

Template syllabus of the revised courses

Course Name : HYDROLOGICAL MODELLING

Number of credits : 3 ECTS

Period : First semester

Coordinator	A/P Nguyen Van Cong
Credits	3 ECTS
Lecturers	A/P Tran Van Ty, 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

In this 3 ECTS course, students will be provided systematically about the basic concepts of modeling and the process of building and simulating applied mathematical modeling. Expertise in math modeling currently applied in the field of hydrology and problems related to water resource use in the Mekong Delta, Vietnam and around the world.

Target student audiences

Master in Hydraulic Engineering

Prerequisites

Required courses (or equivalent): N/A

Aims and objectives

- Students grasp common mathematical modeling processes and concepts
- Knowledge of basic concepts and calculation methods of all kinds of hydrological problems.
- Applying mathematical model to hydrological problems related to exploitation use, water resource management such as calculation of flow characteristics, hydrological forecasting, balance calculation and water resource use planning, flood prevention planning, integrated management in the original country.

The Authentic Tasks are:

- This course will help students apply the mathematical model to the hydrological problem related to the exploitation and management of water resources such as calculating the flow characteristics, hydrological forecasts, calculating balance and planning the use of water resources., flood prevention planning, integrated management in the whole country.

General learning outcomes:

By the end of the course, successful students will:

Knowledge

- Understand the concept and process of building general mathematical models
- Apply random and statistical models to the analysis of hydrological data.

Skills

- Skills to simulate hydrostatic math models
- Proficient skills in using some computational software
- Self-study and research skills

Attitude / capacity of autonomy and responsibility

- Active, willing to learn and self-study
- Has a positive attitude in research

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

- Project Based Learning
- Literature review
- Stakeholder analysis / customer consultation

Course outline

Week	Topics
Week 1	Topic 1: The deterministic model
Week 2	Topic 2: Random pattern
Week 3	Topic 3: Random pattern
Week 4	Topic 4: Statistical analysis in Hydrological calculation
Week 5	Practice Lessons 1. HEC-HMS model
Week 6	Practice Lessons 2. Artificial intelligence network model ANN
Week 7	Practice Lessons 3. Statistical analysis

Literature

Compulsory
N/A

Recommended:

[1] Tran Van Ty, Huynh Vuong Thu Minh, 2019. Mô hình toán thủy văn lưu – NXB Đại học Cần Thơ.

[2] CT. Haan, HP. Johnson and DL. Brakensiek, 2003. Mô hình toán thủy văn lưu vực nhỏ (Người dịch: Nguyễn Thanh Sơn).

[3] Đặng Văn Bảng, 2001. Bài giảng Mô hình toán thủy văn, Khoa Thủy văn môi trường, Trường Đại học Thủy lợi.

[4] Lê Văn Nghinh, 2008. Giáo trình cao học Thủy lợi: Mô hình toán thủy văn. NXB Xây dựng.

[5] Lê Văn Nghinh, 2003. Tính toán thủy văn thiết kế. NXB Nông nghiệp.

[6] Maidment, David R. Handbook of Hydrology, 1993. New York, USA, McGraw-Hill Book company.



- [7] Mark Ole and David Luketina, 2003. Hydrological Modelling - Lecture notes. AIT. Thailand.
 [8] Huynh Vuong Thu Minh, Giáo trình Thủy Văn Công Trình – NXB Đại học Cần Thơ, 2010.
 [9] Hair Jr, J.F. Multivariate Data Analysis Joseph F. Hair Jr. William C. Black Barry J. Babin Rolph E. Anderson Seventh Edition.

Course workload

The table below summarizes course workload distribution:

Activities	Learning outcomes	Assessment	Estimated workload (hours)
In-class activities (37.5 hours)			
Teaching theory in class	<p>Students are provided with general math modeling processes and concepts.</p> <p>Applying mathematical model to hydrological problems related to exploitation use, water resource management such as calculation of flow characteristics, hydrological forecasting, balance calculation and water resource use planning, flood prevention planning, integrated management in the original country.</p> <p>Apply random and statistical models to the analysis of hydrological data</p>	Join the class	
Class discussion is moderated	Discuss each case of the lesson	Join classes and prepare for discussions	
Exercises in class, practical homework Lesson 1. HEC-HMS model Lesson 2. Artificial intelligence network model ANN Lesson 3. Statistical analysis	Completed individually	Join classes and prepare for assignments	
Reading and discussion of assigned papers for preparation for lectures	Depending on the number of academics and topics, groups of exercises will be appropriate	Class participation, creative and active contribution to discussion	



Presentation group	Depending on the number of academies and topics, the group will group the appropriate presentation	Quality group exercises and individual presentations	
Independent work (75 hours)			
Working group: - Contribution to group case studies projects - Contribute to the preparation and delivery of personalized presentations - Contribute to web application		Quality group exercises and individual presentations	
Course group exercises			
Presentation group		Quality group exercises and individual presentations	
Total			

Grading

The students' performance will be based on the following:

- Assessment**
- Progress assessment (10%): attend class and discuss plenary
 - Group report (30%): Participants will be divided into groups of 4-5 students and choose 1 topic and complete a group project report according to specific requirements of each topic.
 - Final examination (60%): Multiple choice quiz
- Evaluation**
- A (8,5 – 10)
B (7,0 – 8,4)
C (5,5 - 6,9)
D (4,0 – 5,4)