

Course guide

290506 - ENERCIU - Energy and City

Last modified: 21/06/2023

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

Degree: MASTER'S DEGREE IN SUSTAINABLE INTERVENTION IN THE BUILT ENVIRONMENT (Syllabus 2014).
(Compulsory subject).

Academic year: 2023 **ECTS Credits:** 5.0 **Languages:** English

LECTURER

Coordinating lecturer: Pages Ramon, Anna (ES)
Palumbo Fernandez, Mariana (ENG)

Others: Cuchí Burgos, Alberto (ES)

PRIOR SKILLS

No special habilities are required

REQUIREMENTS

None

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

8. Capacity to asses and organize information related to sustainability and architecture.
9. Awareness of the impact that social demand for sustainability has in the architect's fields of action (namely design, building, city and territory) and the need for the architect's role re-definition.
10. Knowledge in the description of the material flows that determine urban metabolism as well as in understanding their relationship with urban spaces.

Generical:

4. Competence in outlining the relationship between sustainability and the urban environment on a theoretical and experimental level.
5. Ability to diagnose urban settings according to sustainability characterization.

Transversal:

6. TEAMWORK: To be able to work as a member of an interdisciplinary team, either as an associate or as a team-leader, so that projects are developed in a pragmatic and responsible manner by setting up goals fitted with the available resources.

7. SOLID USE OF INFORMATION RESOURCES: Proper management and acquisition, structuring, analysis and visualization of data and information in the specified knowledge field; capacity for critical assessment of results and conclusions.

Basic:

1. Students will gain and understand knowledge which may be further developed or applied in a research environment.
2. Students will earn skills in clear and non-ambiguous communication of their conclusions, as well as the knowledge and reasoning sustaining them, to expert and non-expert audiences.
3. Students will build a capacity for self-driven and autonomous learning that may empower them in further studies or education.

TEACHING METHODOLOGY

The face-to-face hours will consist on the one hand of lectures or conferences in which the a topic of theoretical reflection and/or applied to a case will be presented; and on the other hand of participative expository classes oriented towards problem solving and case studies, which will be organised through debates and the presentation in the classroom of exercises and work carried out individually or in small groups.

In the non-face-to-face hours, students must carry out activities aimed at assimilating, analysing, synthesising or extending the contents of the subject individually or in groups (readings, exercises and problems) and carry out, in groups, a course project consisting of an analysis of the energy metabolism associated with the habitability of a neighbourhood or case study.

LEARNING OBJECTIVES OF THE SUBJECT

At the end of the course, students should be able to understand the relationship between energy flow and the social metabolism of the city and the changes brought about at the urban level by the energy crisis and the climate change crisis.

In addition, they should also be able to:

- Be familiar with the basic energy concepts in order to understand the metabolism of today's society.
- Assess the determinant aspects from the point of view of the sustainability of an urban model in relation to its energy metabolism.
- Characterise energy consumption and greenhouse gas emissions associated with the urban expression of social metabolism.
- Analyse and prioritise strategies for improving the sustainability of the energy flow associated with the city's metabolism.

STUDY LOAD

Type	Hours	Percentage
Hours medium group	22,5	18.00
Hours large group	22,5	18.00
Self study	80,0	64.00

Total learning time: 125 h

CONTENTS

1. Energy and sustainability

Description:

The current energy model will be discussed in relation to sustainability and climate change, as well as the actions currently undertaken at a global level to mitigate its effects.

Specific objectives:

- To become familiar with energy concepts related to sustainability.
- To analyse the current energy model and understand its consequences through scientific evidence.
- To become familiar with existing policies in the global, regional and local context to mitigate the effects of climate change.

Full-or-part-time: 9h

Theory classes: 4h 30m

Practical classes: 4h 30m

2. Characterisation of the city's energy flows

Description:

The energy flows associated with the activities we carry out in the urban context will be analysed, quantified and assessed based on the information and data available from various types of sources.

Specific objectives:

- To quantify the energy associated with the construction and use of buildings.
- To quantify the energy associated with urban mobility and accessibility.
- To quantify the energy associated with food.
- To quantify the energy associated with urban services and other sectors.

Full-or-part-time: 28h 30m

Theory classes: 14h 15m

Practical classes: 14h 15m

3. Energy diagnosis of social metabolism

Description:

The implications associated with the use of energy in cities and the challenges to be faced will be discussed.

Specific objectives:

- To understand the social implications linked to access to energy (energy poverty).
- To understand and analyse the intervention strategies on the energy flow in cities that exist at different scales.

Full-or-part-time: 7h 30m

Theory classes: 3h 45m

Practical classes: 3h 45m

GRADING SYSTEM

Participation in the discussions of the face-to-face sessions (25%), the resolution of activity A1 (25%) and activity A2 (50%) will be assessed.

EXAMINATION RULES.

Grading will be based on continuous evaluation.

BIBLIOGRAPHY

Basic:

- Cuchí, A.; Pagès-Ramon, A. "Counting CO2 emissions in planning sustainable urban quarters". Babalis, Dimitra, ed. Ecopolis : conceptualising and defining sustainable design [on line]. Firenze: Alinea, 2007. p. 121-125 [Consultation: 14/10/2022]. Available on: <https://upcommons.upc.edu/handle/2117/8003>.
- Cuchí, A.; Arcas-Abella, J.; Casals-Tres, M.; Fombella, G. Building a common home : A global vision report [on line]. Barcelona: World SB14, 2014 [Consultation: 11/10/2022]. Available on: <https://gbce.es/archivos/ckfinderfiles/WSB14/global-vision-report.pdf>.
- Cuchí, A.; Mourao, J.; Pagès-Ramon, A. "A framework to take into account of CO2 restrictions on municipal urban planning". 45th ISOCARP Congress 2009. Low Carbon Cities [on line]. [Consultation: 11/10/2022]. Available on: <https://upcommons.upc.edu/handle/2117/9977>.
- Serra Florensa, Rafael; Coch Roura, Helena. Arquitectura y energía natural [on line]. Barcelona: Edicions UPC, 2001 [Consultation: 11/10/2022]. Available on: <https://upcommons.upc.edu/handle/2117/169033>. ISBN 9788498800098.
- Rueda, Salvador. Ecological urbanism : its application to the design of an eco-neighborhood in Figueres. Barcelona: Agència d'Ecologia Urbana de Barcelona, 2014. ISBN 9788461699391.
- Queralt, B. N.. Análisis de una dieta real, una saludable y una saludable y sostenible. Tesina Final de Master, 2015.
- Romero, J. C.; Linares, P.; López Otero, X. Pobreza energética en España : análisis económico y propuestas de actuación [on line]. Vigo: Economics for energy, 2014 [Consultation: 11/10/2022]. Available on: <https://www.easp.es/crisis-salud/busqueda/resultados/item/2523-pobreza-energetica-en-espana-analisis-economico-y-propuestas-de-actuacion>.
- Scudo, G.; Clementi, M. "Local productive systems planning tools for bioregional development". Cinà, G.; Dansero, E. Localizing urban food strategies : Farming cities and performing rurality. 7th International Aesop Sustainable Food Planning Conference Proceedings, Torino, 7-9 October 2015 [on line]. Torino: Politecnico di Torino, 2015. p. 526-539 [Consultation: 11/10/2022]. Available on: <https://re.public.polimi.it/retrieve/handle/11311/1140478/522794/aesop2015.pdf>.
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- Cuchí, A.; Sweatman, P. Informe GTR 2012 : un visión-país para el sector de la edificación en España : plan de acción para un nuevo sector de la vivienda [on line]. Grupo de Trabajo sobre Rehabilitación, 2012 [Consultation: 11/10/2022]. Available on: <https://upcommons.upc.edu/handle/2117/18610>. ISBN 9788461619177.
- Tirado Herrero, S.; Jiménez Meneses, L.; López Fernández, J.L.; Perero Van Hove, E.; Irigoyen Hidalgo, V. M.; Savary, P. Pobreza, vulnerabilidad y desigualdad energética : nuevos enfoques de análisis [on line]. Madrid: Asociación de Ciencias Ambientales, 2016 [Consultation: 11/10/2022]. Available on: <https://static.ecestaticos.com/file/45a/ae5/1d7/45aae51d7181a4dd96418a571b2e71ec.pdf>.
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- Olgyay, Victor. Arquitectura y clima : manual de diseño bioclimático para arquitectos y urbanistas. Barcelona: Gustavo Gili, DL 1998. ISBN 9788425214882.
- Analyses of the energy consumption of the household sector in Spain [on line]. IDAE. General Secretary, Planning and Studies Department, 2011 [Consultation: 11/10/2022]. Available on: https://ec.europa.eu/eurostat/cros/system/files/SECH_Spain.pdf.
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Complementary:

- Common Reporting Framework = Marco común de reporte del Pacto Global de Alcaldes (GCoM) [on line]. Global Covenant of Mayors for Climate and Energy, 2018 [Consultation: 11/10/2022]. Available on: <https://www.globalcovenantofmayors.org/wp-content/uploads/2019/07/ES-Original-CRF-ES-vHD-rev-EAC.pdf>.