

Course guide

2500045 - GECESOSTUR - Elements of Urban Sustainability

Last modified: 01/10/2023

Unit in charge: Barcelona School of Civil Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering.

Degree: BACHELOR'S DEGREE IN CIVIL ENGINEERING (Syllabus 2020). (Optional subject).

Academic year: 2023 **ECTS Credits:** 4.5 **Languages:** Catalan

LECTURER

Coordinating lecturer: ELISABETH ROCA BOSCH

Others: JOSEP MERCADÉ ALOY, ELISABETH ROCA BOSCH, MERCÈ TABERNA TORRES

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

14424. Knowledge of the urban management regulation framework. (Specific technology module: Urban Transport and Services)

14425. Knowledge of the influence of infrastructure in the planning of the territory and to participate in the urbanization of urban public space, such as water distribution, sanitation, waste management, transport systems, traffic, lighting, etc. (Specific technology module: Urban Transport and Services)

Generical:

14380. Scientific-technical training for the exercise of the profession of Technical Engineer of Public Works and knowledge of the functions of advice, analysis, design, calculation, project, construction, maintenance, conservation and exploitation.

14383. Ability to project, inspect and direct works, in their field.

14385. Ability to carry out territorial planning studies and environmental aspects related to infrastructure, in its field.

14386. Capacity for maintenance, conservation and exploitation of infrastructure, in its field.

14389. Knowledge of the history of civil engineering and training to analyze and assess public works in particular and construction in general.

14390. Identify, formulate and solve engineering problems. Pose and solve construction engineering problems with initiative, decision-making skills and creativity. Develop a systematic and creative method of analysis and problem solving. (Additional school competition).

TEACHING METHODOLOGY

The course consists of 2 hours per week of theoretical sessions and 1 hours weekly of workshop sessions.

The 1.5 hours are devoted to theoretical lectures, in which the teacher introduces the basic concepts and topics of the subject, and 0,5 hours for evaluation and support activities. The methodology is active and participatory.

The 1 hour weekly is devoted to solving 4 practical problems with greater interaction with the students. The objective of these practical exercises is to consolidate the general and specific learning objectives.

Support material in the form of a detailed teaching plan is provided using the virtual campus ATENEA: content, program of learning and assessment activities conducted and literature.

Although most of the sessions will be given in the language indicated, sessions supported by other occasional guest experts may be held in other languages.

LEARNING OBJECTIVES OF THE SUBJECT

Introduction to the concept of sustainable urbanism. Mechanisms and processes for the management of urban systems from sustainability. Constructive Elements of urbanization associated with a sustainable model.

1 Ability to manage urban services associated with a reading of urban ecology and the cycles of water, energy and materials, from the principles of sustainability.

Introduction to the concept of sustainable urban planning. Introduction to urban models and urban services associated with a reading of urban ecology and the cycles of water, energy and materials. Mechanisms and processes of management of urban systems from sustainability. Construction elements of urbanization associated with a sustainable model. The elements of the urbanization. Graduality and survival in the construction of networks. Referential levels of urbanization. Functionalist approach of networks versus complementarity of services. Social and environmental economic costs of the management of low-density urbanization. Processes of social segregation in access to urban infrastructures and services. Urban sustainability and criteria for a more sustainable urbanism. Environmental assessment of urban planning. Sustainability indicators. Ecobarris of reference. Introduction to the water cycle in urban systems. Technologies for reducing water consumption and water reuse in urban environments. Urban infrastructures for energy efficiency and local use of renewable energy resources. The cycle of materials and their impacts on urbanism. Technologies and systems for the collection of urban waste. Criteria for the organization of active mobility and public transport. Public space, urban landscape and green infrastructure. Noise management and air quality. Policies and forms of urban intervention and management. Concertation and participatory processes.

STUDY LOAD

Type	Hours	Percentage
Hours large group	22,5	20.00
Self study	63,0	56.00
Guided activities	4,5	4.00
Hours medium group	22,5	20.00

Total learning time: 112.5 h

CONTENTS

1. Urbanization over time

Description:

The elements of urbanization Graduality and survival in the construction of networks Reference levels of urbanization Towards a sustainable territorial vision Functionalist approach of networks versus complementarity of services

Specific objectives:

Introduce the student to an evolutionary vision of urbanization. Highlight the contradiction between a compartmentalized normative vision for each service and maximalist in the demands of each element of urbanization; and the need for complementarity between services.

Full-or-part-time: 4h 48m

Theory classes: 2h

Self study : 2h 48m

2. Urban ecology and metabolism

Description:

Approach from urban ecology to urban management. The city as an ecosystem. Urban metabolism: The consumption of energy and resources (water, soil, etc.). Environmental issues. Management strategies: The compact, complex, diverse and efficient city. The BCN Ecology Model.

Specific objectives:

Introduce the student to ecosystem thinking and the perspective of urban metabolism for urban management. Understand and apply desirable criteria in sustainable urban models.

Full-or-part-time: 4h 48m

Theory classes: 2h

Self study : 2h 48m

3. Instruments for environmental assessment of urban planning

Description:

Elements of sustainability in urban legislation Environmental assessment in urban planning The measure of sustainability and environmental indicators. Applications of indicators in urban context.

Specific objectives:

Recognize the legal instruments applicable to urban planning practice to assess their environmental impact and improve their sustainability. Learn to use indicators in the analysis of urban sustainability. .

Full-or-part-time: 4h 48m

Theory classes: 2h

Self study : 2h 48m

4. Ecocities in perspective

Description:

Concept of Eco-neighborhood Environmental, social and economic elements of an eco-neighborhood Analysis of experiences of reference eco-neighborhoods (Vauban (Freiburg)) Potentialities and Limits of eco-neighborhoods Comparison between the Vauban Eco-neighborhood and other European neighborhoods

Specific objectives:

Introduce the environmental, social and economic aspects to the concept of eco-neighborhood. Compare experiences in order to assess the degree of change towards an ecological urbanization model that an eco-neighborhood can represent.

Full-or-part-time: 4h 48m

Theory classes: 2h

Self study : 2h 48m

5. Water cycle and sustainable urbanization

Description:

Introduce the environmental, social and economic aspects to the concept of eco-neighborhood. Compare experiences in order to assess the degree of change towards an ecological urbanization model that an eco-neighborhood can represent.

Specific objectives:

Understand the water cycle and the possibility of reusing water with elements of urbanization

Full-or-part-time: 4h 48m

Practical classes: 2h

Self study : 2h 48m

6. The materials cycle: urban solid waste management

Description:

The cycle of materials and their impacts on urban planning. Principles of sufficiency, proximity and the polluter pays. Urban waste collection technologies and systems. Municipal collection and management experiences.

Specific objectives:

Understand the cycle of materials and waste management in the urban environment. Assess the urban repercussions of existing collection models.

Full-or-part-time: 4h 48m

Practical classes: 2h

Self study : 2h 48m

7. Mobility, energy and sustainable urbanization

Description:

Sustainable mobility Criteria for sustainable mobility Law of Sustainable Mobility Studies of generated mobility Assessment of energy consumption, pollution generation, noise generation Experiences of rearrangement of transport and mobility associated with public transport Experiences of rearrangement of transport associated with pedestrian axles and bicycles

Specific objectives:

Introduce the student to the analysis of the close correlation between mobility model and sustainable energy model. Introduce the student to the uses of the key indicators for evaluating the energy and mobility model.

Full-or-part-time: 4h 48m

Theory classes: 2h

Self study : 2h 48m

8. Atmospheric management: Noise planning and air quality

Description:

Noise management: Regulatory framework and acoustic planning. Sound maps and acoustic capacity. Air quality management: Regulatory framework and strategies for planning and managing air pollution. Plans to improve Air Quality in the Barcelona Metropolitan Region

Specific objectives:

Know the management strategies and planning tools for atmospheric problems such as noise and air pollution.

Full-or-part-time: 4h 48m

Theory classes: 2h

Self study : 2h 48m

9. Public spaces, landscape and green infrastructure

Description:

Quality of public spaces, uses, activities and design. Urban parks and green corridors The management and arrangement of urban beaches.

Specific objectives:

Provide the student with criteria for assessing the quality of public spaces. Be able to make proposals for the arrangement and management of public spaces.

Full-or-part-time: 4h 48m

Theory classes: 2h

Self study : 2h 48m

10. Management of the urban environment and the energy cycle

Description:

Urban infrastructures for energy efficiency and local use of renewable energy resources. The elements of urbanization and management favorable to renewable energy resources. Sustainable Energy Action Plans (SEAPs) Evaluation of the most effective actions to reduce CO2 generation.

Specific objectives:

Understand the energy cycle and the management of the implementation of renewable energy resources in the urban environment. Assess the urban repercussions of the models of the energy cycle and the actions of the Sustainable Energy Plans.

Full-or-part-time: 4h 48m

Theory classes: 2h

Self study : 2h 48m

11. Costs and management of dispersed urbanization

Description:

Causes and trends of scattered urbanization in the RMB Economic, social and environmental costs of low-density urbanization. Policies and forms of intervention and urban management.

Specific objectives:

Causes and trends of scattered urbanization in the RMB Economic, social and environmental costs of low-density urbanization. Policies and forms of intervention and urban management.

Full-or-part-time: 4h 48m

Theory classes: 2h

Self study : 2h 48m

12. Socio-territorial segregation, social equity and urbanization networks

Description:

Social segregation processes in access to infrastructure. Urban regeneration: Diversity and social stability.

Specific objectives:

Understand the processes of social segregation caused by unequal access to communication infrastructures and urban services. Provide analytical capacity to the student to assess proposals for urban regeneration that improve social inequities.

Full-or-part-time: 4h 48m

Theory classes: 2h

Self study : 2h 48m

13. Participatory processes in urban planning and management

Description:

Agendas 21 and citizen participation. The agreement and the participatory processes in the urban intervention. Participatory experiences in Catalonia.

Specific objectives:

To know the antecedents of the citizen participation in the environmental management of the city. Know and analyze participatory experiences that improve urban practice.

Full-or-part-time: 4h 48m

Theory classes: 2h

Self study : 2h 48m

Workshops

Description:

Presentation of the Practices consisting of 4 Workshops with their corresponding exercises. The student carries out a set of 4 Workshops on different elements of urbanization associated with the infrastructures of urban services and of transport and his relation with the urban territory and his management from a perspective of sustainability of the urban environment. All 4 Workshops are held in the same municipality or neighborhood (in case of analyzing an exceptionally complex municipality) to be freely chosen by the student.

Work 1: Territorial fit of the chosen field of study in relation to the infrastructure networks

Workshop 2: Graphic representation of the sanitation network in relation to the topography. Proposal for the implementation of a wastewater quality improvement system using an alternative lagoon-type system. Exercise 2.2: * Identification of a residential area likely to support a system of lacunage and graphic representation of the solution adopted in relation to the chosen residential fabric * Preparation of a brief supporting report

Workshop 3: Identification and delimitation of a sector susceptible to transformation into an environmental area of coexistence with a sustainable mobility system. Exercise 3.3: * Proposal for the transformation of the environmental area with a new system for offering sustainable mobility * Preparation of a brief explanatory report Presentation of Workshop 4: Proposal for the transformation of an element of the unique road network including elements of sustainable urbanization for the water cycle and for sustainable mobility.

Workshop 4: Proposal for the transformation of a unique road network element with the inclusion of sustainable urbanization elements for the water cycle and sustainable mobility Exercise 4.2: * Representation of the plant, cross sections and details of the current state * Representation of the plant, cross-sections and construction details of the proposed state * Preparation of a brief justification report

Specific objectives:

Plantear los 4 Talleres como oportunidad de aplicar gradualmente los conocimientos adquiridos en las clases teóricas en un contexto conocido por el alumno.

Learn to place a given field of study in a broader context from a graphical representation of synthesis capable of intentionally characterizing the territory.

Learn to analyze the urban fabric to propose projects to improve the sanitation network as instruments of urban planning.

Learn to reorganize the mobility of the city with sustainability criteria as a project tool for public space. Introduce the proposal for the transformation of an element of the road network with sustainability criteria as a construction project for the urban landscape.

Learn basic criteria for designing public space. Learn to adequately represent the proposals for the transformation of elements of the road network.

Full-or-part-time: 45h 36m

Practical classes: 19h

Self study : 26h 36m

GRADING SYSTEM

The grade for the subject is obtained from the continuous assessment grades based on classroom exercises and urban planning workshops.

Continuous assessment consist in several activities, both individually and in group, of additive and training characteristics, carried out during the year (both in and out of the classroom).

The final assessment is: 40% (deliverables of assignments carried out in class) + 50% (4 workshops) + 10% active participation in the classroom.

Criteria for re-evaluation qualification and eligibility: students that failed the ordinary evaluation and have regularly attended all evaluation tests will have the opportunity of carrying out a re-evaluation test during the period specified in the academic calendar. Students who have already passed the test or were qualified as non-attending will not be admitted to the re-evaluation test. The maximum mark for the re-evaluation exam will be five over ten (5.0). The non-attendance of a student to the re-evaluation test, in the date specified will not grant access to further re-evaluation tests. Students unable to attend any of the continuous assessment tests due to certifiable force majeure will be ensured extraordinary evaluation periods.

These tests must be authorized by the corresponding Head of Studies, at the request of the professor responsible for the course, and will be carried out within the corresponding academic period.

EXAMINATION RULES.

The final grade consists of a written test that counts 40%, four practical works + the exit that correspond to 50%, the remaining 10% will correspond to the participation and attendance in the classroom. The four practical exercises will be considered essential to pass the course. There will be a course trip to a work / neighborhood in transformation and a review must be submitted. It is a mandatory activity to pass the course. At the end of the course, there will be an extraordinary test for those who, having delivered the 4 practical exercises, have not been able to pass the course with continuous assessment.

BIBLIOGRAPHY

Basic:

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- Magrinyà, F.; Miró, J.; Herce, M. (eds.). Construcció de ciutat i xarxes d'infraestructures. 2a ed. Barcelona: Edicions UPC, 2006. ISBN 9788483018781.
- Herce, M. Lec. 11. Sobre la movilidad urbana [on line]. Barcelona: Ed. Reverté, 2009 [Consultation: 29/03/2021]. Available on: http://www.ingebook.com/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=1493. ISBN 978-84-291-2118-6.