WATERSHED MANAGEMENT (3 ECTS)

Fall semester, 2021-2022

Cooordinator	College of Environment and Natural Resources
Credits	3 ECTS
Lecturers	**Nguyen Đinh Giang Nam**
Level	Master
Host institution	Can Tho University
Course duration	30 hours

Summary

The module equips students with the basics of climate, natural disasters and climate change, and scenarios of change in climate change research., Impacts of natural disasters and climate change aspects of life, production, identification of impact and adaptation mitigation measures and disaster management.

Target student audiences

Master in Climate Change & Delta Management

Prerequisites

Required courses (or equivalents): NO

Aims and objectives

- Students have a general knowledge of watershed management
- Analyze the causes of problems in watershed management
- Skills of analyzing suitable methods, which are popular in the world today.
- Knowledge of strategic environmental management including key issues and concerns, assessment steps and recommendations

Authentic Tasks:

Desired learning outcomes:

By the end of the course, successful students will:

Knowledge	Module is conceptualized to provide recommendations for application of watershed planning and management. In addition, in watershed management, the module introduces a multidisciplinary approach related to the fields of environmental science, public policy, urban / rural and regional planning and Assessment. strategic environment.
Comprehensive	Help participants grasp the basics of targeting and targeting to address watershed water resource issues.
Application	Find social-physical and interdependent relationships, especially between water systems and the environment, and socio-economic development.

Analysis	Strategic environmental assessment as a planning tool for developing sustainable river basin development and management plans
Synthesis	Various technical, institutional, governance, legal and financial frameworks required for successful implementation of a watershed management plan

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

- Video presentations
- Group work, write articles / essays
- Project Based Learning
- Literature review
- Stakeholder analysis / customer consultation

Literature

- Compulsory

[1] Hosea M. Mwangi et. al (2015). Introduction to watershed management. Tropical Forestry Handbook. Springer-Verlag Berlin Heidelberg
[2] Kenneth N. Brooks et. al (2012). Hydrology and the Management of Watersheds. Wiley Blackwell. Fourth edition
[3] Kevin Drake and Michael Hogan (2013). Watershed management guidebook. Integrated Environmental Restoration Services, Inc
[4] Isobel W Heathcote (2009). Integrated watershed management: principles and practice. Jonh Wiley & Sons. Second edition
[5] ICEM, 2010. Strategic environmental assessment of hydropower on the mekong mainstream. Final report. MRC.

- Literature

Technical reports, articles and articles on websites of Universities, Research Institutes, and Journal of Specialized Science.

Course workload

The table below summarizes course workload distribution:

Activities	**Learning outcomes**	**Assessment**	**Estimated workload (hours)**
In-class activities (15 hours of theory and 5 hours of group presentations)			
Lectures	Understand theories, concepts, methodologies and tools	Join the class	18 hours/ 6 Topic
Moderated in-class discussions	Discuss each case of the lesson	Class participation and preparedness for discussions	2 hours

In-class assignments, homework assignment	Plenary discussion	Class participation and preparedness for assignments	2 hours
Reading and discussion of assigned papers for preparation for lectures		Class participation, creative and active contribution to discussion	3 hours
Presentation group	Depending on the number of academies and topics, it will be classified into appropriate groups	Quality group exercises and individual presentations	5 hours
Independent work (10 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	5 hours
Course group exercises			
Presentation group		Quality group exercises and individual presentations	5 hours
Total			

Course outline

Week	**Topics**
Week 1	Topic 1: Introduce
Week 2	Topic 2. Issues in watershed management
Week 3	Topic 3. Basin management solutions
Week 4	Topic 4. Basin management solutions
Week 5	Topic 5. Assessment of climate change impacts on river basins
Week 6	Topic 6. Assessment of climate change impacts on river basins
Week 7	Group presentations
Week 8	Final examination

Course Schedule

Topic 1: Introduce	
Learning objectives	Equip with basic knowledge about river basins
Learning outcomes	Provide students with general knowledge of watershed management
Student deliverables	Exercise: Questions & Answers and Plenary Discussion in Class
Topic materials	Lesson [1] Hosea M. Mwangi et. al (2015). Introduction to watershed management. Tropical Forestry Handbook. Springer-Verlag Berlin Heidelberg [2] Kenneth N. Brooks et. al (2012). Hydrology and the Management of Watersheds. Wiley Blackwell. Fourth edition
Outline	1.1. Introduction to watershed management 1.2 Hydrological cycle 1.3 Water balance 1.4 Water source reserves 1.5 Characteristics of the basin
Topic 2. Issues in watershed management	
Learning objectives	Understand general concepts of the management of river basins
Learning outcomes	Analyze the causes of problems in watershed management by presenting case studies / case studies in the Mekong Basin
Student deliverables	Exercise: Participants will be asked to discuss problems that exist and what their variable causes / effects in watershed management are.
Topic materials	Lesson [2] Kenneth N. Brooks et. al (2012). Hydrology and the Management of Watersheds. Wiley Blackwell. Fourth edition [3] Kevin Drake and Michael Hogan (2013). Watershed management guidebook. Integrated Environmental Restoration Services, Inc
Outline	2.1. Describe problems in watershed management 2.2. Variations have important implications for watershed management 2.3. Other River Basin Related Issues 2.4 Understand the problem / results analyzed - Observe and monitor
Topic 3. The basin management solutions	
Learning objectives	Knowledge of watershed management methods
Learning outcomes	Skills of analyzing suitable methods, which are popular in the world today.

Student deliverables	Exercise: Questions & Answers and Plenary Discussion in Class
Topic materials	Lesson [2] Kenneth N. Brooks et. al (2012). Hydrology and the Management of Watersheds. Wiley Blackwell. Fourth edition [3] Kevin Drake and Michael Hogan (2013). Watershed management guidebook. Integrated Environmental Restoration Services, Inc [4] Isobel W Heathcote (2009). Integrated watershed management: principles and practice. Jonh Wiley & Sons. Second edition
Outline	3.1. Integration / synthesis method 3.2. The "Consortium" approach 3.3. River basin governance with the participation of stakeholders
Topic 4. Environmental assessment from a watershed boundary perspective	
Learning objectives	Understanding key issues and concerns, steps for environmental assessment and making recommendations from an integrated perspective on the watershed boundary
Learning outcomes	Knowledge of strategic environmental management including key issues and concerns, assessment steps and recommendations
Student deliverables	Exercise: Questions & Answers and Plenary Discussion in Class
Topic materials	Lesson [2] Kenneth N. Brooks et. al (2012). Hydrology and the Management of Watersheds. Wiley Blackwell. Fourth edition [3] Kevin Drake and Michael Hogan (2013). Watershed management guidebook. Integrated Environmental Restoration Services, Inc [4] Isobel W Heathcote (2009). Integrated watershed management: principles and practice. Jonh Wiley & Sons. Second edition [5] ICEM, 2010. Strategic environmental assessment of hydropower on the mekong mainstream. Final report. MRC
Outline	4.1. Identify important strategic issues and concerns 4.2. Assess the status 4.3. Impact assessment 4.4. Follow-up studies

Course Assignments
Course assignments will constitute a multi-part project:

• Assignment #1 -(in-class)- Questions & Answers and Plenary discussion in class according to each situation

• Assignment #2 - Approach / visit or discuss case and case studies of water resource management and policy

• Assignment #3 - Present individually / in groups on topics selected for the visit or field discussions in Exercise 2

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)