# Course Syllabus (Academic Year 2021)

## 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 2021
5. **Class Schedule & Venue** : Friday: 01:30 pm – 04:30 pm, Salaya campus and online classroom
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 Objectives / Course Learning Outcomes (CLOs)**

| No. | Objectives / CLOs | Expected Skills / Knowledge | | | PLOs |
|---|---|---|---|---|---|
| | | Specific (SS) | Generic (GS) | Knowledge (K) | |
| 1. | Understand the basic concepts of disaster management such as definition and history of disaster management, basic concepts of hazard, risk, disaster etc. | SS1-SS5 | GS1-GS5 | K1, K3, K4, K5 | 1-5 |

| No. | Objectives / CLOs | Expected Skills / Knowledge | | | PLOs |
|---|---|---|---|---|---|
| | | Specific (SS) | Generic (GS) | Knowledge (K) | |
| 2. | Understand the basic of environmental engineering and main topics that an environmental engineer deals with. | SS1-SS5 | GS1-GS5 | K1-K5 | 1-5 |

**9. Class Instructor List**

1) Dr. Sirinon Suwanmolee Contact No.: 0814282303 Email: sirinon.suw@mahidol.edu
2) Dr. Luksanaree maneechot Contact No.: 084-159-8294 Email: luksanaree.man@mahidol.ac.th
3) Dr. Yutthana Phankamonsilp Contact No.: 08 1695 4621 Email: yutthana.pha@mahidol.edu
4) Dr. Wimonmas Boonyungyuen Contact No.: 081-906-6678 Email: bwimonmas.boo@yahoo.com
5) Asst. Prof. Dr. Arika brihdikitti Contact No.: 084-660-2919 Email: arika.bri@mahidol.edu
6) Dr. Pensiri Prachakittikul Contact No.: 086-024-0919 Email: pensri.prc@mahidol.edu
7) Dr. Jutamas Kaewsuk Contact No.: Email: juthamas.kae@mahidol.edu
8) Lect. Monchai Pumkaew Contact No.: Email: Monchai.pum@mahidol.edu

**10. Course Outline**

| Week | Date | Contents | CLOs | Teaching & Learning method | Instructor's Names |
|---|---|---|---|---|---|
| 1 | 13/08/2021 | - Overview of Disaster Management Cycle | 1, 4 | • Lecture<br>• Activity/ Assignment in Class | Sirinon |
| 2 | 20/08/2021 | - Climate Change Adaptability | 1, 4 | • Lecture<br>• Activity/ Assignment in Class | Sirinon |
| 3 | 27/08/2021 | - Emerging disease and Response | 1, 4 | • Lecture<br>• Activity/ Assignment in Class | Sirinon |
| 4 | 3/09/2021 | - Overview water resource management | 1-3 | • Lecture<br>• Activity/ Assignment in Class | Luksanaree |
| 5 | 10/09/2021 | - Dams in Thailand | 1-3 | • Lecture<br>• Activity/ Assignment in Class | Yutthana |

| Week | Date | Contents | CLOs | Teaching & Learning method | Instructor's Names |
|---|---|---|---|---|---|
| 6 | 17/09/2021 | - History of Irrigation and Water resources development in Thailand | 1-3 | • Lecture<br>• Activity/ Assignment in Class | Yutthana |
| 7 | 24/09/2021 | - Safety Engineering<br>- Occupational health and safety | 1-3 | • Lecture<br>• Activity/ Assignment in Class | Wimonmas |
| 8 | 1/10/2021 | - Personal protective equipment (PPE)<br>- Chemical hazards and oil spill management | 1-3 | • Lecture<br>• Activity/ Assignment in Class | Wimonmas |
| 9 | Mid-term Examination | | | | |
| 10 | 15/10/2021 | - Introduction to environmental engineering<br>- The Origins of Environmental Engineering<br>- Environmental Engineering Today<br>- Environmental Engineering on the Horizon<br>- Engineering Calculations | 1-3 | • Lecture<br>• Activity/ Assignment in Class | Pensiri |
| 11 | 22/10/2021 ** | - Environmental Pollution and Adverse Effects<br>- Water pollution | 1-3 | • Lecture<br>• Activity/ Assignment in Class | Pensiri |
| 12 | 29/10/2021 | - Air pollution and meteorology | 1-3 | • Lecture<br>• Activity/ Assignment in Class | Arika |
| 13 | 5/11/2021 | - Waste management<br>- Disaster Waste Management | 1-3 | • Lecture<br>• Activity/ Assignment in Class | Juthamas |
| 14 | 12/11/2021 | - Microplastics: A global disaster | 1-3 | • Lecture<br>• Activity/ Assignment in Class | Juthamas |
| 15 | 19/11/2021 | - Building sanitation<br>- Environmental management | 1-3 | • Lecture<br>• Activity/ Assignment in Class | Monchai |
| 16 | 26/11/2021 | - Environmental law | 1, 4 | • Lecture | Monchai |

| Week | Date | Contents | CLOs | Teaching & Learning method | Instructor's Names |
|---|---|---|---|---|---|
| | | - Engineering Ethics | | • Activity/ Assignment in Class | |
| 17 | Mid-term Examination | | | | |

** Substitution day for Chulalongkorn Memorial Day, the instructor will schedule the makeup class later.

## 11. Course Assessment

| No. | Methods / Activities | Regulations | CLOs | Week | Weight Distribution (%) |
|---|---|---|---|---|---|
| 11.1 | Mid-term exam | - Content week 1-7<br>- Closed book<br>- Faculty-approved calculator | 1-3 | 8 | 25 |
| 11.2 | Final exam | - Content week 11-16<br>- Closed book<br>- Faculty-approved calculator | 1-4 | 16 | 25 |
| 11.3 | Quiz /Activities in class | Dependent on each instructor assignment (3% x 15 classes) | | | 45 |
| 11.4 | Class participation | Student must attend class 80 % of course | | | 5 |
| | | | | **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. Aarne 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)

13.4) Kolokytha E., S. Oishi, and R. S. V. Teegavarapu, Sustainable water resources planning and management under climate change. Singapore: Springer, 2016. (Lect. Luksanaree)


**Note:**

| **PLO** | |
|---|---|
| PLO 1 | Apply environmental engineering principles and knowledge to systematic solutions according to professional standards |
| PLO 2 | Apply practical skills in environmental engineering and disaster management to real situations based on academic principles and professional ethics |
| PLO 4 | Effectively present and discuss engineering knowledge to related professional people for objective fulfillment by using proper language and media |
| PLO 5 | 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 |
| **Generic Skill (GS)** | |
| GS1 | Systematic Thinking, Problem Solving, and Analytical Skills |
| GS2 | Basic Computer Skills |
| GS3 | Environmental and Disaster Risk Awareness |
| GS4 | A broad education is necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context. |
| GS5 | 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 |