Course Syllabus (Academic Year 2021)

School of Interdisciplinary Studies, Kanchanaburi Campus, Mahidol University

1. **Course No. and Title** : KAED 344 Solid Waste Engineering

   Credit (study hours) : 3 (3-0-6)

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

3. **Course Module** : Required course (Environmental Engineering)

   Pre/co-requisite : KAED225, KAED231

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

5. **Class Schedule & Venue** : Thursday 13:00 – 16:00, Online (Hybrid)

   √ Room

   ☐ Laboratory Room .....

6. **Class Coordinator** : Dr. Jutamas Kaewsuk

   Contact No. : +66825496465 Email : jutamas.kae@mahidol.ac.th

7. **Course Description**

   Development of municipal solid waste management system, generation source, composition, quantities and characteristics of municipal solid waste, handling and collection, transfer and transport, processing and transformation technologies, source reduction and recycling, disposal of solid waste and residual matter, incineration, composting and sanitary landfill.

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

No.	Objectives / CLOs	Expected Skills / Knowledge			PLOs
		Specific	Generic	Knowledge	
8.1	To explain the characteristics of municipal waste, source and the related laws and regulation of municipal waste in Thailand	SS1 – SS3	GS1 – GS4	K1 – K4	1
8.2	To explain the waste management system in Thailand	SS1 – SS4	GS1 – GS4	K1 – K4	1
8.3	To select the suitable technology for municipal waste treatment and/or suitable policy for municipal waste	SS1-SS7	GS1 – GS4	K5-K9	6

No.	Objectives / CLOs	Expected Skills / Knowledge			PLOs
		Specific	Generic	Knowledge	
	management in the different contexts				
8.4	To design the basic landfill for municipal waste in accordance with engineering standards	SS8	GS1 – GS4	K9-K10	6

9. Class Instructor List

9.1 Dr. Jutamas Kaewsuk (JK) Contact No. : +66956466473 Email : jutamas.kae@mahidol.ac.th

9.2 Dr. Sirinon Suwanmolee (SS) Contact No. +66814282303 E-mail: sirinon.suw@mahidol.ac.th

10. Course Outline

Week	Date	Contents	CLOs	Teaching & Learning Method	Instructor
1	12 Aug 2021	Introduction to municipal waste system in Thailand	1	Lecture, problem practice, and homework assignment	JK
2	19 Aug 2021	Law and regulation	1		JK
3	26 Aug 2021	Population estimates and projections	1,2		JK
4	2 Sep 2021	Sources, characteristics, and collection (1.4, 1.5, 2.1, 2.2)	1,2		JK
5	9 Sep 2021	Waste segregation, collection and transfer	1		JK
6	16 Sep 2021	Integrated Municipal waste management system	2		JK
7	23 Sep 2021	Integrated Municipal waste management system	2		JK
8	7 Oct 2021	Waste utilization	3		JK
9	Mid-term Examination (14 Oct 2021)				
10	21 Oct 2021	Composting	3	Lecture, problem practice, and homework assignment	JK
11	28 Oct 2021	Thermal process and incineration	3		JK
12	4 Nov 2021	Landfill	4		JK
13	11 Nov 2021	Engineering design for landfill	4		JK
14	18 Nov 2021	Engineering design for landfill	4		JK
15	25 Nov 2021	Applied Humanitarian intervention	4		SS
16	2 Dec 2021	Applied Community response	4		SS

17	Final Examination (9 Dec 2021)
18	

11. Course Assessment

No.	Methods / Activities	Regulations	CLOs	Week	Weight Distribution (%)
11.1	Mid-term exam	☑ Content (Week 1-8) ☑ Open note ☑ Faculty-approved calculator	1,2	9	30
11.2	Final exam	☑ Content (Week 10-16) ☑ Open note ☑ Faculty-approved calculator	1,2	17-18	30
11.3	Quiz	☑ Content (composition analysis, solid waste forecasting, waste management flow, waste minimization) ☑ Closed book ☑ Faculty-approved calculator	1	3,5,8,11	10
11.4	Homework	Student must return their homework to TD's and PP's office on Wednesdays by 16:00.	1,2	2-7, 10-15	20
11.5	Class participation	Student must attend a class more than 80% of the whole course.	-	All	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

13.1 ศ.ดร. ธเรศ ศรีสถิตย์. วิศวกรรมการจัดการมูลฝอยชุมชน พิมพ์ครั้งที่ ๑. วิศวกรรมฐานแห่งประเทศไทย ในพระบรมราชูปถัมภ์. ๒๕๕๘

13.2 Tchobanoglous G. Theisen H. and Vigil S. Integrated Solid Waste Management. McGraw-Hill :New York. 1993.

Note:

Specific Skill (SS)	
SS1	Assess the number of people in the city
SS2	Assess quantity of municipal waste per capita
SS3	Understand concepts of the whole system of municipal waste management in Thailand
SS4	Calculate waste balances in basic material flow analysis
SS5	Understand types of waste disposal sites
SS6	Understand the 3Rs concepts for waste reduction
SS7	Understand parameters, equations and operational principles of each disposal site, reuse, and recycling
SS8	Design fundamental sanitary landfill
Generic Skill (GS)	
GS1	Systematic thinking, problem solving and analytical skills
GS2	Basic computer skills
GS3	Risk awareness
GS4	Professional ethics and responsibilities
Knowledge (K)	
K1	Characteristics of municipal waste
K2	Municipal waste collection and transportation
K3	Municipal waste management system in Thailand
K4	Law and regulation of municipal waste in Thailand
K5	Reuse and recycle of municipal waste
K6	Composting from municipal waste
K7	Municipal waste disposals
K8	Incineration
K9	Landfill
K10	Engineering design for landfill