



Course Syllabus (Academic Year 2020)

School of Interdisciplinary Studies, Kanchanaburi Campus, Mahidol University

- 1. **Course No. and Title** : KAED 314 Environmental Engineering Laboratory
Credit (study hours) : 1 (0-3-1)
- 2. **Program Name** : Bachelor of Engineering in Environmental and Disaster Management
- 3. **Course Module** : Major Required Courses
Pre/co-requisite : KAED 312 Environmental Unit Operations
- 4. **Class Semester** : 1st Semester 2nd Semester Academic Year 2020
- 5. **Class Schedule & Venue** : Wednesday 09:00 – 12:00, Room L-306, L-111, Laboratory Building
- 6. **Class Coordinator** : Dr. Pensiri Prachakittikul
 Contact No. : 08-6024-0919 Email : pensiri.prc@mahidol.edu

7. Course Description

Skill practices for environmental engineering in laboratory, sedimentation, filtration, adsorption, ion-exchange, anaerobic digestion, activated sludge treatment process, UASB process, investigation the kinetics of biological system, calculation F/M ratio, sludge age, SVI and air treatment.

8. Course Objectives / Course Learning Outcomes (CLOs)

No.	Objectives / CLOs	Expected Skills / Knowledge			PLOs
		Specific	Generic	Knowledge	
1	Conduct experiments, analyze and interpret results of an experiment for engineering design of unit operation for environmental engineering	1-4	1-10	1-7	1, 2, 4, 5
2	Perform and/or explain air sampling equipment used in the field, treating samples in the laboratory	1-4	1-10	1-7	1, 2, 4, 5
3	Perform mathematical calculations required for laboratory analysis of unit operation for environmental engineering	1-4	1-10	1-7	1, 2, 4, 5
4	Write a laboratory summary of experiments performed	1-4	1-10	1-7	1, 2, 4, 5
5	Further understand and explain the engineering principles of each unit operation for environmental engineering	1-5	1-10	1-7	1, 2, 4, 5, 6

9. Class Instructor List

- 1) Asst. Prof. Dr. Arika brihdikitti (AB) Contact No.: 084-660-2919 Email: arika.bri@mahidol.edu
- 2) Dr. Pensiri Prachakittikul (PP) Contact No.: 086-024-0919 Email: pensiri.prc@mahidol.edu
- 3) Dr. Wimonmas Boonyungyuen (WB) Contact No.: 081-906-6678 Email: bwimonmas@yahoo.com
- 4) Lect. Monchai Pumkaew (MP) Contact No.: 081-553-4346 Email: monchai.pum@mahidol.edu

9.1 Scientist List

- 1) Miss Phirata Khunode (PK) Contact No.: 089-248-0181 Email: phirata.khu@mahidol.ac.th
- 2) Mr. Suphat Prasopsin (SP) Contact No.: 087-151-2945 Email: suphat.pra@mahidol.ac.th
- 3) Mr. Phong Srithongdee Contact No.: 063-165-9657 Email: phong.srt@mahidol.ac.th

10. Course Outline

Week	Date	Contents	CLOs	Teaching & Learning	Groups	Instructor's Names	
1	20/01/2021	Course outline	1-5	Lecture	All Groups	PP	
2	27/01/2021	Chemical precipitation	1, 3, 4, 5	Lecture/ Lab practice/ report	G.1, G.2	PP	
		Reverse osmosis/ Ion exchange resin			G.3, G.4	WB	
3	3/02/2021	Chemical precipitation			G.3, G.4	PP	
		Reverse osmosis/ Ion exchange resin			G.1, G.2	WB	
4	10/02/2021	Oxygen mass transfer			1-5	G.1, G.2	PP
		Air sampling (TSP/ PM10)				G.3, G.4	AB
5	17/02/2021	Oxygen mass transfer			1, 3, 4, 5	G.3, G.4	PP
		Air sampling (TSP/ PM10)			1-5	G.1, G.2	AB
6	24/02/2021	Sedimentation I	1, 3, 4, 5	All groups	PP		
7	3/03/2021	Sedimentation II		All groups	PP		
8	10/03/2021	Lab summary	1-5	Discussion	All groups	PP	
9	17/03/2021 Mid-term Examination						
10	24/03/2021	Respiration dust	1-5	Lecture/ Lab practice/ report	G.1, G.2	AB	
		Adsorption	1, 3, 4, 5		G.3, G.4	MP	
11	31/03/2021	Respiration dust	1-5		G.3, G.4	AB	
		Adsorption	1, 3, 4, 5		G.1, G.2	MP	
12	7/04/2021	Activated sludge process & Anaerobic process I	1, 3, 4, 5		All groups	PP/ WB	
13	14/04/2021	Songkran Day (Holiday)					
14	21/04/2021	Activated sludge process & Anaerobic process II	1, 3, 4, 5		All groups	PP/ WB	

Week	Date	Contents	CLOs	Teaching & Learning	Groups	Instructor's Names
15	28/04/2021	Activated sludge process & Anaerobic process III			All groups	PP/ WB
16	5/05/2021	Activated sludge process & Anaerobic process IV		Lecture/ Lab practice/ report	All groups	PP/ WB
17	12/05/2021 Final Examination					
18						

11. Course Assessment

No.	Methods / Activities	Regulations	CLOs	Week	Weight Distribution (%)
11.1	Mid-term exam	- Content week 2-7 - Closed book	5	8	30
11.2	Final exam	- Content week 10-17 - Closed book	5	16	20
11.3	Lab reports	Send the lab report on time/ Lab report quality	1-4	1-8 10-18	40
11.4	Class participation	Student must attend class 100 % of course	1-3	1-8, 10-18	10
				Total	100

12. Grading System

Criterion-referenced evaluation

Grade	Score	Grade	Score	Grade	Score	Grade	Score
A	≥ 80 %	B	70 – 74.99%	C	60 – 64.99%	D	50 – 54.99%
B+	75 – 79.99%	C+	65 – 69.99%	D+	55 – 59.99%	F	< 50 %

13. References

- 1) Metcalf & Eddy, Inc. Wastewater engineering: Treatment, Disposal and Reuse. 3rd edition. New York: McGraw-Hill. 1991.
- 2) Reynolds and Richards, editors. Unit Operations and Processes in Environmental Engineering. 2nd ed. PWS Publishing Company; 2002.

Note:

Specific Skill (SS)	
SS1	Laboratory skills
SS2	Steps in analytical procedure (sampling, preservation, analysis and interpretation of experimental results)
SS3	Preparing and performing laboratory experiments
SS4	Preparation of laboratory reports
Generic Skill (GS)	
GS1	Systematic Thinking, Problem Solving and Analytical Skills
GS2	Basic Computer Skills
GS3	Disaster Risk Awareness
GS4	Professional Ethics and Responsibilities
GS5	An ability to function on multidisciplinary teams
GS6	An ability to communicate effectively
GS7	The broad education necessary to understand the impact of engineering solutions in a economic, environmental, and societal context
GS8	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
GS9	A knowledge of contemporary issues
GS10	A recognition of the need for, and an ability to engage in life-long learning
Knowledge (K)	
K1	Water quality
K2	Wastewater characteristics
K3	Environmental unit operation for water and wastewater treatment
K4	Standards of effluents
K5	Sampling methods of air pollution
K6	Environmental unit operation for air pollution control
K7	Physico chemical and biological wastewater treatments
PLOs	
PLO1	Apply environmental engineering principles and knowledge to systematic solutions according to professional standards
PLO2	Apply practical skills in environmental engineering and disaster management to real situations based on academic principles and professional ethics
PLO4	Effectively present and discuss engineering knowledge to relate professional people for objective fulfillment by using proper language and media
PLO5	Work as an environmental engineer with other people to solve complicated problems according to economic, social, and environmental issues
PLO6	Develop a creative technology in environmental engineering and disaster management