Climate change and mitigation challenge in developing countries

**Fall semester, 2019-2020**

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| Coordinator | **Ly Bich Thuy** |
| Credits | 1.5 ECTS (optional course), 15 in-class hours |
| Lecturers | **Ly Bich Thuy** (Hanoi University of Science and Technology, Vietnam)**Nguyen Ngoc Huy** (Vietnam Japan University) |
| 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

*The course aims to provide students with fundamental concepts about climate change and its effects. Two main approaches to cope with climate change, namely mitigation and adaptation, will be discussed. A case study in Vietnam will be introduced.*

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

### Target student audiences

Doctoral students in the fields of:

* Environmental Engineering
* Environmental Science
* Natural resources and environmental management
* Heat Engineering
* Transportation Engineering

### Prerequisites

Required courses (or equivalents):

* Not require.

### Aims and objectives

The main course objective is to provide students with facts, effects and mitigation actions for climate change. Status, causes, scientific proofs about climate change will be presented. Effects of climate change in the world and in Vietnam will be focused. Mitigation and adaptation measures will be discussed. A case study in Vietnam will be introduced.

### General learning outcomes:

By the end of the course, successful students will:

* understand climate change.
* understand cause of climate change
* understand the effects of climate change
* understand the scientific proof of climate change
* be aware of effects of climate change at local levels
* be able to discuss some potential mitigation and adaptation solutions

### Overview of sessions and teaching methods

The course will try to make use of interactive and self-reflective methods of teaching and learning including video show, video conference (if possible), course assignment/project and their presentations and discussions. It will start with an introduction about climate change, effects, causes and scientific proofs. The second part will introduce about mitigation and adaptation measures. The third part will discuss current and potential effects of climate change in Vietnam. The final part is a case study in Vietnam.

### 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 | 15 |
| Moderated in-class discussions | Understanding approach of climate change mitigation and adaptation  | Class participation and preparedness for discussions | 10 |
| **Independent work** |
| Group work:* Contribution to the group case-study projects
* Contribution to the preparation and delivery of individual presentation
 | Ability to develop a reasonable adaptation plan | Quality of group assignments and individual presentations | 20 |
| ***Total*** |  |  | ***45*** |

### 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

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| --- | --- | --- | --- |
| **Day****(Tentative)** | **Time** | **Topic** | **Lecturer** |
| October 19, Saturday | 08:00-09:30 | Introduction about climate change | Ly Bich Thuy |
| 09:45-11:15 | Greenhouse gases and climate models | Ly Bich Thuy |
| 11:30-12:15 | Effects of climate change | Ly Bich Thuy |
| October 26, Saturday | 08:00-09:30 | Dealing with climate change, mitigation approach | Ly Bich Thuy |
| 09:45-11:15 | Dealing with climate change, adaptation approach | Ly Bich Thuy |
| 11:30-12:15 | Climate change’s effects in Vietnam | Ly Bich Thuy |
| November 2, Saturday | 08:00-09:30 | Case study “Climate and hazard risk in urban development” | Nguyen Ngoc Huy |
| 09:45-11:15 | Case study “Climate and hazard risk in urban development” | Nguyen Ngoc Huy |
| November 9, Saturday | 08:00-09:30 | Case study “Climate and hazard risk in urban development” | Nguyen Ngoc Huy |
| 09:45-11:15 | Case study “Climate and hazard risk in urban development” | Nguyen Ngoc Huy |

### Course assignments

Course assignments will constitute a multi-part project:

* Assignment #1 (mostly in-class) – General facts about climate change
* Assignment #2 – Development of an adaptation plan for an effect of climate change in Vietnam.

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 will be evaluated by paper test.

**Assignment #2** will require a greater level of dealing with real work from students. Partly based on Assignment #1, it requires students to develop an adaptation plan for an effect of climate change in Vietnam.

**Literature**

**IPCC, 2007**: Climate Change 2007: *The Physical Science Basis. Contribution of Working
Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate
Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Averyt, M. Tignor
and H. L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and
New York, NY, USA.

**IPCC, 2012:** *Managing the Risks of Extreme Events and Disasters to Advance Climate*
*Change Adaptation. A Special Report of Working Groups I and II of the*
*Intergovernmental Panel on Climate Change* [Field, C. B., V. Barros, T. F. Stocker, D.
Qin, D. J. Dokken, K. L. Ebi, M. D. Mastrandrea, K. J. Mach, G. -K. Plattner, S. K. Allen, M.
Tignor, and P. M. Midgley (eds.)]. Cambridge University Press, Cambridge, UK, and New
York, NY, USA, 582 pp.
**IPCC, 2013**: *Climate Change 2013: The Physical Science Basis. Contribution of Working*
*Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate*
*Change* [Stocker, T. F., D. Qin, G.-K. Plattner, M. Tignor, S. K. Allen, J. Boschung, A.
Nauels, Y. Xia, V. Bex and P. M. Midgley (eds.)]. Cambridge University Press,
Cambridge, United Kingdom and New York, NY, USA, 1535 pp, doi:
10.1017/CBO9781107415324

**Ministry of Natural Resources and Environment**. *Scenario of climate change and sea level rise in Vietnam*. Vietnam Publishing House of Natural Resources, Environment and Cartography , 2016.