Climate Change Assessment and Mitigation

(Course Code: CLM305)

Spring semester, 2019

Coordinator	Om Katel
Credits	4 ECTS (Compulsory course)
Lecturers	Om Katel (Environment and Climate Studies, The College of Natural Resources, Royal University of Bhutan)
Level	BSc
Host institution	Department of Environment and Climate studies, College of Natural Resources, Royal University of Bhutan
Course duration	March 10 – May 30 2019

Summary

This 4 ECTS course covers the overview on introduction to global and regional climate change, status of climate change in the Hindu Kush Himalaya, climate change vulnerability assessment, adaptation and mitigation to climate change, and policies and politics of climate change.

Target student audiences

Final year BSc students.

Prerequisites

None

Aims and objectives

This module provides students with concepts on vulnerability, adaptation, mitigation and negotiation concerning climate change. Students can learn to develop vulnerability indices and formulate adaptation and mitigation options.

General learning outcomes:

By the end of the course, successful students will:

- Explain global and regional climate change
- Explain the importance of climate change vulnerability assessment
- Relate current status of natural resources to climate change impacts
- Develop climate change vulnerability assessment indices
- Assess the climate change impacts in relation with human activities
- Relate climate change impacts and climate finances
- Analyze SDGs and adaptation practices in Bhutan
- Analyze climate policy and mitigation actions

Overview of sessions and teaching methods

The course is delivered in three interactive methods such as lectures, individual assignment and class exercises. The course starts with brief introduction to climate change at the global level,

regional level and then exposes students to computing vulnerability and then link the same to the policies and politics of climate change.

Course workload

The table below summarizes course workload distribution:

Activities	Learning outcomes	Assessment	Estimated workload (hours)
In-class activities			
Lectures	Understanding concepts of Climate change, Global scenario of climate change, Assessment methods, Adaptation strategies and practices, mitigation strategies and practices, policies and practices	Class participation	30
Moderated pracical work	Understanding assessment methods, vulnerability and resilience and global climate change impacts and adaptation scenarios.	Class participation and discussions	30
In-class assignments	Developing indices for assessing climate change impacts and vulnerabilities.	Class participation and presentation	30
Independent work			
Individual Work: - Contribution to the case-study projects	Ability to understand the principals, policies and governance mechanism covering climate change impacts, practices and policies.	Quality of group assignments	15
Course assignment	Ability to relate to specific situation and frame specific policy context in order to address the climate change impacts and resilience.	Quality of their presentation	15
Total			*120*

Grading

The students' performance will be based on the following:

- Level of preparedness for practical and seminars (30 %);
- Quality of the project work (Written assignment on Ability to link specific impacts to policies) (40%)
- Quality of written assignment which will be based on applicability of cases on real world situations (30%)

Course schedule

Day	Time	Topic	Lecturer

March 05 Tuesday	09:15 – 12:15	Global climate change scenarios Drivers of change to mountain sustainability ; Environmental drivers of change Socio-cultural drivers Economic drivers Climate change in the mountains Monsoon, surface air, temperature, precipitation Changes in temperature and precipitation	Om Katel
March 07 Thursday	13:15 – 16:15	Compare of HKH and major mountain environments Scenarios and pathways: Future of Hindu Kush Himalaya (downhill, business as usual and prosperous) Challenges and opportunities in Hindu Kush Himalaya (national considerations, commitments for 2030 SDGs and NDCs)	Om Katel
March Tuesday 12	09:15 – 12:15	Biodiversity and ecosystem services Cryosphere, water and different energy sources Water poverty, food and nutrition security	Om Katel
March 14 Thursday	09:15 – 12:15	Emissions and air pollution Poverty and livelihood vulnerability in mountains Natural resources, vulnerability and climate change in mountains	
March 19 Tuesday	09:15 – 12:15	Concepts of vulnerability assessment Livelihood strategies assessment Climate change vulnerability assessment versus livelihood vulnerability assessment	Om Katel
March 21 Thursday	09:15 – 12:15	Adaptive capacity, exposure and sensitivity Vulnerability: physical, social, economic and environmental dimensions Risk assessment and its relation to vulnerability Climate vulnerability indices: a case study	Om Katel
March 25 Tuesday	09:15 – 12:15	Adaptation to climate change Types of adaptation (incremental adaptations and transformative adaptations) Adaptation to climate change in the Hindu Kush Himalaya	Om Katel
March 27 Thursday	09:15 – 12:15	From adaptation to adaptive capacity and vulnerability reduction Natural hazards (social aspects of adaptive capacity) Adaptation funding (legal and institutional issues)	Om Katel

		Status of regional climate change adaptation	
April 01 Monday	13:15 – 16:15	Mitigation versus adaptation Climate change adaptation and mitigation management options Paris agreement and foundation for mitigation Climate change mitigation through forest conservation	Om Katel
April 02 Tuesday	09:15 – 12:15	Clean Development Mechanism Decarbonization through electric power and transportation (biofuel) Case studies on different mitigation measures	Om Katel
April 03 Wednesday	13:15 – 16:15	Climate change policy debate Impacts and adaptation, emissions and mitigation responses Cost and benefits of adaptation and mitigation	Om Katel
April 04 Thursday		UNFCCC and IPCC Kyoto protocol and beyond Conference of parties and international negotiations and carbon markets National determined contributions Bhutan's approach to addressing climate change impacts (mitigation and adaptation)	Om Katel
April 05 to April 15		Projects and assignments	Om Katel
April 30 Tuesday		Deadline for submission of Assignments	

Course assignments

Course assignments will constitute a project:

- Assignment #1 (mostly in-class) – an understanding of concepts and development of organizing case studies.
- Assignment #2 – links the theoretical concepts in assignment #1 with assignment #2 and compute the vulnerability index to understand the climatic impacts.

To complete the assignments the class will be divided into several groups. **Assignment #1** will help students to understand the scope of the problem, understand the concepts and prepare for organizing case studies. (ppts and oral presentations will be used during the class).

Assignment #2 will link Assignment #1, where students will analyse the developed indices and apply in the real word situations.

Literature

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- Eric, L. (2012). *Agroecology and strategies for climate change*. Springer publication
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- Ruddiman, W.F. (2008). *Earth's Climate: past and future.* WH Freeman and company
- Sovacool, B.K., D'Agostino, A.L., Rawlani, A. & Meenawat, H. (2012). Improving climate change adaptation in least developed Asia. *Environmental Science & Policy*, 21, 112-125
- Srivastav, A. (2018). *The Science and Impact of Climate Change*. Springer publication