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Template syllabus of the revised courses

Course Name : Environmental Modelling
Number of credits : 3 ECTS

Period : Second semester

Coordinator	**A/P Nguyen Van Cong**
Credits	3 ECTS
Lecturers	**Dr. Huynh Vuong Thu Minh**
Level	Master
Host institution	College of Environment and Natural Resources, Can Tho University
Course duration	7 weeks
New/revised	Revised

Summary

This course belongs to the specialized knowledge block, providing students with in-depth knowledge about environmental modelling, application of modeling tools and computer models, forecasting of service pollution. for the assessment of environmental impacts and control, prevention of pollution and environmental protection. To apply knowledge of the model in the process of developing a decision support system in the management of environment and natural resources.

Target student audiences

Master students majoring in Environment and Natural resources field

Prerequisites

Required courses (or equivalents): NA

Aims and objectives

The main course objective is to equip students with knowledge of: (i) To apply the modelling in order to management of pollutant dispersion; (ii) To have skills in using modeling and applied modelling in environmental management and protection; (iii) To have teamwork and presentation skills; and (iv) To have the professional attitude to study and work.

The Authentic Tasks are:

This course will help students understand the knowledge of mathematical models, methods, correction, testing and analysis of mathematical models.

General learning outcomes:

By the end of the course, successful students will:

Knowledge	• This course will help students understand the knowledge of mathematical models, methods, correction, testing and analysis of mathematical models.
Comprehensive	• Help students grasp and apply the main steps in the study of mathematical models
Application	• Use and application of surface water quality models and air quality models.
Analysis	• Analyze the selection of use and verify the results of the water quality and air quality models applied in the field of technology and environmental management.
Synthesis	• Can identify and describe a number of important processes in a number of environmental and resource management related issues.

Overview of sessions and teaching methods

The course will make most of interactive and self-reflective methods of teaching and learning and, where possible,avoid standing lectures and presentations.

- **Learning methods**
  - Presentation method;
  - Intuitive method
  - Learning by case study and projects methods
  - Group discussion method
  - Literature review method
  - And other skill methods.

Course outline

Week 1	Basics
Week 2	Conceptual modelling
Week 3	Hydrodynamics Modelling
Week 4	Mid-term exam
Week 5	Water quality modelling
Week 6	Practice in water quality modelling
Week 7	Group presentation Final exam

Literature
Compulsory
Lecture of Modelling of environment.

Recommended:

[1] Ngo Ngoc Hung (2008), Principles and applications of mathematical models in biological, agricultural and environmental research. NXB Nông nghiệp. TP Hồ Chí Minh.
[2] Beven, K.J. (2008). Rainfall – runoff modelling: The primer. John Wiley and Sons. Chichester, England.Mo
[3] Massei, G., Rocchi, L., Paolotti, L., Greco, S., & Boggia, A. (2014). Decision Support Systems for environmental management: A case study on wastewater from agriculture. Journal of Environmental. 146, 491-504.
[4] Modeling chemical transport in soils: Natural and applied contaminants

Course workload
The table below summarizes course workload distribution:

Activities	Learning outcomes	Assessment	Estimated workload (hours)
In-class activities (42 hours)			
	- Some basic concepts of modelling - The role of modelling in environmental management - Basic processes in modelling	Class participation	10
	2.1. Overview of the surface water quality modelling 2.2. Introduction of mathematical modelling software that can simulate water quality 2.3. Surface water quality modeling (hydrodynamics modelling, pollutant transport and diffusion, pathogenic organism variation modelling) 2.4. Lake water quality model (water balance, thermal stratification, eutrophication and nutrient loading such as, N and P) 2.5. Estuary water quality modelling (estuarine hydrodynamics modelling, diffusion coefficient and estuary stratification) 2.6. Introduction several modelling (MIKE 11)	Class participation and active contribution to discussions	30
	Develop conceptual modelling	Class participation and active	5

		contribution to discussions	
Independent work (73 hours)			
	Practices in water quality modelling		90
Total			***135***

Grading

The students' performance will be based on the following:

Assessment

- Mid semester examination (40%)
- Final semester examination (60%)

Evaluation

A (8,5 – 10)
B (7,0 – 8,4)
C (5,5 - 6,9)
D (4,0 – 5,4)