UNSW SYDNEY | Australia's Global University

Built Environment

ARCH7218
Urban Climate Change - Mitigation and Adaptation in the Urban Built Environment

Course Outline – Term 1, 2020

Disclaimer

Information within this document is subject to change. The full and most accurate course outline will be available in Moodle closer to the start of the term in which the course is offered.

1. COURSE STAFF

Course Convenor	Professor Mattheos Santamouris / Co-Convener: Dr Shamila Haddad
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2. COURSE DETAILS

Credit Points	6 units of credit (uoc)
Workload	Approx. 150 hours including class contact hours, weekly individual and group online learning activities, readings, class preparation, and assessment activities.
Teaching Times and Location	Find details in timetable http://www.timetable.unsw.edu.au

Description

This course will focus on the urban climate problems and the relevant mitigation and adaptation design techniques and technologies to counterbalance the temperature increase in the urban built environment. The first part of the course, will explore the major issues around the climate of cities, will offer advanced knowledge on the interaction between the urban climate, buildings, and open spaces, and will analyze the main impact of local climate change on energy, indoor and outdoor thermal comfort, health, and economy. The second part of the course will explore, analyze, and present in detail the major mitigation and adaptation design techniques and technologies to counterbalance the urban temperature increase. It will investigate and present issues related to the appropriate use of materials in cities, new advanced and cutting edge materials for open spaces and buildings, heat dissipation and amortization technologies for buildings and open spaces based on the use of low temperature environmental sinks, smart energy and environmental management technologies for cities, Anthropogenic heat avoidance technologies and all aspects related to the proper use of urban greenery in the urban built environment. Examples from successful real case studies will be presented. Modelling techniques (i.e. ENVI-met) to simulate the thermal characteristics of cities and evaluate the impact of the main mitigation technologies will be presented, analyzed, and used by the students.

Aims

Attending this course will enable the students to understand urban climate and its impact on the built environment and also to apply advanced mitigation and adaptation techniques and technologies to design urban buildings and open spaces adapted to the urban climate and counterbalancing the local climate change.

Furthermore students will gain analytical and computational skills so as to be able to analyse the impact of urban climate change on energy, comfort, health and economy and develop proper and advanced design strategies to minimize the environmental cost of climate change in the built environment.

Course Learning Outcomes (CLOs)

At the successful completion of this course, you will be able to:

- Recognise the major climatic phenomena and mechanisms in the urban environment affecting the performance of urban buildings and open spaces
- Analyse the specific impact of the urban climate on the energy consumption of buildings, thermal comfort and the global environmental performance of the urban built environment
- Apply advanced mitigation and adaptation techniques and technologies to design and enhance the performance of urban buildings and urban structures counterbalancing the urban climate change
- Apply advanced computational methods to optimise the environmental design of urban buildings and open spaces and minimize their environmental impact

3. ASSESSMENT

Assessment task	Weight	CLOs Assessed
1. Site analysis: Students will perform an analysis of the existing condition in relation to the site and climate. Students will submit their analysis in a report format.	10%	1, 2
2. A report of field monitoring and measurement: Students will perform field measurement at UNSW campus and report their findings and results of monitoring.	30%	1, 2
3. Final submission, report and simulations outcome: A case study on the rehabilitation of urban buildings and open spaces to counterbalance the impacts of local climate change.	60%	1,2,3,4

4. COURSE IMPROVEMENT AND FEEDBACK

Feedback from students is an integral part of improving courses and teaching approaches. One of the primary mechanisms of feedback is myExperience, which we strongly urge all students to complete at the end of term. Course convenors use the feedback to make ongoing improvements to the course. This is communicated in Moodle in the myFeedback Matters page.