

Course Syllabus

1. Course Title: Environmental Modelling

2. Course Code: ENMD125810

3. Credit Units: 2 (2/0/4) (2 units of theory/ 0 unit of practice/ 4 units of self-study)

Duration: 15 weeks (2 hours of theory + 0 hours of practice, and 4 hours of self-study per week)

4. Course Instructors

1/ PhD. Nguyen Thai Anh

2/ MSc. Nguyen Ha Trang

5. Course Requirements

Prerequisite courses: None

Previous courses: None

Parallel courses: None

6. Course Description

This module equips learners with the basic knowledge of modeling what includes the model for the diffusion of pollutants in water, the diffusion model of air pollution, the factors affecting the emission modeling in atmosphere, groundwater.

7. Course Goals

Goals	Goal Description	Programme ELOs
G1	Apply the specialized knowledge of mathematical and digital modelling to manage environment	ELO3
G2	Predict the speed of spread of pollution	ELO5
G3	Plan forecasting impact of pollutants in environment	ELO12

8. Course Learning Outcomes (CLOs)

CLOs		CLO Description	Programme ELOs
G1	CLO1	List of input variables	ELO3
	CLO2	Select mathematical modelling	
	CLO3	Analyze output results	
G2	CLO4	Calculate area of the impacted zones and concentration of pollutants	ELO5
G3	CLO5	Write development process of model	ELO12

9. Learning Resources

- Textbooks:

[1] Anthony J. Jakeman al et (2008), Environmental Modelling, Software and Decision Support, Volume 3

[2] PGS.TSKH. Bùi Tá Long (2011), Mô hình hóa môi trường, NXB. ĐH Quốc Gia TP.HCM

[3] Trần Ngọc Chấn (2002), Ô Nhiễm Không Khí và Xử Lý Khí Thải: Tập 1: Ô Nhiễm Không Khí và

[4] Tính Toán Khuếch Tán Chất Ô Nhiễm, Nhà xuất bản Khoa Học Kỹ Thuật.

- References:

[5] Jo U. Smith, Pete Smith (2007), Introduction to environmental Modelling, Oxford University Press

[6] Philip, B. B., Hanadi, S. R., Charles J. N. (1994), Ground Water Contamination: Transport and Remediation- Prentice Hall, Inc., Singapore

10. Student Assessment

- Grading scale: **10**

- Assessment plan:

Type	Content	Timeline	Assessment method	CLOs	Rate (%)
Processing Assessment					50
BT#1	Calculate the maximum ground concentration on the axle by Gaussian model	Week 3	Homework	CLO3	10
BT#2	Determination of air flow, oxygen mass transfer coefficient, critical point and critical distance	Week 8	Homework	CLO1 CLO2 CLO3 CLO4 CLO5	10

PRJ#1	Apply MIKE 2.1 model to predict the spread of pollution in water	Week 12	Assignment	CLO3 CLO4	30
Final exam					50
Total					100

11. Course Content

Week	Content	CLO
1-2	Chapter 1: Overview of Environmental Model (4,0,8)	
	A/ Content and pedagogical methods in class: (4h) Content: 1.1 Definitions 1.2 Role, meaning of environmental modeling 1.3 Model development process 1.4 Modelling softwares 1.5 Mechanism of transporting pollutants in the environment 1.6 Applications of modelling in environmental management Pedagogical methods: + Presentation of lecture + Focus group discussion	CLO1 CLO2
	B/ Self-study content: (8h) + BT#1	
3-5	Chapter 2: Modeling of spread pollution in atmosphere (6,0,12)	
	A/ Content and pedagogical methods in class: (6h) Content: 2.1 Meteorology 2.2 Classification of waste sources 2.3 Gaussian model 2.4 Beriland model 2.5 Sutton model 2.6 MM5 – CMAQ software Pedagogical methods: + Presentation of lecture + Group exercises + Discussion	CLO2 CLO3 CLO4 CLO5
	B/ Self-study content: (12h)	

	+ BT#1	
6-9	Chapter 3: Modeling of spread pollution in water (8,0,24)	
	A/ Content and pedagogical methods in class: (8h) Content: 3.1. Input parameters 3.2. Model of river water quality 3.3. Model of water quality in estuaries 3.4. MIKE software Pedagogical methods: + Presentation of lecture + Group exercises	CLO1 CLO4 CLO5
	B/ Self-study content: + Review the content of chapter 1,2,3 to prepare for online test (24h)	
10-13	Chapter 4: Underground water model (8,0,16)	
	A/ Content and pedagogical methods in class: (8h) Content: 4.1 Geological conditions 4.2 Hydrography of underground water flow 4.3 Visual modflow 4.4 Apply Modflow model to evaluate water reserves Pedagogical methods: + Presentation of lecture + Power point presentation + Focus group discussion	CLO2
	B/ Self-study content: (16h) + Review	
14-15	Presentation PRJ#1	

12. Learning Ethics

Students must do homework by themselves. If plagiarism is found students will get zero point.

13. **Date of first approval:** August 1st, 2012

14. **Approved by:**

Dean

Head of Department

Compiler

Prof. Nguyen Van Suc

MSc Nguyen Thi Minh Nguyet

MA Nguyen Thi Tinh Au

15. Date and Up-to-date content

1st time August 25th, 2015

- Update content and structure of the programme adjusted in:
- Content and assessment method

Instructor:

Nguyen Ha Trang
Head of Department:

Dr Tran Thi Kim Anh