



Sungkyunkwan University (SKKU) International Summer Semester (ISS) 2017
"New Experience, New Engagement"

Climate Change: Science, Technology and Policy

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SHORT COURSE DESCRIPTION

The issue of climate change has been the overarching global challenge to the development of urban places since a few decades. In December 2015 a landmark agreement was reached in Paris wherein countries commit to pursue efforts to limit the temperature increase to 1.5 degrees Celsius above pre-industrial levels, recognizing that this will significantly reduce the risks and impacts of climate change. This course addresses this turning point in the global struggle to contain global warming, the science behind climate change and the role cities and technology in particular can play in achieving the important climate targets.

The course addresses the basic science of climate change, the various policy frameworks for climate change as well as key local policies and technologies to deal with climate change, i.e. adapting to climate change impacts and mitigating climate change.

Through lectures and class seminars students discuss the question of how to mitigate climate change, looking at what the different urban sectors, amongst others transport, can do to reduce emissions of greenhouse gases; in addition students discuss the vulnerability of cities and its population to climate change and different ways cities can innovate to adapt through various development and planning strategies. The course deals with climate change issues in both developed as well as developing countries.

In two seminars, and based on a fieldwork in Seoul, groups of students will present their own specific urban climate change issue and discuss state-of-the-art technology for adaptation and/or mitigation.

Ultimately the course seeks to provide students – through lectures, discussion and debate – with an overview of the most relevant and pertinent issues in climate change.

READING MATERIALS

A syllabus with both theoretical and conceptual introductions into the topic as well as relevant case-applications in scientific literature will be provided to students.

COURSE REQUIREMENTS AND GRADING

Students should at least have a general interest in the topic of climate change, urbanization and development. Teaching methods comprise of lectures, brainstorm, group work and discussion, two written issue papers presented in a seminar (with peer-to-peer review), including field visits and a guest lecture.

Students are expected to actively engage in the lessons and tasks. Grading breakdown: 30% marked issue paper urban mitigation, 10% presentation; 30% marked issue paper urban adaptation, 10% presentation; 20% contribution to brainstorms (individual hand-in) and in discussions.

SKKU regulations require students to attend at least 80% of all classes. Besides, attendance, tardiness and academic dishonesty will lead to failing the course. More specific information about grading percentages and credit procedures will be distributed prior to the first lecture.

COURSE SCHEDULE

– WEEK I –

Tuesday (27 June)

Lecture: Introduction to Climate change: Definitions, Concepts, Impacts

The lecture introduces to the basic concepts, definitions and impacts of climate change, discusses the evidence of climate change and implications for urban areas.

Preparatory reading

- UN Habitat (2011): Cities and climate change. Chapter 1: Urbanization and the Challenge of climate change. (16p.)

Assignment

Brainstorming exercise: collecting climate change impacts

Wednesday (28 June)

Lecture: Watching and Discussing the Al Gore documentary “An Inconvenient Truth”

The 2 Academy Awards winning documentary film “An Inconvenient Truth” by Davis Guggenheim about the former United States Vice President Al Gore's campaign to educate citizens about global warming is used as an input for a thorough discussion of climate change evidence, impacts and awareness.

Preparatory reading

- Quiring, S.M. (2007). Science and Hollywood: a discussion of the scientific accuracy of An Inconvenient Truth. *GeoJournal*, 70, Pages 1-3.
- Steig, E.J. (2007). Another look at An Inconvenient Truth. *GeoJournal*, 70, Pages 5-9.

Assignment

Plenary session, reflecting on details of the movie

Thursday (29 June)

Lecture: Climate Change Concepts, Policies, Frameworks

Adaptation and mitigation are the principal policies for addressing climate change. While adaptation reacts to various climate change impacts by means of spatial planning and urban design, is mitigation focusing on energy, transport, industry and housing sectors. The lecture introduces to various global to local climate change policies, in particular the outcomes of the 2015 Paris Climate Deal and recent political events (Brexit, American elections), and discusses tradeoffs, synergies or conflicts between adaptation and mitigation.

Preparatory reading

- Wilson and Piper (2010): Spatial Planning and climate change. Chapter 2 (up to 2.3): Climate change mitigation and adaptation: impacts and opportunities. (10p.)
- UNFCCC (2007): Uniting on Climate: A guide to the Climate Change Convention and the Kyoto Protocol. United Nations Framework Convention on Climate Change.

Assignment

Group assignments: Collection of mitigation/adaptation measures

Homework assignment: Analyzing / synthesizing Paris Climate Agreement (2015).

Friday (30 June)

Lecture: Climate Change Mitigation

The reduction of CO₂ emissions constitutes one of the largest challenges of the current era. This lecture discusses the different urban sectors and how they contribute to climate change, and the key technologies that can mitigate their contributions to the problem.

Preparatory reading

- Wynn Chi-Nguyen Cam (2012): Technologies for Climate Change Mitigation, GEF/UNEP.

Assignment

Group assignment: Collection of mitigation/adaptation measures

– WEEK II –

Monday (3 July)

Lecture: Transport and Climate Change: An introduction

The reduction of CO₂ emissions constitutes one of the largest challenges of the current era. Sustainable transportation can contribute to the mitigation of CO₂ emissions. This lecture introduces the role of transport and infrastructure in solving the issue of climate change rather than being the problem.

Preparatory reading

- Banister (2011). Cities, Mobility and Climate Change. *Journal of Transport Geography*, 19(6), Pages 1538-1546.

Assignment

Group assignment: listing key issues of transport induced emissions in the cities they come from (Problem Tree Analysis)

Tuesday (4 July)

Lecture: A Framework for Mitigation Transport Emissions

The Avoid-Shift-Improve (ASI) framework that is adopted by many of the international development banks for addressing transport and climate change is discussed in this lecture. Planning and policy interventions based on ASI are discussed. Fundamentals of transport systems analysis are given to give the students basic understanding of the mechanisms of urban transport systems and the possible effect of interventions therein.

Preparatory reading

- Leather, J. & CAI-Asia. (2009). Rethinking Transport and Climate Change. *Report*, Asian Development Bank. Manila, Philippines.
- Grazi and Van den Bergh (2008). Spatial organization, transport, and climate change: Comparing instruments of spatial planning and policy, *Ecological Economics*, 67(4), November 2008, Pages 630-639.
- Cuenot, Fulton and Staub (2012). The prospect for modal shifts in passenger transport worldwide and impacts on energy use and CO₂, *Energy Policy*, 41, February 2012, Pages 98-106.
- Offer, Contestabile, Howey, Clague, Brandon (2011). Techno-economic and behavioural analysis of battery electric, hydrogen fuel cell and hybrid vehicles in a future sustainable road transport system in the UK, *Energy Policy*, 39(4), April 2011, Pages 1939-1950.

Assignment

FCM group activity: Avoid – Shift – Improve (ASI) measures for Seoul, Korea

Wednesday (5 July)

Field work – Mitigation exercise

Thursday (6 July)

Guest lecture: Sustainable Transport in Korea

Public Transport and Non-Motorized Transport play an important role in mitigating CO2 emissions. This lecture introduces Korea's policies towards sustainable urban transport, with special attention to public transportation.

Preparatory reading

- Certero and Chang Deok Kang (2011). Bus rapid transit impacts on land uses and land values in Seoul, Korea. *Transport Policy*, 18, 2011, 102-116
- Kwang Sik Kim, John Dickey (2006). Role of urban governance in the process of bus system reform in Seoul, *Habitat International*, 30(4), December 2006, Pages 1035-1046

Assignment

Group assignment: data needs assessment for sustainable transport assessment for Seoul

Friday (7 July)

Climate change mitigation student seminar

– WEEK III –

Monday (10 July)

Climate change mitigation student seminar - Continued

Tuesday (11 July)

Lecture: Climate change adaptation planning

This lecture discusses measures on the local level suitable to adapt to climate change impacts. By learning from best practice examples different adaptation measures will be reviewed, and their synergies and tradeoffs with mitigation measures will be critically analyzed.

Preparatory reading

- EEA (2012). Urban adaptation to climate change in Europe. Challenges and opportunities for cities together with supportive national and European policies, European Environment Agency.

Assignment

Defining adaptation measures. Review of best practice cases.

Wednesday (12 July)

Field work – Adaptation exercise

Thursday (13 July)

Lecture: Climate change adaptation: cities and the urban poor

This lecture discusses how climate change is impacting large parts of the developing world and discusses the problems and issues associated with adaptation in the context of cities in developing countries.

Preparatory reading

- The World Bank (2012). Climate change, disaster risk, and the urban poor. Urban Development Series, No. 68358.

Assignment

Video analysis: Climate change financing

Friday (14 July)

Climate change adaptation student seminar

– WEEK IV –

Monday (17 July)

Climate change adaptation student seminar – Continued

Group discussion on how this course contributes to the ISS theme 'New experience, new engagement'.