



Course Syllabus (Academic Year 2021)

School of Interdisciplinary Studies, Kanchanaburi Campus, Mahidol University

1. **Course No. and Title:** KAED 493 Special Topics

Credit (study hours): 1 (0-2-3)

2. **Program Name:** Bachelor of Engineering in Environmental Engineering and Disaster Management

3. **Course Module:** Specific Elective Course

Pre/co-requisite: No

4. **Class Semester:** 1st Semester 2nd Semester Academic Year 2021

5. **Class Schedule & Venue:** 16.00-18.00 on Wednesday, Google classroom and Zoom Platform

6. **Class Coordinator:** Dr. Luksanaree Maneechot

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7. **Course Description**

Study interesting topics of special problems related to environmental engineering and disasters management, learning by discussion of those topics.

8. **Course Objectives / Course Learning Outcomes (CLOs)**

No	Objectives / CLOs	Expected Skills / Knowledge			PLOs
		Specific (S)	Generic (G)	Knowledge (K)	
1	To visualize and analyze data	S1, S2	G1		1, 4, 6
2	To understand principles of Artificial Neuron Networks		G1, G2	K1	4, 6
3	To construct the ANNs models using toolbox and codes in MATLAB	S1, S3	G1	K2	1, 6
4	To develop the ANNs models based on environmental problems	S1, S2, S3, S4	G1	K2	1, 6

Specific Competences

S1 Ability to create MATLAB scripts

S2 Ability to analyze data based on data relationships and to create images using visualization techniques

S3 Ability to construct basic ANNs models

S4 Ability to apply and develop ANNs models for environmental engineering and disaster management fields

Generic Competence

G1 Computer skills

G2 Systematic thinking, problem solving, and analytical skills

Knowledge Competence

K1 Fundamentals and principles of neural networks

K2 Incorporating engineering knowledge into ANNs models

9. Class Instructor List

9.1 Dr. Luksanaree Maneechot Instructor and project advisor

10. Course Outline

Week	Date	Contents	CLOs	Teaching & Learning method	Instructors
1	11/8/2021	-Class Introduction -Data Preparation and Inputs	1, 4	Course Syllabus and Lecture	LM
2	18/8/2021	Graph Plotting Functions (1D)	1, 4	Lecture and Activity/Assignment	LM
3	25/8/2021	Graph Plotting Functions (2D and 3D)	1, 4	Lecture and Activity/Assignment	LM
4	1/9/2021	Principles of Artificial Neural Networks	1	Lecture, Activity, and Quiz	LM
5	8/9/2021				
6	15/9/2021	Techniques Used with Neural Networks	1	Lecture, Activity, and Quiz	LM
7	22/9/2021	Artificial Neural Networks Toolbox	1	Lecture and Activity/Assignment	LM
8	29/9/2021				
9		Mid-term Examination			LM
10	9/10/2021	Case Study of ANNs by using Toolbox	1, 6	Lecture, Activity and Assignment	LM
11	20/10/2021				
12	27/10/2021	Special Lecture	1	Lecture and Activity	LM
13	3/11/2021	Coding for ANNs models	1, 6	Lecture, Activity and Assignment	LM
14	10/11/2021				
15	Negotiation	Development of ANNs models		Self-study: Assignment and meeting with instructors	LM
16	Negotiation				
17	Negotiation				
18	8/12/2021	Final Examination		Presentation: 15 mins	LM

11. Course Assessment

No.	Methods / Activities	Regulations	CLOs	Week	Weight Distribution (%)
1	Class participation	Submitting assignments in time and 80% of ontime-attendences		All	40
2	Exams		1	9	20
3	Assignments and proposal		1, 4, 6	16-18	25
4	Final evaluation	Presentation (15 mins) and Q&A	1, 6	19	15

12. Grading System

Grade	Score
A	≥80
B	75-79.99
B+	70-74.99
C+	65-65.99
C	60-64.99
D+	55-59.99
D	50-54.99
F	<50

13. References

- Graupe, D. (2007). Principles of Artificial Neural Networks. In *World Scientific Publishing Co. Pte. Ltd.* (2nd Edition). https://doi.org/10.1142/9789813146464_fmatter
- Maynard, M. (2017). Neural Networks: Introduction to Artificial Neurons, Backpropagation and Multilayer Feedforward Neural Networks with Real-World Applications. In *Morgan Maynard*.
- Paliouras, G., Karkaletsis, V., & Spyropoulos, C. D. (2001). Machine Learning and Its Applications: Advanced Lectures. Germany: Springer-Verlag Berlin Heidelberg.
- Wlodarczak, P. (2020). Machine Learning and its Applications. In *Taylor & Francis Group, LLC*. <https://doi.org/10.1201/9780429448782>
- Matworks. Classify Patterns with a Shallow Neural Network - MATLAB & Simulink - MathWorks Switzerland. (n.d.). <https://ch.mathworks.com/help/deeplearning/gs/classify-patterns-with-a-neural-network.html>.