



Course Syllabus (Academic Year 2022)

School of Interdisciplinary Studies, Kanchanaburi Campus, Mahidol University

1. **Course No. and Title** : KAED 101 Natural and Environmental Disasters
Credit (study hours) : 3 (3-0-6)
2. **Program Name** : Bachelor of Engineering Program in Environmental Engineering and Disaster Management
3. **Course Module** : Major Required Courses
Pre/co-requisite : -
4. **Class Semester** : 1st Semester 2nd Semester Academic Year 2022
5. **Class Schedule & Venue** : **Tuesday: 09:00 pm – 12:00 pm, Salaya campus**
6. **Class Coordinator** : Dr. Pensiri Prachakittikul
 Contact No: 086-024-0919
 : Email: pensiri.prc@mahidol.edu

7. Course Description

An introduction to earth science, climate and climate change; water cycle; natural disasters, flood, drought, seismic and volcanic hazards, tsunami, storm, forest fire, landslide and mudslide; epidemics of human and animal diseases; impact and risk from natural hazard; environmental disasters caused by human activities such as dam construction and spills of oil, chemicals or radioactive elements, etc.; disaster trends in Thailand and around the world

8. Course Learning Outcomes (CLOs)

No.	CLOs	Expected Skills / Knowledge			PLOs
		Specific (SS)	Generic (GS)	Knowledge (K)	
1.	Explain terminology, basic concepts, and significance of disaster management, such as definition of disaster management, basic concepts of hazard, risk, disaster etc	SS1 -Engineering terminology -Problem identification	GS1-GS4 -Coordinating -Communication -Interpersonal skill -Teamwork	K1 -Disaster preparedness -Emergency response -Risk assessment -Language	2, 4, 5 (Introductory)

No.	CLOs	Expected Skills / Knowledge			PLOs
		Specific (SS)	Generic (GS)	Knowledge (K)	
2	Explain terminology, basic concepts, and significance of water management and conservation of water resources	SS2 -Engineering terminology -Problem identification	GS1-GS4 -Coordinating -Communication -Interpersonal skill -Teamwork	K2 -Hydrology and Water resource -Language	1, 2, 4, 5 (Introductory)
3	Explain terminology, basic concepts, and significance of the recognition and assessment of health and safety hazards in the workplace	SS1 -Engineering terminology -Problem identification	GS1-GS4 -Coordinating -Communication -Interpersonal skill -Teamwork	K5 - Occupational health and safety - Risk assessment - Environmental impact assessment - -Language	2, 4, 5 (Introductory)
4	Explain terminology, basic concepts, and significance of water, air, solid and hazardous waste treatment to solve basic environmental engineering problems	SS2-SS5 -Engineering terminology -Problem identification	GS1-GS4 -Coordinating -Communication -Interpersonal skill -Teamwork	K2-K5 - Water and Wastewater Engineering -Air Pollution Engineering -Solid waste/ Hazardous waste engineering -Language	1, 4, 5 (Introductory)
5	Explain terminology, basic concepts, and significance of renewable energy resources and the potential for future developments	SS6 -Engineering terminology -Problem identification	GS1-GS4 -Coordinating -Communication -Interpersonal skill -Teamwork	K6 - Pollution Prevention and Control - -Language	2, 4, 5 (Introductory)

9. Class Instructor List

- 1) Asst. Prof. Dr. Yutthana Phankamonsilp Contact No.: 081-695-4621 Email: yutthana.pha@mahidol.edu
- 2) Asst. Prof. Dr. Arika brihdikitti Contact No.: 084-660-2919 Email: arika.bri@mahidol.edu
- 3) Dr. Wimonmas Boonyungyuen Contact No.: 081-906-6678 Email: bwimonmas.booy@yahoo.com

- 4) Dr. Pensiri Prachakittikul Contact No.: 086-024-0919 Email: pensri.prc@mahidol.edu
- 5) Dr. Jutamas Kaewsuk Contact No.: Email: juthamas.kae@mahidol.edu
- 6) Dr. Sirinon Suwanmolee Contact No.: 081-428-2303 Email: sirinon.suw@mahidol.edu
- 7) Dr. Watcharapol Wonglertarak Contact No.: 085*849-3199 Email: watcharapol.won@mahidol.edu

10. Course Outline

Week	Date	Contents	CLOs	Teaching & Learning method	Instructor's Names
1	9/08/2022	- Introduction to environmental engineering (Origin, Today, Future)	4	- Lecture with learning materials - Asking and answering questions - Activity/ Assignment in Class	Pensiri
2	16/08/2022	- Environmental Management System (EMS) Environmental law - Engineering Ethics	4		Pensiri
3	23/08/2022	- Water quality standard - Characteristics of Water	4		Pensiri
4	30/08/2022	- Building sanitation - Water supply	4		Pensiri
5	6/09/2022	- Water reuse	4		Pensiri
6	13/09/2022	- Solid waste management - Hazardous and Disaster Waste Management	4		Watcharapol
7	20/09/2022	- Microplastics: A global disaster	4		Juthamas
8	27/09/2022	- Meteorology, Air pollution and Climate change	1, 4		Arika
9	4/10/2022 Midterm examination				
10	11/10/2022	- Overview of Disaster Management Cycle - Climate Change Adaptability	1		Sirinon
11	18/10/2022	- Emerging disease and Response	1		Sirinon
12	25/10/2022	- Overview water resource management - Dams in Thailand	2		Yutthana
13	1/11/2022	- History of Irrigation and Water resources development in Thailand	2		Yutthana
14	8/11/2022	- Safety Engineering	3		Wimonmas

Week	Date	Contents	CLOs	Teaching & Learning method	Instructor's Names
		- Occupational health and safety			
15	15/11/2022	- Personal protective equipment (PPE) - Chemical hazards and oil spill management	3		Wimonmas
16	22/11/2022	- Renewable Energy	4		Pensiri
17	29/11/2022	- Wrap up/ Discussion	1-4		Pensiri
18	9/12/2022 Final Examination				

11. Course Assessment

No.	Methods	Regulations	CLOs	Week	Weight Distribution (%)
11.1	Midterm exam	- Content week 1-7 - Closed book - Faculty-approved calculator	1, 2, 3, 4, 5	8	25
11.2	Final exam	- Content week 11-16 - Closed book - Faculty-approved calculator	1, 2, 3, 4, 5	17	30
11.3	Individual and groups assignment or activities in class	- Dependent on each instructor assignment (3% x 15 classes) - Scoring rubric	1, 2, 3, 4, 5	All	45
				Total	100

12. Grading System

Grade	Score
O	≥ 80 %
S	50 – 79.99 %
U	0-49.99 %

O = Outstanding S= Satisfactory U = Unsatisfactory

13. References

- 13.1) Susan M. Morgan, Lauren G. Heine, P. Arne Vesilind, Introduction to Environmental Engineering, SI Version, 3rd edition, CL-Engineering, 2010. ([Lect. Pensiri](#))
- 13.2) Mackenzie L. Davis, David A. Cornwell, Introduction to Environmental Engineering, 5th Edition, McGraw-Hill Education, 2013. ([Lect. Pensiri](#))
- 13.3) Mileti, D. S. (1999). Disasters by design: A reassessment of natural hazards in United States. Washington, DC: Joseph Henry Press. ([Lect. Sirinon](#))

Note:

PLO	
PLO 1 (Introduced)	Apply environmental engineering principles and knowledge to systematic solutions according to professional standards
PLO 2 (Introduced)	Apply practical skills in environmental engineering and disaster management to real situations based on academic principles and professional ethics
PLO 4 (Introduced)	Effectively present and discuss engineering knowledge to relate professional people for objective fulfillment by using proper language and media
PLO 5 (Introduced)	Work as an environmental engineer with other people to solve complicated problems according to economic, social, and environmental issues
Specific Skill (SS)	
SS1	Risk assessment, prevention, mitigation, and preparedness
SS2	Assess quantity & quality of water resource demand and supply
SS3	Assess quantity & quality of solid & hazardous wastes
SS4	Assess quantity & quality of air pollution by monitoring and forecasting
SS5	Assess quantity & quality of wastewater
SS6	Awareness of changing and emerging technologies in energy
Generic Skill (GS)	
GS1	Systematic Thinking, Problem Solving, and Analytical Skills
GS2	Environmental and Disaster Risk Awareness
GS3	A broad education is necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
GS4	A knowledge of contemporary issues
Knowledge (K)	

K1	Fundamental of disaster management
K2	Fundamentals of environmental engineering
K3	Fundamentals of Water and waste management
K4	Environmental pollution
K5	Fundamental principles of occupational health and safety
K6	Basic principles of renewable energy production technologies