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
This course is designed for graduate students (MEng, MESc, MSc, PhD) enrolled in civil, mechanical, or chemical engineering, physics, environmental science, geography and urbanism. 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.

TOPICS

<table>
<thead>
<tr>
<th>Lesson #</th>
<th>Description</th>
<th>Learning Activities</th>
<th>Tentative timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to Subject &amp; Evolution and Morphology of Cities</td>
<td>- One recorded lecture&lt;br&gt;- Additional reading material</td>
<td>Week 1</td>
</tr>
<tr>
<td>2</td>
<td>Climate Change: background</td>
<td>- One recorded lecture&lt;br&gt;- Additional reading material</td>
<td>Week 2</td>
</tr>
<tr>
<td>3</td>
<td>Internal Forcing Mechanisms of Climate Change</td>
<td>- One recorded lecture&lt;br&gt;- Additional reading material</td>
<td>Weeks 3</td>
</tr>
<tr>
<td>4</td>
<td>External Forcing Mechanisms of Climate Change</td>
<td>- One recorded lecture</td>
<td>Week 4</td>
</tr>
<tr>
<td>Week</td>
<td>Topic</td>
<td>Additional Reading Material</td>
<td>Lecture Type</td>
</tr>
<tr>
<td>------</td>
<td>-------</td>
<td>----------------------------</td>
<td>--------------</td>
</tr>
</tbody>
</table>
| 5    | Resilience: Theory | • One recorded lecture  
• Additional reading material | One recorded lecture | Week 5 |
| 6    | Resilience: Application | • One recorded lecture  
• Additional reading material | One recorded lecture | Week 6 |
| 7    | Urban Resilience | • One recorded lecture  
• Additional reading material | One recorded lecture | Week 7 |
| 8    | Urban Resilience: from practice to theory | • One recorded lecture  
• Additional reading material | One recorded lecture | Week 8 |
| 9    | Societal Concerns | • One recorded lecture  
• Additional reading material | One recorded lecture | Week 9 |
| 10 & 11 | L 10-Urban Climate Change Adaptation: general approach  
L 11-Urban Climate Change Adaptation: practice | • One recorded lecture  
• Additional reading material | One recorded lecture | 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 | • One recorded lecture  
• Additional reading material | One recorded lecture | Week 11 |
| 14 & 15 & Final summary of the course | L 14- Adaptive Capacity  
L 15- A Case Study | • One recorded lecture  
• Additional reading material | One recorded lecture | Week 12 |

**SPECIFIC LEARNING OUTCOMES**

<table>
<thead>
<tr>
<th>Degree Level Expectation</th>
<th>Weight</th>
<th>Assessment Tools</th>
<th>Outcomes</th>
</tr>
</thead>
</table>


<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Material Covered</th>
<th>Tentative Due Date</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework Assignments</td>
<td>All topics</td>
<td>Will be posted on OWL</td>
<td>40%</td>
</tr>
<tr>
<td>Final Project</td>
<td>All Topics</td>
<td>Will be posted on OWL</td>
<td>50%</td>
</tr>
<tr>
<td>Participation (synchronous)</td>
<td>Attendance in synchronous activities proposed by TAs</td>
<td>All tutorial sessions</td>
<td>10%</td>
</tr>
</tbody>
</table>

Activities in which collaboration is permitted:
- Final project, collaboration is permitted in the team.

Activities in which students must work alone (collaboration is not permitted):
- Homeworks

CONTACT INFORMATION
Course instructor: Professor Hassan Peerhossaini
Contact policy:

• Contact instructor via email (above)
• Administrative Support: Spencer Engineering Building, Room 3005
• Weekly Office hours are held via Zoom: Thursdays 9:30 to 11:30 AM, from week 1 to 12.

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


Cooper, J., and P. Sheets, eds. 2012.

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

Earth’s Climate, Past and Future, 3rd Edition.
Freeman, New York. (2nd Edition is also fine)

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

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

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

Introducing Social Geographies.
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

COURSE CONTENT
The lecture notes and online lecture videos are copyrighted to the instructor and legally protected. Do not post these videos and lecture notes on any other website or online forums. The recording of the live/synchronous sessions of the course without the permission from the instructor is prohibited. The illegal posting and sharing of the copyrighted course content could be subjected to legal actions.

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 under “Assessments” 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 (see Western's scholastic discipline regulations for graduate students).

SYNCHRONOUS LEARNING ACTIVITIES
Students are expected to participate in synchronous learning activities as outlined in the course syllabus and/or described by the instructor. If you have issues that will impede your ability to participate in synchronous activities, please discuss with the course instructor at the beginning of the course.

CONDUCT
Students are expected to follow proper etiquette during synchronous and asynchronous activities to maintain an appropriate and respectful academic environment. Any student who, in the opinion of the instructor, is not appropriately participating in the synchronous and asynchronous learning activities and/or is not following the rules and responsibilities associated with the online learning 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
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 (remotely accessible) 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. Campus mental health resources may be found at http://www.health.uwo.ca/mental_health/resources.html
https://www.uwo.ca/health/psych/index.html

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.

ACCESSIBILITY
Please contact the course instructor if you require material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Accessible Education at 661-2111 x 82147 or http://academicsupport.uwo.ca/accessible_education/index.html, for any specific question regarding an accommodation.