Trans-Boundary Water Management

**Fall semester, 2019-2020**

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| Coordinator | **Hoang Thi Thu Huong** |
| Credits | 3 ECTS (optional course), 30 in-class hours |
| Lecturers | **Hoang Thi Thu Huong** (Hanoi University of Science and Technology, Vietnam)  **Tran Thanh Chi** (Hanoi University of Science and Technology, Vietnam) |
| Level | Doctoral students |
| Host institution | **Hanoi University of Science and Technology**, School of Environmental Science and Technology |
| Course duration | October 19 – November 23, 2019 |

### Summary

*This 3 ECTS course serves as an advance to water management focusing on specific issues on trans-boundary water management. It provides doctoral students with advanced knowledge on the equitably and cooperatively, manage the development of, and balance interdependencies between river basins that cross the political boundaries of two or more countries so they can meet the increasing requirements in the fields of environmental engineering as well as natural resources and* *environmental management. The main content of the course includes knowledge on water governance, water sustainability in transboundary watercourse basin and potential dispute, processes in and technical and legal tools for transboundary water resources management to achieve sustainable development goals, reducing the impact of natural disasters and human, as well as maintaining ecological processes, protecting the ecosystems*

*Through the course, students will also be enhanced with analytical, synthesis, presentation and teamwork skills.*

### Target student audiences

Doctoral students in the fields of:

* Natural resources and environmental management
* Environmental Science
* Environmental Engineering
* Water resources Management

### Prerequisites

Required courses (or equivalents):

* Environmental Engineering and/or Science
* Natural resources and environmental management
* Ecology

### Aims and objectives

The course aims to provide students with fundamental and advanced knowledge related to catchment management planning processes and associated catchment management plans in intra and trans-boundary catchments. Review, collation and analysis of models, data and information that allow for the (spatially explicit) estimation of water pollution abatement impacts, costs and benefits in linked catchment ecosystems. Development and application of integrated modelling approach for efficient water quality planning and management, for the case of intra and trans-boundary river basins in linked catchment ecosystems. In addition, students will be introduced to the legal instruments in the field of dispute resolution on trans-boundary water resources.

During the courses, participants will discuss the strategies of integrated water management and how to develop a common agreement, commitments tp, processes of promoting cooperation. International water management legislation, involving all stakeholders, and strengthening the use of technical and legal instruments are extended. The use of some tools for watercourse management for land and water use planning is increased. Some arising transboundary water management issues around the world are discussed. Political and public awareness of the health and waterborne diseases problem, especially in relation with climate change, is addressed.

Different stakeholders/actors including Government, Markets and Community are addressed to get involved in transboundary water management for decision making. Different tools including legislative, technical and economic ones are applied in an integrated manner. Opportunities and challenges in transboundary water management for developing countries are analyzed.

### General learning outcomes:

By the end of the course, successful students will:

* Understand the benefits of water and productive outcomes of water are shared,
* Understand the ownership of the respective riparian feel, how to develop political commitments to, processes of promoting cooperation,
* Develop the respective riparian shifts focus and moves from challenges and constraints to opportunities,
* Built broad partnerships for negotiated outcomes among and within riparian countries
* Develop trust and personal relations among riparian delegations from countries and between domestic water user groups.

### Overview of sessions and teaching methods

Distribution of the coursework between various activities, academic hours (e.g. lectures, seminars, workshops, independent/moderated group work, debates, exams (tests, oral, written, take home), reading of course literature, course research, development of a course paper/essay, preparation to exams etc.):

* Concepts and bases of transboundary watercourse management; Relationship between ecological processes in water resources with human activities (lecture)
* What is “good” water governance (lecture)
* Water sustainability in transboundary watercourse basin (lecture)
* On-going processes in transboundary water resources management (lecture)
* The participants’ institutions effectiveness in transboundary water resources management (lecture)
* Trans-boundary water resources and resolution of potential disputes (group work – discussion and seminar)
* International Legal Instruments on Trans-Boundary Water Management (lecture)
* Technical and legal tools for water resources assessment and management
* The legal instruments in the field of dispute resolution on trans-boundary water resources (exercises and seminar)
* Analysis of lessons learned from the transboundary watercourse management projects; Discuss transboundary watercourse management model and prospects, the ability to apply in practice (group work – discussion and seminar)

The course will try to make use interactive and self-reflective methods of teaching and learning including video show, video conference (if possible), course assignment/project and their presentations and discussions. Lecturing on water governance and management will be provided. Legislative and economical tools for trans-boundary water management are addressed in this part. The second part will provide with different issues and case study for trans-boundary water management. The third and also main part will focus on individual case study on trans-boundary water management: the strategies of integrated management solutions, how to develop an agreement and action plan, different stakeholders/actors for decision making in water management for developing countries.

### Course workload

The table below summarizes course workload distribution:

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| **Activities** | **Learning outcomes** | **Assessment** | **Estimated workload (hours)** |
| **In-class activities** | | | |
| Lectures | Understanding theories, concepts, methodology. | Class participation | 10 |
| Moderated in-class discussions | Understanding various techniques, tools and management contexts and common problems in transboundary water management. | Class participation and preparedness for discussions | 15 |
| In-class assignments | Understanding various techniques, tools and management contexts and common problems in transboundary water management. | Class participation and preparedness for assignments | 5 |
| **Independent work** | | | |
| Group work:   * Contribution to the group case-study projects * Contribution to the preparation and delivery of individual presentation | Ability to use the concepts, tools, and methods for transboundary water management.  Plan and develop a transboundary water management project. | Quality of group assignments and individual presentations | 30 |
| Course group assignment | Ability to deal with real cases of transboundary water management. | Quality of developed transboundary water management strategies and their presentation | 30 |
| ***Total*** |  |  | ***90*** |

### Grading

The students’ performance will be based on the following:

* Process assessment: 40% including:
  + Level of preparedness for participation in class discussions and seminars (10 %) (from 100 % for active participation and demonstrated familiarity with the course readings to 0 % for completely ignoring in-class discussions);
  + Group assignments (15 %) (from 100% for clearly demonstrated input to 0 % for non-participation);
  + Mid-term exam (15%)
* Final exam: 60%

### Course schedule

* Concepts and bases of transboundary watercourse management (lecture)
* On-going processes in transboundary water resources management (lecture)
* The participants’ institutions effectiveness in transboundary water resources management (lecture)
* Trans-boundary water resources and resolution of potential disputes (group work – discussion and seminar)
* International Legal Instruments on Trans-Boundary Water Management (lecture)
* Technical and economic tools for water resources assessment and management
* The legal instruments in the field of dispute resolution on trans-boundary water resources (exercises and seminar)
* Analysis of lessons learned from the transboundary watercourse management projects; Discuss transboundary watercourse management model and prospects, the ability to apply in practice (group work – discussion and seminar)

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| **Day**  **(Tentative)** | **Time** | **Topic** | **Lecturer** |
| December 10, Tuesday | 08:00-09:30 | Concepts and bases of transboundary watercourse management |  |
| 09:45-11:15 | Water governance |  |
| 11:30-12:15 | Water governance |  |
| December 11, Wednesday | 08:00-09:30 | Water sustainability in transboundary watercourse basin |  |
| 09:45-11:15 | Water sustainability in transboundary watercourse basin |  |
| 11:30-12:15 | Policies and legislation related to transboundary watercourse management |  |
| December 12, Thursday | 08:00-09:30 | Planning and organizing TBWM |  |
| 09:45-11:15 | Legislative and economic tools for TBWM |  |
| 11:30-12:15 | Legislative and economic tools for TBWM |  |
| December 16, Monday | 08:00-09:30 | Technical tools for TBWM |  |
| 09:45-11:15 | Technical tools for TBWM |  |
| 11:30-12:15 | Integrated approach in TBWM |  |
| December 17, Tuesday | 08:00-09:30 | The legal instruments in the field of dispute resolution on trans-boundary water resources |  |
| 09:45-11:15 | The legal instruments in the field of dispute resolution on trans-boundary water resources |  |
| 11:30-12:15 | The legal instruments in the field of dispute resolution on trans-boundary water resources |  |
| December 18, Wednesday | 08:00-09:30 | DPSIR model for decision making.  Opportunities and challenges in TBWM for developing countries |  |
| 09:45-11:15 | Analysis of lessons learned from the transboundary watercourse management projects |  |
| 11:30-12:15 | Development of TBWM strategies for developing countries |  |

### Course assignments

Course assignments will constitute a multi-part project:

* Assignment #1– Trans-boundary water resources and resolution of potential disputes
* Assignment #2 – Development of a TBWM strategies for developing countries
* Assignment #3 – Development of a TBWM project for a specific country

To complete the assignments, the class will be divided into several groups (if possible). **Assignment #1** will help students to understand the general content of the course. The outcome of the first assignment are preliminary solutions for resolving potential disputes in TBWM (ppts and oral presentations).

**Assignment #2** will require a greater level of dealing with real work from students. Partly based on Assignment #1, it requires students to develop TBWM strategies for developing countries.

**Assignment #3** will also require a greater level of dealing with real work from students. Partly based on Assignment #1, it requires students to develop a TBWM project for their countries.

**Literature**

1. Steven C. Chapra, Greg Pelletier and Hua Tao, *QUAL2K: A Modeling Framework for Simulating River and Stream Water Qualiy (Version 2.04)*, Documentation, US Environmental Protection Agency, 2006.
2. Velma I. Grover: Water- source of conflict or cooperation?, Science Publishers, NH, USA, 2007
3. Salah Darghouth, Christopher Ward, Gretel Gambarelli, Erika Styger, and Julienne Roux: Watershed Management Approaches, Policies, and Operations: Lessons for Scaling Up, The World Bank, 2008
4. Michael Zoebisch, Khin Mar Cho, San Hein and Runia Mowla: Integrated watershed management- Studies and Experiences from Asia, Asian Institute of Technology, 2005
5. Ali Mirchi, David Watkins Jr. and Kaveh Madani: Modelling for watershed planning, management, and decision making, Nova Science Publishers, Inc., 2009
6. Chris Jones, R. Mark Palmer, Susan Motkaluk, Mike Walters: Watershed health monitoring- Emerging Technologies, LEWIS PUBLISHERS, 2002