Course guide
210921 - TE II - Engineering Techniques II

Last modified: 14/12/2023

Unit in charge: Barcelona School of Architecture
Teaching unit: 753 - TA - Department of Architectural Technology.

Degree: MASTER'S DEGREE IN LANDSCAPE ARCHITECTURE (Syllabus 2015). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 3.0 **Languages:** Spanish, English

LECTURER

Coordinating lecturer: BLANCA ESMARAGDA ARELLANO RAMOS

Others: Primer quadrimestre:
BLANCA ESMARAGDA ARELLANO RAMOS - Grup: 2N1S

TEACHING METHODOLOGY

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LEARNING OBJECTIVES OF THE SUBJECT

The aim of the course is to provide the student the ability to carry out a landscape project with criteria of sustainability and adaptation to climate change. The project is equivalent to part of that required in a professional climate analysis and must contain a sufficient level of detail and precision. On the other hand, written documentation of a climate analysis of the landscape project will be carried out.

The course also aims to establish criteria and strategies for the adaptation of cities to climate change, at the level not only of the landscape project, but also of the importance of these green spaces or infrastructures within the different urban tissues.

The course will provide new skills that promote an integrated design approach for the implementation of adaptation to climate change in open space. The students will learn climate analysis techniques, in order to define the different micro-climates within the city and will be able to propose adaptation measures on a small and large scale.

Finally, the student must be able to develop a climate analysis of the landscape project. The student will be able to incorporate criteria that allow the enhancement and enrichment of a landscape project while respecting the environment and contributing to softening the effects of climate change and the urban heat island phenomenon.

STUDY LOAD

Type	Hours	Percentage
Self study	80,0	64.00
Hours small group	15,0	12.00
Hours large group	30,0	24.00

Total learning time: 125 h

CONTENTS

ADAPTATION TO CLIMATE CHANGE IN THE LANDSCAPE PROJECT

Description:
In a combination of theoretical classes with presentations and group work, excursions, e-learning and practical work, the following contents are developed:
•Basic scientific knowledge on climate change and urban climatology:
-Regional climate change scenarios and impacts of climate change in urban areas
-Temperature: short- and long-wave thermal radiation, air temperature, albedo, bio climatic aspects and the development of the urban heat island
-Wind: wind condition patterns and ventilation
-Water: Water cycle and flow paths

•Analysis techniques for urban climate
-The students will learn how experts analyse the urban climate. Measurement techniques, data availability and urban climatope maps are the main topics in this unit. After completing this part of the course you should be able to perform simple urban climate analysis themselves or interpret existing analysis. Examples of different climatopes will be presented on an excursion.

•Large scale implementation
-Develop a climatic analysis and the recommendation map on climate adaptation for a city.

•Small scale (landscape project) adaptation measures
-Best practices: Building materials, paints, surface sealing, shading elements, green walls, building and road orientation, vegetation, rainfall retention, evaporation, wind protection and ventilation. Examples of adaptation to climate change in public spaces will be presented through an excursion.

These contents will focus on the topics of 1. Temperature/heat, 2. Water/heavy rainfall, 3. Wind/ventilation; and the integration of these three aspects in the landscape project.

Full-or-part-time: 28h
Practical classes: 28h

GRADING SYSTEM

Continuous evaluation of the individual and group works.

Continuous assessment:
Continuous assessment will be carried out on the basis of the work to develop by the student during the course through the delivery of jobs or the realization of written or/and oral tests, according to the criteria and timetable to be established.

Final assessment:
If the results of the continuous assessment are not positive, it will be possible to perform a second evaluation which will consist in a global final test that can consist in a written or oral exam or the delivery of jobs, in accordance with the criterion of the responsible teachers.

Continuous telematic evaluation
In online teaching situations, continuous assessment will be carried out synchronously and asynchronously by the means established by the University and the School, with a periodic record of academic activity through submissions, forums, questionnaires or any other means facilitated by the Atenea platform, or the alternatives provided to the teaching staff. In the situations in which this telematic teaching is a product of face-to-face teaching that has already begun, or for questions of extra-academic order, the changes in the weightings or regular control systems of the teaching will be communicated in detail to all students by the Athena of each subject.

Telematic final evaluation
If the continuous telematic evaluation is not positive, a second evaluation can be carried out, which will consist of a final test of a global nature in telematic format that will be established in accordance with the criteria of the professor responsible and the media and ICTs provided by the University or School.

The measures for adaptation to non-classroom teaching will be implemented in accordance with the criteria of ICT security and personal data protection to ensure compliance with the legislation on Personal Data Protection (RGPD and LOPDGDD)

BIBLIOGRAPHY

Basic:
- T. R. Oke. Boundary Layer Climates. SECOND EDITION. Routledge Taylor & Francis Group, 1987. ISBN 10-0415043190.
- Ciutat i Salut. Primera Edició. Diputació de Barcelona, 2022. ISBN 978-84-19091-24-6.
- T. R. Oke, G. Mills, A. Christen, J. A. Voogt. URBAN CLIMATES. September 2017. Cambridge University Press, 2017. ISBN 9781139016476.

Complementary:
- Arellano, B.; Roca, J. & Batlle, E.. "Green areas and urban heat island: Combining remote sensed data with ground observations". International Society for Photo-Optical Instrumentation Engineers (SPIE) [on line]. Available on: http://hdl.handle.net/2117/127388.- McGregor, G. & Ren, C. . Urban Climate Science for Planning Healthy Cities. Springer, Cham, 2021. ISBN 978-3-030-87597-8.
- Lenzholzer, Sanda. Weather in the City. How Design Shapes the Urban Climate. First Edition. nai010 publishers, 2015. ISBN ISBN 978-94-6208-226-7.

RESOURCES

Hyperlink:
- Intranet docent.. http://atenea.upc.edu/moodle/

Other resources:
Go to Spanish or Catalan version.