Course Syllabus (Academic Year 2020)

School of Interdisciplinary Studies, Kanchanaburi Campus, Mahidol University

1. **Course No. and Title** : KAED 451 Environmental System and Management

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

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

3. **Course Module** : Required course

   Pre/co-requisite : -

4. **Class Semester** : ☑ 1st Semester ☐ 2nd Semester Academic Year 2020

5. **Class Schedule & Venue** : Tuesday 9:00-12:00 (week 1-5 on-line, week 6-17 in-class) , Room xxxx

   Saturday 9:00-16:00 (week 7-8, 10-11), Room xxx

6. **Class Coordinator** : Monchai Pumkaew

   Contact No. : 0972488554 Email : monchai.pum@mahidol.edu

7. **Course Description**

Basic concepts of environmental system and management issues and priorities, dynamic approach and system analysis, environmental standards and criteria setting, environmental aspect analysis at source, sink and pathways, monitoring of pollutants in environment :soil, water and air, environmental indication and indices, environmental information systems, environmental organization, guidelines and preventive measures based on enforcement and economic aspects, environmental accreditation, environmental management system (EMS) and ISO 14001, integrated pollution prevention, case studies of environmental system and management

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

No.	Objectives / CLOs	Expected Skills / Knowledge			PLOs
		Specific	Generic	Knowledge	
8.1	To understand the theory behind environmental management system (EMS), including its definitions, concepts, guidelines, and the requirement of the ISO 14001 international standard				1,4
8.2	To document the environmental aspects, environmental impacts, risk assessment and planning for selected activities				2,3

No.	Objectives / CLOs	Expected Skills / Knowledge			PLOs
		Specific	Generic	Knowledge	
8.3	To develop environmental policies, environmental objectives and implementation for an organization				2,3
8.4	To apply an EMS auditing principles, including documentation, preparation checklists.				3
8.5	To perform and apply a life cycle assessment (LCA) tool for selected products or services				2
8.6	To apply the principles of pollution control and abatement for industrial processes as a part of Environmental Management System				2,3

9. Class Instructor List

9.1 Monchai Pumkaew (MP) Contact No. : 0972488554 Email : monchai.pum@mahidol.edu

9.2 Dr. Thuangsit Denpetkul (TD) Contact No. : 0846464566 Email : thuangsit.den@mahidol.edu

10. Course Outline

Week	Date	Contents	CLOs	Teaching & Learning Method	Instructor
1	7 Jul 2020 (on-line)	*The global goals* ● Environmental problem issues ● SDGs and related issues	1	Lecture, practice, and assignment	MP
2	14 Jul 2020 (on-line)	*What is EMS?* ● Overview the basic concept of EMS	1,2		MP
3	21 Jul 2020 (on-line)	*Preparatory Environmental Review* ● Review the organization's environmental goals ● Review laws and regulations related to environmental aspects	3		MP
4	28 Jul 2020 (on-line)	*How to set Environmental Policy* ● Analyzing environmental policy, objectives and targets from selected organizations	3		MP
5	4 Aug 2020 (on-line)	ISO14001 accreditation and EMS implementation	1,2,3		MP

Week	Date	Contents	CLOs	Teaching & Learning Method	Instructor
		● Review the requirement of ISO14001 ● Learn to establish the EMS program based on selected industry			
6	11 Aug 2020 (in class)	*Why do you need EMS training?* ● Apply training program for employee	2		MP
7-8*	15 Aug 2020 (All day -in class)	*Internal audit simulation* ● Prepare auditing checklists ● Practice the internal audit by Role-play activity	1,2		MP
9 Mid-term Examination 18 Aug 2020 (in class)					
10-11*	22 Aug 2020 (All day -in class)	Pollution abatement and Control	6	Lecture, practice, and assignment	MP
12	25 Aug 2020 (in class)	Environmental Assessment tools, Processes and Innovation for Sustainable development	5		MP
13	1 Sep 2020 (in class)	Life cycle assessment for products, services and organization	5		MP
14	8 Sep 2020 (in class)	Introduction to Environmental information systems and its application	6		MP
16	15 Sep 2020 (in class)	Fundamental of Engineering Economic Analysis i.e., present worth, future worth, cash flow	1, 2	Lecture and Assignment	TD, MP
17	22 Sep 2020 (in class)	Application of Engineering Economic for project selection	1,2	Lecture and Assignment	TD, MP
17 Final Examination 29 Sep 2020					

11. Course Assessment

No.	Methods / Activities	Regulations	CLOs	Week	Weight Distribution (%)
11.1	Oral presentation	☑ EMS-policy review from selected organization (week 2/3) individual presentation ☑ Internal auditing (week 7/8) group presentation ☑ Evaluation by Rubrics	1,2	1st -2/3 2nd-7/8	20
11.2	Poster presentation	☑ Content (Week 5 and 6) group work ☑ Evaluation by Rubrics	1,2	1st -9 2nd-15	20
11.3	Quiz	☑ Content Quiz I. Definitions, concept and guideline of EMS Quiz II. ISO 14001 standard Quiz III. Engineering Economic Analysis Quiz IV. LCA ☑ Open book ☑ Faculty-approved calculator	1	2,6,11,14	20
11.4	Assignment	Student must submit the assignment on specific time.	1,2	1,4,10,12 ,15	20
11.5	Class participation	Student must attend a class more than 80% of the whole course.	-	All	20
				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 Ken Whitelaw. ISO 14001 Environmental Systems Handbook.; Elsevier Butterworth-Heinemann second edition 2004

Note:

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
PLO3	Apply geo-informatics system and information technologies in planning to handle environmental and disaster problems in accordance with academic principles
PLO4	Effectively present and discuss engineering knowledge to related 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