this syllabus are not final—they may be updated.