Course guide
480081 - MUUE - Urban Metabolism and Ecological Urbanism

Last modified: 22/05/2026

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

Degree: MASTER'S DEGREE IN SUSTAINABILITY SCIENCE AND TECHNOLOGY (Syllabus 2013). (Optional subject).
MASTER'S DEGREE IN ENVIRONMENTAL ENGINEERING (Syllabus 2014). (Optional subject).

Academic year: 2026 **ECTS Credits:** 5.0 **Languages:** English

LECTURER

Coordinating lecturer: JOSEP MERCADÉ ALOY

Others: Mercadé Aloy, Josep
Roca Bosch, Elisabeth

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
2. The ability to critically analyse the features and work, business and environmental management methods and strategies of organisations, institutions and key agents for promoting sustainable human development, sustainability and environmental protection, particularly against climate change, by understanding and applying the concepts and theories of business ethics and social responsibility in the fields of engineering and scientific and technical innovation.
3. The capacity to apply the methods and tools used in the identification, information management, planning, management, execution and evaluation of programmes and projects in the fields of sustainability and environmental management to specific problems in a collaborative manner.
4. The ability to develop advanced approaches to analysing and assessing the sustainability of the built environment, including buildings, infrastructure and transport, which minimise their impact, and to choose the most appropriate options in agreement with one or more of the economic, social and environmental principles of sustainability.
5. The ability to design, develop and apply, in an integrated and coordinated manner, the theories and analytical techniques of the social, economic and Earth sciences, as well as management and research-action techniques and approaches based on sustainability science and technology in the fields of biodiversity and natural resources, the built environment and services, and production systems and information.

Transversal:
1. FOREIGN LANGUAGE: Achieving a level of spoken and written proficiency in a foreign language, preferably English, that meets the needs of the profession and the labour market.

TEACHING METHODOLOGY

The following teaching methods will be used in the development of the course:
Lecture or conference (EXP): Sharing knowledge through lectures by professors or by external guest speakers.
Problem solving and case studies (RP): group decision exercises, debates and group dynamics, with the teacher and students in the classroom; class presentation of an activity carried out individually or in small groups.
Tutorials of practical or theoretical works (TD): to perform an activity in the classroom, or a theoretical or practical exercise, individually or in small groups, with the advice of the teacher.
Carry out a project, activity or work of reduced scope (PR): to carry out, individually or in a group, of a homework assignment of reduced complexity or scope, applying knowledge and presenting results.
Evaluation Activities (EV).

Training activites:

The following training activities will be used in the development of the course:

Face-to-face
Theoretical classes and conferences (CTC): knowledge, understanding and synthesis of contents presented by the lecturer (professor) or by guest speakers.
Practical classes (CP): participation in group exercises, as well as discussions and group dynamics, with the teacher and other students in the classroom.
Theoretical/practical work tutorials (TD): carry out in the class an activity or exercise, theoretical or practical in nature, individually or in small groups, with the advice of the professor.

Remote
Carry out a project, activity or work of reduced scope (PR): to carry out, individually or in a group, of a homework assignment of reduced complexity or scope, applying knowledge and presenting results.
Autonomous study (EA): study or development of the subject individually or in groups, understanding, assimilating, analysing and synthesising knowledge.

LEARNING OBJECTIVES OF THE SUBJECT

-To know and understand the relationships between urban planning as a social instrument and urban metabolism.
-To know and understand the relationship between city and territory from an ecological perspective.
-To design and apply methods to evaluate sustainability in the built environment and services by identifying parameters and using multicriteria decision-making.
-Ability to critically analyze the sustainability of transformations associated with the built environment and services.
-Ability to work in multidisciplinary teams, oriented towards the characterization and evaluation of specific urban contexts, as well as the establishment of strategies from a sustainability perspective.

STUDY LOAD

Type	Hours	Percentage
Hours small group	6,7	5.36
Hours large group	20,0	15.99
Self study	88,4	70.66
Hours medium group	10,0	7.99

Total learning time: 125.1 h

CONTENTS

1. URBAN ECOLOGY CONCEPTS AND ECOLOGICAL URBAN PLANNING . URBAN METABOLISM AND FLOWS

Description:
1.1 . Concepts of urban ecology, landscape urbanism

Specific objectives:
Develop advanced approaches capable of analyzing and assessing the sustainability of the built environment , including buildings , infrastructure , transport, etc. . , so that you can minimize the impact and decide the alternatives most appropriate according to the pillars of sustainability (three - economic , social and environmental - or one / some of them) .

Related activities:
Module Concepts urban ecology and ecological urban planning

2. ECOLOGICAL URBAN PLANNING AND MANAGEMENT (I): URBAN PLANNING AND SUSTAINABILITY .

Description:
2.1. Elements of sustainability in planning legislation
2.2 . Environmental Assessment in urban planning
2.3 . Application to urban plans
2.4 . Guidelines for reporting of sustainability for urban partial plans

Specific objectives:
Design, develop , and implement integrated and coordinated concepts, theories and techniques of analysis of social , economic, earth science , and management techniques and research - action and science-based approaches and technologies sustainability in the areas of Biodiversity and Natural Resources, the Built Environment and Services, and Production System and Info .

Related activities:
Ecological planning and management module.

3. ECOLOGICAL PLANNING AND MANAGEMENT (II): COMPACT CITY , COMPLEX AND DIVERSE . A VIEW FROM URBAN INDICATORS

Description:
3.1 . The BCN Ecologia Model
3.2 . Applications to Barrio de Gracia and Seville
3.3 . Measuring sustainable city from the available indicators

Specific objectives:
Design, develop , and implement integrated and coordinated concepts, theories and techniques of analysis of social , economic, earth science , and management techniques and research - action and science-based approaches and technologies sustainability in the areas of Biodiversity and Natural Resources, the Built Environment and Services, and Production System and Info .

Related activities:
Ecological planning and management module.

4. ECOLOGICAL PLANNING AND MANAGEMENT (III): THE SOCIAL SUSTAINABILITY , ENVIRONMENTAL AND ECONOMIC PLANNING FROM ECOLOGICAL

Description:
4.1.Urban mix and social equity
4.2.The network access urbanization and social inequality
4.3 .The right to the city of services : transport, electricity, water, urban waste
4.4.Infraestructures and economic costs associated with processes of social segregation

Specific objectives:
Design, develop , and implement integrated and coordinated concepts, theories and techniques of analysis of social , economic, earth science , and management techniques and research - action and science-based approaches and technologies sustainability in the areas of Biodiversity and Natural Resources, the Built Environment and Services, and Production System and Information.

Related activities:
Ecological urban planning and urban management Module.

5. ECOLOGICAL URBAN PLANNING AND EVOLUTION (I) ELEMENTS OF URBANISATION AND SUSTAINABILITY

Description:
5.1. Low density urbanization and sustainability
5.2.Assesment of development costs for different urban services
5.3.Assesment costs of urbanization and its impact on housing densities as
5.4.Environmental maintenance costs and fonctions conditions of networks for a design of low-density developments
5.5 Planning and urban design with sustainable regulations

Specific objectives:
Develop advanced approaches capable of analyzing and assessing the sustainability of the built environment , including buildings , infrastructure , transport, etc. . , So that you can minimize the impact and decide the alternatives most appropriate according to the pillars of sustainability (economic , social and environmental).

Related activities:
Ecological urban planning and evolution Module

6. ECOLOGICAL URBAN PLANNING AND EVOLUTION (II): ECOCITIES AND ECOVILLAGES IN PERSPECTIVE

Description:
6.1.Eco-neighborhouds ecovillages and instruments of urban transformation towards ecological urban planning
6.2 . Ratings concerning Vauban (eco-neighborhoud) and Lakabe (eco-village)
6.3 . Comparison between eco-neighborhoud Vallbona and eco-village Can Masdeu
6.4 . Potential and limits of eco-neighborhoud and eco-villages

Specific objectives:
Develop advanced approaches capable of analyzing and assessing the sustainability of the built environment , including buildings , infrastructure , transport, etc. . , So that you can minimize the impact and decide the alternatives most appropriate according to the pillars of sustainability (three - economic , social and environmental - or one / some of them).

Related activities:
Ecological urban planning and evolution Module

7. URBAN ECOLOGICAL AND DEVELOPMENTAL READING (III): URBAN ECOLOGY AND URBAN RESILIENCE:

Description:
7.1 . Agenda 21 and participatory processes in sustainable urbanization
7.2 . From Sustainability to urban resilience
7.3 . Crisis scenarios and urban resilience
7.4 . Transition Towns and instruments
7.5 . Comparison of urban dynamics in empty public spaces
7.6 . Sustainability and resilience in the case of Gracia (Barcelona)

Specific objectives:
Develop advanced approaches capable of analyzing and assessing the sustainability of the built environment , including buildings , infrastructure , transport, etc. . , So that you can minimize the impact and decide the alternatives most appropriate according to the pillars of sustainability (three - economic , social and environmental - or one / some of them).

Related activities:
Ecological urban planning and evolution Module

8. URBAN METABOLISM (I): CYCLE ENERGY AND MOBILITY IN SUSTAINABLE DEVELOPMENT

Description:
8.1.The concept of sustainable mobility
8.2.Experiencies rearrangement of transport associated to the axes of public transport and bicycles (Curitiba (public transport) and Copenhagen (Bicycle))
8.3.Criterias for sustainable mobility
8.4.Law of Sustainable Mobility
8.5.Research on sustainable mobility
8.6.Assesment of energy consumption
8.7.Experiences transforming urban systems associated with mobility and energy

Specific objectives:
Develop advanced approaches capable of analyzing and assessing the sustainability of the built environment , including buildings , infrastructure , transport, etc. . , So that you can minimize the impact and decide the alternatives most appropriate according to the pillars of sustainability (three - economic , social and environmental - or one / some of them).

Related activities:
Urban metabolism Module

9. URBAN METABOLISM (II): WATER CYCLE AND SUSTAINABLE DEVELOPMENT

Description:
9.1 . Flood zones management
9.2 . Water supply and demand from the resource savings
9.3 . Alternative Sanitation and Drainage and Wetlands

Specific objectives:
Develop advanced approaches capable of analyzing and assessing the sustainability of the built environment , including buildings , infrastructure , transport, etc. . , So that you can minimize the impact and decide the alternatives most appropriate according to the pillars of sustainability (three - economic , social and environmental - or one / some of them).

Related activities:
Urban metabolism Module

10. URBAN METABOLISM (III): CYCLE OF URBAN WASTE AND SUSTAINABLE DEVELOPMENT

Description:
10.1 . Various technologies for waste collection
10.2.Municipal eperiences of urban waste collection and balance

Specific objectives:
Develop advanced approaches capable of analyzing and assessing the sustainability of the built environment , including buildings , infrastructure , transport, etc. . , So that you can minimize the impact and decide the alternatives most appropriate according to the pillars of sustainability (three - economic , social and environmental - or one / some of them).

Related activities:
Urban metabolism Module

11. ECOLOGICAL PLANNING AND ELEMENTS OF NATURAL SYSTEMS (I): PARKS AND PUBLIC SPACES AS INSTRUMENTS OF RELATIONSHIP BETWEEN URBAN AND NATURAL SYSTEMS

Description:
11.1.The urbanization: the element who link public space and built
11.2. Quality of urbanization
11.3. Quality of individual space
11.4. Quality of public spaces
11.5. Stay Spaces and relationships spaces
11.6. Relationships with mobility and design of public space

Specific objectives:
Design, develop , and implement integrated and coordinated concepts, theories and techniques of analysis of social , economic, earth science , and management techniques and research - action and science-based approaches and technologies sustainability in the areas of Biodiversity and Natural Resources, the Built Environment and Services, and Production System and Info.

Related activities:
Urban ecological systems and natural elements Module

12. ECOLOGICAL URBAN PLANNING AND ELEMENTS OF NATURAL SYSTEMS (II): BIOENGINEERING AND BIOARCHITECTURE

Description:
12.1 . Concepts of bioengineering and bio-architecture
12.2 . Bioengineering : Technical functions , ecological, aesthetic and scope
12.3 . Bioengineering : Slope stabilization and erosion control . Retaining structures
12.4 . Bioengineering : fluvial dynamics and environmental restoration
12.5 . Bioarchitecture. 1st approximation . The metabolism of the building and eco-efficiency
12.6 . Bioarchitecture. Organic vs mechanical
12.7 . Bioarchitecture. Inspiration from the principles of nature. Biomimetisme
12.8 . Bioarchitecture . Zoomorphism . The formal analogy

Specific objectives:
Design, develop , and implement integrated and coordinated concepts, theories and techniques of analysis of social , economic, earth science , and management techniques and research - action and science-based approaches and technologies sustainability in the areas of Biodiversity and Natural Resources, the Built Environment and Services, and Production System and Info.

Related activities:
Urban ecological systems and natural elements Module

ACTIVITIES

A1. PRESENTATION OF URBAN ECOLOGY AND ECOLOGICAL URBAN PLANNING CONCEPTS. URBAN METABOLISM AND FLOWS

Description:
1.1. Urban Ecology and Ecological Urban Planning Concepts
References
NIEMELÄ, J. (1999). "Ecology and urban planning". Biodiversity and Conservation 8: 119-131.
NIEMELÄ, J. (1999). "Is there a need for a theory of urban ecology?", Urban Ecosystems, 3, 57¿65.
MCINTYRE, N. E.; KNOWLES-YANEZ, K.; HOPE, D. (2000), "Urban ecology as an interdisciplinary field: differences in the use of "urban" between the social and natural sciences", Urban Ecosystems, 4, 5¿24.
URBAN, Dean L.; O'NEILL, Robert V.; SHUGART, Jr, Herman H. (1997), "Landscape Ecology. A hierarchical perspective can help scientists understand spatial patterns", BioScience, Vol. 37 (2), 119-127.

Specific objectives:
Develop advanced approaches capable of analyzing and assessing the sustainability of the built environment , including buildings , infrastructure , transport, etc. . , So that you can minimize the impact and decide the alternatives most appropriate according to the pillars of sustainability (three - economic , social and environmental - or one / some of them).

Delivery:
Lecture and text report.

A2. PRESENTACIÓN DE ECOLOGICAL URBAN PLANNING AND MANAGEMENT (I): URBAN PLANNING AND SUSTAINABILITY

Description:
2.1. Elements of sustainability in planning legislation
2.2 . Environmental Assessment in urban planning
2.3 . Application to urban plans
2.4 . Guidelines for reporting of sustainability for urban partial plans
Material
GENERALITAT de CATALUNYA, POUM. Avaluació ambiental en el planejament urbanístic, Generalitat de Cataluna. Dep. Medi Ambient, 2006.

Specific objectives:
Design, develop , and implement integrated and coordinated concepts, theories and techniques of analysis of social , economic, earth science , and management techniques and research - action and science-based approaches and technologies sustainability in the areas of Biodiversity and Natural Resources, the Built Environment and Services, and Production System and Information.

Delivery:
Lecture and text report.

A3. EVALUATION OF URBAN PLANNING AND SUSTAINABILITY

Description:
1. Environmental Assessment in urban planning
2. Application to urban plans

Specific objectives:
Design, develop , and implement integrated and coordinated concepts, theories and techniques of analysis of social , economic, earth science , and management techniques and research - action and science-based approaches and technologies sustainability in the areas of Biodiversity and Natural Resources, the Built Environment and Services, and Production System and Information.

Material:
GENERALITAT de CATALUNYA, POUM. Avaluació ambiental en el planejament urbanístic, Generalitat de Cataluna. Dep. Medi Ambient, 2006.

Delivery:
Ecological planning and management module.

A4. PRESENTATION OF ECOLOGICAL PLANNING AND MANAGEMENT (II): COMPACT CITY, COMPLEX AND DIVERSE. A VIEW FORM URBAN INDICATORS

Description:
3.1 . The BCN Ecologia Model
3.2 . Applications to Barrio de Gracia and Seville
3.3 . Measuring sustainable city from the available indicators

Specific objectives:
Design, develop , and implement integrated and coordinated concepts, theories and techniques of analysis of social , economic, earth science , and management techniques and research - action and science-based approaches and technologies sustainability in the areas of Biodiversity and Natural Resources, the Built Environment and Services, and Production System and Info.

Material:
RUEDA, Salvador. (2002) Barcelona, ciutat mediterrània, compacta i complexa : una visió de futur més sostenible. Barcelona: Ajuntament de Barcelona ; Agència d'Ecologia Urbana. 87 p.
AYUNTAMIENTO DE SEVILLA & AGENCIA DE ECOLOGIA URBANA DE BARCELONA (2007), Plan Especial de Indicadores de Sostenibilidad Ambiental de la Actividad Urbanística de Sevilla
http://www.sevilla.org/urbanismo/plan_indicadores/0-Indice.pdf
AYUNTAMIENTO DE VITORIA-GASTEIZ & AGENCIA DE ECOLOGIA URBANA DE BARCELONA (2009), Plan de Indicadores de Sostenibilidad Urbana de Vitoria-Gasteiz,
http://www.vitoria-gasteiz.org/wb021/http/contenidosEstaticos/adjuntos/es/89/14/38914.pdf
MINISTERIO DE MEDIO AMBIENTE Y MEDIO RURAL Y MARINO & AGENCIA DE ECOLOGIA URBANA DE BARCELONA (2010). Sistema de indicadores y condicionantes para ciudades grandes y medianas, Barcelona.
http://www.ecourbano.es/imag/pdf/INDICADORES%20CIUDADES%20GRANDES%20Y%20MEDIANAS.pdf

Delivery:
Lecture and text report

A5. EVALUATION OF COMPACT CITY, COMPLEX AND DIVERSE. A VIEW FROM URBAN INDICATORS

Description:
1. Measuring sustainable city from the available indicators

Specific objectives:
Design, develop , and implement integrated and coordinated concepts, theories and techniques of analysis of social , economic, earth science , and management techniques and research - action and science-based approaches and technologies sustainability in the areas of Biodiversity and Natural Resources, the Built Environment and Services, and Production System and Info.

Material:
RUEDA, Salvador. (2002) Barcelona, ciutat mediterrània, compacta i complexa : una visió de futur més sostenible. Barcelona: Ajuntament de Barcelona ; Agència d'Ecologia Urbana. 87 p.
AYUNTAMIENTO DE SEVILLA & AGENCIA DE ECOLOGIA URBANA DE BARCELONA (2007), Plan Especial de Indicadores de Sostenibilidad Ambiental de la Actividad Urbanística de Sevilla
http://www.sevilla.org/urbanismo/plan_indicadores/0-Indice.pdf
AYUNTAMIENTO DE VITORIA-GASTEIZ & AGENCIA DE ECOLOGIA URBANA DE BARCELONA (2009), Plan de Indicadores de Sostenibilidad Urbana de Vitoria-Gasteiz,
http://www.vitoria-gasteiz.org/wb021/http/contenidosEstaticos/adjuntos/es/89/14/38914.pdf
MINISTERIO DE MEDIO AMBIENTE Y MEDIO RURAL Y MARINO & AGENCIA DE ECOLOGIA URBANA DE BARCELONA (2010). Sistema de indicadores y condicionantes para ciudades grandes y medianas, Barcelona.
http://www.ecourbano.es/imag/pdf/INDICADORES%20CIUDADES%20GRANDES%20Y%20MEDIANAS.pdf

Delivery:
Ecological planning and management module.

A6. PRESENTATION OF ECOLOGICAL PLANNING AND MANAGEMENT (III): THE SOCIAL SUSTAINABILITY , ENVIRONMENTAL AND ECONOMIC PLANNING FROM ECOLOGICAL

Description:
4.1.Urban mix and social equity
4.2.The network access urbanization and social inequality
4.3. The right to the city of services : transport, electricity, water, urban waste
4.4. Infraestructures and economic costs associated with processes of social segregation

Specific objectives:
Design, develop , and implement integrated and coordinated concepts, theories and techniques of analysis of social , economic, earth science , and management techniques and research - action and science-based approaches and technologies sustainability in the areas of Biodiversity and Natural Resources, the Built Environment and Services, and Production System and Information .

Material:
CAMPBELL, Scott (1996), Green Cities, Growing Cities, Just Cities? Urban Planning and the Contradictions of Sustainable Development, Journal of the American Planning Association, Vol 62 (3) 296-312, DOI: 10.1080/01944369608975696
http://www-personal.umich.edu/~sdcamp/Ecoeco/Greencities.html
COUTARD, O., DUPUY, G., and FOL, S. (2004), Mobility of the Poor in Two European Metropolises: Car Dependence versus Locality Dependence, Built Environment, Vol 30(2),138-145.
HERCE, Manuel (2004), Barcelona: Accessibility Changes and Metropolitan Transformations. Built Environment, Vol. 30(2), 127-137
ATKINSON, R. (2000), Measuring gentrifi cation and displacement in Greater London. Urban Studies,Vol. 37(1).

Delivery:
Lecture and text report

A7. EVALUATION OF SOCIAL, ECONOMIC AND ENVIRONMENTAL SUSTAINABILITY FROM ECOLOGICAL URBANISM

Description:
1. Mixed urban and social equity
2. Infrastructures and economic costs associated with processes of social segregation

Specific objectives:
Design, develop , and implement integrated and coordinated concepts, theories and techniques of analysis of social , economic, earth science , and management techniques and research - action and science-based approaches and technologies sustainability in the areas of Biodiversity and Natural Resources, the Built Environment and Services, and Production System and Information.

Material:
CAMPBELL, Scott (1996), Green Cities, Growing Cities, Just Cities? Urban Planning and the Contradictions of Sustainable Development, Journal of the American Planning Association, Vol 62 (3) 296-312, DOI: 10.1080/01944369608975696
http://www-personal.umich.edu/~sdcamp/Ecoeco/Greencities.html
COUTARD, O., DUPUY, G., and FOL, S. (2004), Mobility of the Poor in Two European Metropolises: Car Dependence versus Locality Dependence, Built Environment, Vol 30(2),138-145.
HERCE, Manuel (2004), Barcelona: Accessibility Changes and Metropolitan Transformations. Built Environment, Vol. 30(2), 127-137
ATKINSON, R. (2000), Measuring gentrifi cation and displacement in Greater London. Urban Studies,Vol. 37(1).

Delivery:
Lecture and text report

A8. PRESENTATION OF ECOLOGICAL URBAN PLANNING AND EVOLUTION (I) ELEMENTS OF URBANIZATION AND SUSTAINABILITY

Description:
5.1. Low density urbanization and sustainability
5.2. Assesment of development costs for different urban services
5.3. Assesment costs of urbanization and its impact on housing densities as
5.4. Environmental maintenance costs and fonctions conditions of networks for a design of low-density developments
5.5 Planning and urban design with sustainable regulations.

Specific objectives:
Develop advanced approaches capable of analyzing and assessing the sustainability of the built environment , including buildings , infrastructure , transport, etc. . , So that you can minimize the impact and decide the alternatives most appropriate according to the pillars of sustainability (economic , social and environmental).
Ecological urban planning and evolution Module

Material:
HERCE, M., MAGRINYÀ, F. & MIRO, J., L'espai Urbà de la mobilitat, Edicions UPC 2007. ISBN: 8483019175
MAGRINYÀ, F. & HERCE, M. (2007), "Los costes ambientales de la ciudad de baja densidad", In: INDOVINA, F., La ciudad de baja densidad: lógicas, gestión y contención, Barcelona, Diputación de Barcelona, 2007, pp.243-264.
HERNANDEZ AJA, Agustín, "Calidad de vida y medio ambiente urbano. Indicadores locales de sostenibilidad y calidad de vida urbana", Revista INVI, Vol. 24, Núm. 65, mayo-sin mes, 2009, pp. 79-111, Universidad de Chile, Chile, ISSN: 0718-8358

Delivery:
Lecture and text report

A9. EVALUATION OF URBANIZATION AND SUSTAINABILITY ELEMENTS

Description:
1.Low-density development and sustainability
2. Maintenance costs and environmental constraints of the network operation
for the design of low-density developments

Specific objectives:
Develop advanced approaches capable of analyzing and assessing the sustainability of the built environment, including buildings, infrastructure , transport, etc. . , So that you can minimize the impact and decide the alternatives most appropriate according to the pillars of sustainability (economic , social and environmental).

Material:
HERCE, M., MAGRINYÀ, F. & MIRO, J., L'espai Urbà de la mobilitat, Edicions UPC 2007. ISBN: 8483019175
MAGRINYÀ, F. & HERCE, M. (2007), "Los costes ambientales de la ciudad de baja densidad", In: INDOVINA, F., La ciudad de baja densidad: lógicas, gestión y contención, Barcelona, Diputación de Barcelona, 2007, pp.243-264.
HERNANDEZ AJA, Agustín, "Calidad de vida y medio ambiente urbano. Indicadores locales de sostenibilidad y calidad de vida urbana", Revista INVI, Vol. 24, Núm. 65, mayo-sin mes, 2009, pp. 79-111, Universidad de Chile, Chile, ISSN: 0718-8358

Delivery:
Ecological urban planning and evolution module

A10. PRESENTATION OF ECOLOGICAL URBAN PLANNING AND EVOLUTION (II) : ECOCITIES AND ECOVILLAGES IN PERSPECTIVE

Description:
6.1.Eco-neighborhouds ecovillages and instruments of urban transformation towards ecological urban planning
6.2 . Ratings concerning Vauban (eco-neighborhoud) and Lakabe (eco-village)
6.3 . Comparison between eco-neighborhoud Vallbona and eco-village Can Masdeu
6.4 . Potential and limits of eco-neighborhoud and eco-villages

Specific objectives:
Develop advanced approaches capable of analyzing and assessing the sustainability of the built environment, including buildings, infrastructure, transport, etc. . , So that you can minimize the impact and decide the alternatives most appropriate according to the pillars of sustainability (economic , social and environmental).

Material:
MORÁN, N. (2002) Glosario de sostenibilidad: Ecobarrios. Biblioteca CF+S CIUADES POR UN FUTURO MAS SOSTENIBLE. http://www.cceimfundacionucm.org/Temas-clave/Ciudades/Documentos-relacionados/Ecobarrios2/Glosario-de-sostenibilidad-Ecobarrios
ESCORIHUELA, José Luís, Ecoaldeas y Comunidades Sostenibles, http://www.selba.org

Delivery:
Lecture and text report

A11. PRESENTATION OF ECOCITIES AND ECOVILLAGES IN PERSPECTIVE

Description:
1.Eco-neighborhouds and ecovillages: instruments of urban transformation towards urbanism
ecological
2. Evaluation of the leaders of the local environment
3. Eco-neighborhouds and ecovillages potentials and limits

Specific objectives:
Develop advanced approaches capable of analyzing and assessing the sustainability of the built environment, including buildings, infrastructure, transport, etc. . , So that you can minimize the impact and decide the alternatives most appropriate according to the pillars of sustainability (economic, social and environmental).

Material:
MORÁN, N. (2002) Glosario de sostenibilidad: Ecobarrios. Biblioteca CF+S CIUADES POR UN FUTURO MAS SOSTENIBLE.

Delivery:
Ecological urban planning and evolution module

A12. PRESENTATION OF URBAN ECOLOGICAL AND DEVELOPMENTAL READING (III): URBAN ECOLOGY AND URBAN RESILIENCE

Description:
7.1 . Agenda 21 and participatory processes in sustainable urbanization
7.2 . From Sustainability to urban resilience
7.3 . Crisis scenarios and urban resilience
7.4 . Transition Towns and instruments
7.5 . Comparison of urban dynamics in empty public spaces
7.6 . Sustainability and resilience in the case of Gracia (Barcelona)

Specific objectives:
Develop advanced approaches capable of analyzing and assessing the sustainability of the built environment, including buildings, infrastructure, transport, etc. . , So that you can minimize the impact and decide the alternatives most appropriate according to the pillars of sustainability (three - economic, social and environmental - or one / some of them).

Material:
Lectrure and text report

A13. EVALUATION OF URBAN RESILIENCE AND URBAN ECOLOGY

Description:
1. Agenda 21 and participatory processes in sustainable urbanization.
2. Comparison of urban dynamics in empty public spaces.
3. Sustainability and resilience in case study.

Specific objectives:
Develop advanced approaches capable of analyzing and assessing the sustainability of the built environment , including buildings , infrastructure , transport, etc. . , So that you can minimize the impact and decide the alternatives most appropriate according to the pillars of sustainability (three - economic , social and environmental - or one / some of them) .

Material:
Urban ecology and developmental reading.

A14. PRESENTATION OF URBAN METABOLISM (I): CYCLE ENERGY AND MOBILITY IN SUSTAINABLE DEVELOPMENT

Description:
8.1.The concept of sustainable mobility
8.2.Experiencies rearrangement of transport associated to the axes of public transport and bicycles (Curitiba (public transport) and Copenhagen (Bicycle))
8.3.Criterias for sustainable mobility
8.4.Law of Sustainable Mobility
8.5.Research on sustainable mobility
8.6.Assesment of energy consumption
8.7.Experiences transforming urban systems associated with mobility and energy

Specific objectives:
Develop advanced approaches capable of analyzing and assessing the sustainability of the built environment , including buildings , infrastructure , transport, etc. . , So that you can minimize the impact and decide the alternatives most appropriate according to the pillars of sustainability (three - economic , social and environmental - or one / some of them).

Material:
MAGRINYÀ, F. (2008), Mobilité durable et qualité urbaine: les quartiers de Gracia, Poblenou et El Prat de Llobregat (Barcelone), URBIA, Les cahiers du développement urbain durable, nº7, pp.43-65. ISSN: 1661-3708

Delivery:
Lecture and text report

A15. EVALUATION OF MOBILITY AND ENERGY AND SUSTAINABLE URBANIZATION

Description:
1. The concept of sustainable mobility in the town under study.
2. Criteria for sustainable mobility in the town under study.
3. Experiences transforming urban systems associated with mobiliy and energy.

Specific objectives:
Develop advanced approaches capable of analyzing and assessing the sustainability of the built environment , including buildings , infrastructure , transport, etc. . , So that you can minimize the impact and decide the alternatives most appropriate according to the pillars of sustainability (three - economic , social and environmental - or one / some of them).

Material:
MAGRINYÀ, F. (2008), Mobilité durable et qualité urbaine: les quartiers de Gracia, Poblenou et El Prat de Llobregat (Barcelone), URBIA, Les cahiers du développement urbain durable, nº7, pp.43-65. ISSN: 1661-3708

Delivery:
Urban metabolism module

A16. PRESENTATION OF URBAN METABOLISM (II): WATER CYCLE AND SUSTAINABLE DEVELOPMENT

Description:
9.1 . Flood zones management
9.2 . Water supply and demand from the resource savings
9.3 . Alternative Sanitation and Drainage and Wetlands

Specific objectives:
Develop advanced approaches capable of analyzing and assessing the sustainability of the built environment, including buildings, infrastructure, transport, etc. . , So that you can minimize the impact and decide the alternatives most appropriate according to the pillars of sustainability (three - economic, social and environmental - or one / some of them).

Material:
GARCIA, J. & CORZO, A., Depuración con Humedales Construidos. Guía Práctica de Diseño, Construcción y Explotación de Sistemas de Humedales de Flujo Subsuperficial, 99p. ISBN: 84-7283-672-X
http://upcommons.upc.edu/e-prints/bitstream/2117/2474/1/JGarcia_and_ACorzo.pdf
HERCE, M., Infraestructuras y Medio Ambiente, Ediciones UOC, 2010

Delivery:
Lecture and text report.

A17. EVALUATION OF WATER CYCLE AND SUSTAINABLE DEVELOPMENT

Description:
1. Water supply and demand from the resource saving in the town under the study.
2. Alternative sanitation and drainage and wetland in the town under the study.

Specific objectives:
Develop advanced approaches capable of analyzing and assessing the sustainability of the built environment , including buildings , infrastructure , transport, etc. . , So that you can minimize the impact and decide the alternatives most appropriate according to the pillars of sustainability (three - economic , social and environmental - or one / some of them).

Material:
GARCIA, J. & CORZO, A., Depuración con Humedales Construidos. Guía Práctica de Diseño, Construcción y Explotación de Sistemas de Humedales de Flujo Subsuperficial, 99p. ISBN: 84-7283-672-X
http://upcommons.upc.edu/e-prints/bitstream/2117/2474/1/JGarcia_and_ACorzo.pdf
HERCE, M., Infraestructuras y Medio Ambiente, Ediciones UOC, 2010

Delivery:
Urban metabolism module

A18. PRESENTATION OF URBAN METABOLISM (III): CYCLE OF URBAN WASTE AND SUSTAINABLE URBANIZATION

Description:
10.1 Variuos technologies for waste collection
10.2 Municipal experiences of urban waste collection and balance

Specific objectives:
Develop advanced approaches capable of analyzing and assessing the sustainability of the built environment , including buildings , infrastructure , transport, etc. . , So that you can minimize the impact and decide the alternatives most appropriate according to the pillars of sustainability (three - economic , social and environmental - or one / some of them).

Material:
LLOPIS, ARROYO, José (2011), Tipología de sistemas de recogida de residuos sólidos municipales en Europa según niveles de desarrollo, Tesis de Master de Sostenibilitat, Director: MAGRINYÀ, Francesc, UPC, Junio 2011.
http://hdl.handle.net/2099.1/13618

Delivery:
Lecture and text report

A19. EVALUATION OF URBAN WASTE AND SUSTAINABLE DEVELOPMENT

Description:
1. Various technologies for waste collection
2. Municipal experiences of urban wate collection and balance

Specific objectives:
Develop advanced approaches capable of analyzing and assessing the sustainability of the built environment , including buildings , infrastructure , transport, etc. . , So that you can minimize the impact and decide the alternatives most appropriate according to the pillars of sustainability (three - economic , social and environmental - or one / some of them).

Material:
LLOPIS, ARROYO, José (2011), Tipología de sistemas de recogida de residuos sólidos municipales en Europa según niveles de desarrollo, Tesis de Master de Sostenibilitat, Director: MAGRINYÀ, Francesc, UPC, Junio 2011.
http://hdl.handle.net/2099.1/13618

Delivery:
Urban metabolism module

A20. PRESENTATION OF ECOLOGICAL PLANNING AND ELEMENTS OF NATURAL SYSTEMS (I): PARKS AND PUBLIC SPACES AS INSTRUMENTS OF RELATIONSHIP BETWEEN URBAN AND NATURAL SYSTEMS

Description:
11.1.The urbanization: the element who link public space and built
11.2.Quality of urbanization
11.3.Quality of individual space
11.4.Quality of public spaces
11.5 . Stay Spaces and relationships spaces
11.6 . Relationships with mobility and design of public space

Specific objectives:
Design, develop, and implement integrated and coordinated concepts, theories and techniques of analysis of social, economic, earth science, and management techniques and research - action and science-based approaches and technologies sustainability in the areas of Biodiversity and Natural Resources, the Built Environment and Services, and Production System and Info.

Material:
Notes: Educación física y deportes, ISSN 1577-4015, No 91, 2008 (issue dedicated to the sport in urban public spaces), pags. 102-113

Delivery:
Lecture and text report

A21. EVALUATION OF PARKS AND PUBLIC SPACES AS INSTRUMENTS OF RELATIONSHIP WITH THE NATURAL SYSTEM

Description:
1. Quality of urbanization
2. Quality of individual spaces
3. Quality of public spaces
4. Relationship with mobility and design of public space

Specific objectives:
Design, develop , and implement integrated and coordinated concepts, theories and techniques of analysis of social , economic, earth science , and management techniques and research - action and science-based approaches and technologies sustainability in the areas of Biodiversity and Natural Resources, the Built Environment and Services, and Production System and Info.

Material:
Notes: Educación física y deportes, ISSN 1577-4015, No 91, 2008 (issue dedicated to the sport in urban public spaces), pags. 102-113

Delivery:
Urban ecological systems and natural elements module

A22. PRESENTATION OF ECOLOGICAL URBAN PLANNING AND ELEMENTS OF NATURAL SYSTEMS (II): BIOENGINEERING AND BIOARCHITECTURE

Description:
12.1 . Concepts of bioengineering and bio-architecture
12.2 . Bioengineering: Technical functions, ecological, aesthetic and scope
12.3 . Bioengineering: Slope stabilization and erosion control. Retaining structures
12.4 . Bioengineering: fluvial dynamics and environmental restoration
12.5 . Bioarchitecture. 1st approximation. The metabolism of the building and eco-efficiency
12.6 . Bioarchitecture. Organic vs mechanical
12.7 . Bioarchitecture. Inspiration from the principles of nature. Biomimetisme
12.8 . Bioarchitecture. Zoomorphism. The formal analogy

Specific objectives:
Design, develop , and implement integrated and coordinated concepts, theories and techniques of analysis of social, economic, earth science, and management techniques and research - action and science-based approaches and technologies sustainability in the areas of Biodiversity and Natural Resources, the Built Environment and Services, and Production System and Info.

Material:
REZA POURJAFAR, Mohamad ; MAHMOUDINEJAD, Hadi ; BRANCH, Mahdishahr (2011), Design with Nature in Bio-Architecture Whit emphasis on the Hidden Rules of Natural Organism, International Journal of Applied Science and Technology Vol. 1(4);74-83
FUNDACIÓ DE L'ENGINYERIA AGRÍCOLA CATALANA; COL·LEGI OFICIAL D'ENGINYERS TÈCNICS AGRÍCOLES I PERITS AGRÍCOLES DE CATALUNYA (1999). Tècniques de recobriment de talussos: NTJ 12S Part 1 . Barcelona: Col·legi Oficial d'Enginyers Tècnics Agrícoles i Perits Agrícoles de Catalunya, 1999. 29 p. (Normes Tecnològiques de Jardineria i Paisatgisme) ISBN 84-95372-54-1
FUNDACIÓ DE L'ENGINYERIA AGRÍCOLA CATALANA; COL·LEGI OFICIAL D'ENGINYERS TÈCNICS AGRÍCOLES I PERITS AGRÍCOLES DE CATALUNYA (2000). Tècniques mixtes de recobriment de talussos: NTJ 12S Part 3 . Barcelona: Col·legi Oficial d'Enginyers Tècnics Agrícoles i Perits Agrícoles de Catalunya, 2000. 45 p. (Normes Tecnològiques de Jardineria i Paisatgisme) ISBN 84-95372-61-4
FUNDACIÓ DE L'ENGINYERIA AGRÍCOLA CATALANA; COL·LEGI OFICIAL D'ENGINYERS TÈCNICS AGRÍCOLES I PERITS AGRÍCOLES DE CATALUNYA (2010). Tècniques de recobriment i d'estabilització aplicables en àmbits fluvials: NTJ 12S part 5 . Barcelona: Fundació de l'Enginyeria Agrícola Catalana, 2010. 113 p. (Normes Tecnològiques de Jardineria i Paisatgisme) ISBN 978-84-96564-09-1

Delivery:
Lecture and text report

A23. EVALUATION OF BIOENGINEERING AND BIOARCHITECTURE

Description:
Location of spaces in which to apply bioengineering.

Specific objectives:
Design, develop , and implement integrated and coordinated concepts, theories and techniques of analysis of social , economic, earth science , and management techniques and research - action and science-based approaches and technologies sustainability in the areas of Biodiversity and Natural Resources, the Built Environment and Services, and Production System and Info.

Material:
REZA POURJAFAR, Mohamad ; MAHMOUDINEJAD, Hadi ; BRANCH, Mahdishahr (2011), Design with Nature in Bio-Architecture Whit emphasis on the Hidden Rules of Natural Organism, International Journal of Applied Science and Technology Vol. 1(4);74-83
FUNDACIÓ DE L'ENGINYERIA AGRÍCOLA CATALANA; COL·LEGI OFICIAL D'ENGINYERS TÈCNICS AGRÍCOLES I PERITS AGRÍCOLES DE CATALUNYA (1999). Tècniques de recobriment de talussos: NTJ 12S Part 1 . Barcelona: Col·legi Oficial d'Enginyers Tècnics Agrícoles i Perits Agrícoles de Catalunya, 1999. 29 p. (Normes Tecnològiques de Jardineria i Paisatgisme) ISBN 84-95372-54-1
FUNDACIÓ DE L'ENGINYERIA AGRÍCOLA CATALANA; COL·LEGI OFICIAL D'ENGINYERS TÈCNICS AGRÍCOLES I PERITS AGRÍCOLES DE CATALUNYA (2000). Tècniques mixtes de recobriment de talussos: NTJ 12S Part 3 . Barcelona: Col·legi Oficial d'Enginyers Tècnics Agrícoles i Perits Agrícoles de Catalunya, 2000. 45 p. (Normes Tecnològiques de Jardineria i Paisatgisme) ISBN 84-95372-61-4
FUNDACIÓ DE L'ENGINYERIA AGRÍCOLA CATALANA; COL·LEGI OFICIAL D'ENGINYERS TÈCNICS AGRÍCOLES I PERITS AGRÍCOLES DE CATALUNYA (2010). Tècniques de recobriment i d'estabilització aplicables en àmbits fluvials: NTJ 12S part 5 . Barcelona: Fundació de l'Enginyeria Agrícola Catalana, 2010. 113 p. (Normes Tecnològiques de Jardineria i Paisatgisme) ISBN 978-84-96564-09-1

Delivery:
Urban ecological systems and natural elements module.

GRADING SYSTEM

Any academic fraud, plagiarism or use or possession of unauthorised means in an assessment activity leads to a mark of zero (0) for the affected test or assignment. Furthermore, in accordance with the University's regulations, if disciplinary proceedings are initiated the subject is recorded as "Pending Assessment" until a decision is reached. These incidents are managed in accordance with the **Action Framework for Academic Integrity in Assessment at the UPC**.

3 x Assignments on an individual basis (Ai) + 1 x Course Work Groups (CW)
0.1*A1 + 0.1*A2 + 0.1*A3 + 0.7*CW

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RESOURCES

Audiovisual material:
- http://www.rtve.es/alacarta/videos/tres14/tres14-francesc-magrinya/733416/

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- http://gen-europe.org/- http://www.selba.org- http://issuu.com/ciudadidea/docs/laciudadidea100503-mr