Western University
Faculty of Engineering
Department of Civil and Environmental Engineering

CEE 9625 – Cities: Climate Change Adaptation

COURSE OUTLINE 2021-2022

DESCRIPTION

In 2014, not less than 54% of the world's population lived in urban areas compared to 30% in 1950. By 2050, close to 66% or more of the world's population will live in cities. This fast urbanization trend is mainly driven by the advantages and opportunities that cities provide to their inhabitants: more and better jobs, easier and cheaper access to health, education, sport and cultural services, better housing and transport. However, with fast urbanization, challenges are related to land availability and urban expansion, perturbations of the environment, climate change, energy demand, transport and mobility needs, natural hazards, health and aging, poverty, crime, and very often segregation and social unrest. These challenges grow increasingly and are interrelated in such a way that they constitute one of the major challenges to the near future of humanity.

In this interdisciplinary graduate level course, "city", as a complex dynamical system, will be defined and its controlling parameters will be identified. Thereafter, climate change effects on cities, inhabitants and the adaptation of cities to the climate change will be our focus.

PREREQUISITES

There is no prerequisite for this course, but it is expected that students will have basic understanding of physics and mathematics. Students without a suitable background should consult with the instructor prior to registering for the course.

ENROLLMENT RESTRICTIONS

Enrollment in this course is restricted to graduate students in civil, mechanical, or chemical engineering, physics, environmental science, geography and urbanism, as well as any student that has obtained special permission to enroll in this course from the course instructor as well as the Graduate Chair (or equivalent) from the student's home program.

INSTRUCTOR CONTACT INFORMATION

Course instructor: Professor Hassan Peerhossaini
Email address: hpeerhos@uwo.ca
Office: ACEB 4400C
Office hours: Tuesdays 4 to 5:30 pm
Administrative Support: Spencer Engineering Building, Room 3005

COURSE FORMAT

This course will be delivered in a face-to-face format.

TOPICS

Lesson #	Description	Learning Activities	Tentative timeline
1	Introduction to Subject & Evolution and Morphology of Cities	• Lecture	Week 1

		• Additional reading material	
2	Climate Change: background	• Lecture • Additional reading material	Week 2
3	Internal Forcing Mechanisms of Climate Change	• Lecture • Additional reading material	Weeks 3
4	External Forcing Mechanisms of Climate Change	• Lecture • Additional reading material	Week 4
5	Resilience: Theory	• Lecture • Additional reading material	Week 5
6	Resilience: Application	• Lecture • Additional reading material	Week 6
7	Urban Resilience	• Lecture • Additional reading material	Week 7
8	Urban Resilience: from practice to theory	• Lecture • Additional reading material	Week 8
9	Societal Concerns	• Lecture • Additional reading material	Week 9
10 &11	L 10-Urban Climate Change Adaptation: general approach L 11-Urban Climate Change Adaptation: practice	• Lecture • Additional reading material	Week 10
12 &13	L 12- System Approach to Climate Change Adaptation in Cities: basic principals L 13- System Approach to Climate Change Adaptation in Cities: practical & social aspects	• Lecture • Additional reading material	Week 11
14 & 15 & Final summary of the course	L 14- Adaptive Capacity L 15- A Case Study	• Lecture • Additional reading material	Week 12

SPECIFC LEARNING OUTCOMES

Degree Level Expectation	Weight	Assessment Tools	Outcomes
Depth and breadth of knowledge	25%	• Assignments • Project	• Understanding of advanced concepts and theories • Awareness of important current problems in the field of study
Research & scholarship	25%	• Project	• Ability to conduct critical evaluation of current advancements in the field of specialization • Ability to conduct coherent and thorough analyses of complex problems using established techniques/principles and judgment
Application of knowledge	30%	• Assignments • Project	• Ability to apply knowledge in a rational way to analyze a particular problem
Professional capacity / autonomy	10%	• Project	• Awareness of academic integrity • Ability to implement established procedures and practices in the coursework • Defends own ideas and conclusions • Integrates reflection into his/her learning process
Awareness of limits of knowledge	10%	• Project	• Awareness of the need of assumptions in complex scientific analyses and their consequences • Understanding of the difference between theoretical and empirical approaches • Ability to acknowledge analytical limitation due to complexity of practical problems

ASSESSMENTS

Assessment Type	Material Covered	Tentative Due Date	Weight
Homework Assignments	All topics	Will be posted on OWL	40%
Final Project	All Topics	Will be posted on OWL	50%
Participation	Attendance in the tutorial activities proposed by TAs	All tutorial sessions	10%

<u>Activities in which collaboration is permitted:</u>

- Final project, collaboration is permitted in the team.

<u>Activities in which students must work alone (collaboration is not permitted):</u>

- Homework

REQUIRED TEXTBOOK

There is no textbook for the course; various papers in the scientific, engineering and social science literature will be used. The course material is cumulative; therefore, you should review lectures and readings weekly - do not expect success if you only study and practice before exams.

OPTIONAL COURSE READINGS

Bruntland, G. H. 1987.
Our common future: report of the 1987
World Commission on Environment and Development. Oxford
University Press, Oxford, UK.

Cooper, J., and P. Sheets, eds. 2012.
Surviving sudden environmental change: answers from archaeology. University Press of Colorado, Boulder, Colorado, USA.

Sovacool, B. (2013).
Energy and Ethics.
New York: Palgrave Macmillan.

Ruddiman, W.F. (2014).
Earth's Climate, Past and Future, 3rd Edition.
Freeman, New York. (2ndEdition is also fine)

Maslin, Mark, 2014.
A Very Short Introduction to Climate Change 3rd Edition
Oxford University Press,
ISBN-10: 0198719043
ISBN-13: 9780198719045

Houghton, J., 2009:
Global Warming: The Complete Briefing, 4th Edition,
Cambridge University Press.

Dessler, A., 2011:
Introduction to Modern Climate Change,
Cambridge University Press.

Pain, R. (et al.) (2001).
Introducing Social Geographies.
New York: Oxford.

Northey, M., and D.B. Knight (2007).
Making Sense: A Student's Guide to Research and Writing: Geography & Environmental Sciences, 3rd edition.
Oxford University Press.

Agency, capacity, and resilience to environmental change: lessons from human development, well-being, and disasters.

Brown, K., and E. Westaway
Annual Review of Environment and Resources 36 (2011) 321-342

CHEATING, PLAGIARISM/ACADEMIC OFFENCES

Academic integrity is an essential component of learning activities. Students must have a clear understanding of the course activities in which they are expected to work alone (and what working alone implies) and the activities in which they can collaborate or seek help; see information above and ask instructor for clarification if needed. Any unauthorized forms of help-seeking or collaboration will be considered an academic offense. University policy states that cheating is an academic offence. If you are caught cheating, there will be no second warning. Students must write their essays and assignments in their own words. Whenever students take an idea or a passage of text from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence. Academic offences are taken seriously and attended by academic penalties which may include expulsion from the program. Students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence at the following website: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_grad.pdf

All required papers may be subject to submission for textual similarity review to the commercial plagiarism-detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (http://www.turnitin.com).

CONDUCT

Students are expected to follow proper etiquette to maintain an appropriate and respectful academic environment. Any student who, in the opinion of the instructor, is not appropriately participating in course activities and/or is not following the rules and responsibilities associated with the course activities, will be reported to the Associate Dean (Graduate) (after due warning has been given). On the recommendation of the Department concerned, and with the permission of the Associate Dean (Graduate), the student could be debarred from completing the assessment activities in the course as appropriate.

HEALTH/WELLNESS SERVICES

As part of a successful graduate student experience at Western, we encourage students to make their health and wellness a priority. Western provides several health and wellness related services to help you achieve optimum health and engage in healthy living while pursuing your graduate degree. Information regarding health- and wellness-related services available to students may be found at http://www.health.uwo.ca/.

Students seeking help regarding mental health concerns are advised to speak to someone they feel comfortable confiding in, such as their faculty supervisor, their program director (graduate chair), or other relevant administrators in their unit. Faculty of Engineering has a Student Wellness Counsellor. To schedule an appointment with the counsellor, contact Kristen Edwards

(khunt29@uwo.ca) via confidential email and you will be contacted by our intake office within 48 hours to schedule an appointment.

Students who are in emotional/mental distress should refer to Mental Health@Western: http://www.uwo.ca/uwocom/mentalhealth/ for a complete list of options about how to obtain help.

SICKNESS

Students should immediately consult with the Instructor (for a particular course) or Associate Chair (Graduate) (for a range of courses) if they have problems that could affect their performance. The student should seek advice from the Instructor or Associate Chair (Graduate) regarding how best to deal with the problem. Failure to notify the Instructor or the Associate Chair (Graduate) immediately (or as soon as possible thereafter) will have a negative effect on any appeal. Obtaining appropriate documentation (e.g., a note from the doctor) is valuable when asking for accommodation due to illness.

Students who are not able to meet certain academic responsibilities due to medical, compassionate or other legitimate reason(s), could request for academic consideration. The Graduate Academic Accommodation Policy and Procedure details are available at:
https://www.eng.uwo.ca/graduate/current-students/academic-support-and-accommodations/index.html

ACCESSIBLE EDUCATION WESTERN (AEW)

Western is committed to achieving barrier-free accessibility for all its members, including graduate students. As part of this commitment, Western provides a variety of services devoted to promoting, advocating, and accommodating persons with disabilities in their respective graduate program. Graduate students with disabilities (for example, chronic illnesses, mental health conditions, mobility impairments) are strongly encouraged to register with Accessible Education Western (AEW): http://academicsupport.uwo.ca/accessible_education/index.html

AEW is a confidential service designed to support graduate and undergraduate students through their academic program. With the appropriate documentation, the student will work with both AEW and their graduate programs (normally their Graduate Chair and/or Course instructor) to ensure that appropriate academic accommodations to program requirements are arranged. These accommodations include individual counselling, alternative formatted literature, accessible campus transportation, learning strategy instruction, writing exams and assistive technology instruction.