Course guide
2500006 - GECURSISTE - Urbanism and Regional Systems

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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). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 6.0 **Languages:** Catalan, English

LECTURER

Coordinating lecturer: FRANCESC MAGRINYA TORNER, MIRIAM VILLARES JUNYENT

Others: PERE MACIAS ARAU, FRANCESC MAGRINYA TORNER, ELISABETH ROCA BOSCH, DANIEL RODRIGUEZ ARANDA, MIRIAM VILLARES JUNYENT

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

TEACHING METHODOLOGY

The course consists of 2 hours per week of classroom activity (large size group) and 2 hours weekly with half the students (medium size group).

The 2 hours in the large size groups are devoted to theoretical lectures, in which the teacher presents the basic concepts and topics of the subject, shows examples and solves exercises.

The 2 hours in the medium size groups is devoted to solving 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

Coneixements sobre la influència de les infraestructures en l'ordenació del territori i per participar en la urbanització de l'espai públic urbà. - Instruments de lectura del territori. Sistemes d' informació per a la planificació i gestió territorial i ambiental. Els espais naturals protegits. Els sistema de assentaments humans.
- La planificació hidrològica i dels serveis tècnics (xarxa de telecomunicacions i xarxa d'abastament d'energia elèctrica).
- Infraestructures de transport (xarxa viària i ferroviària).
- Orígens i evolució dels instruments d'Ordenació Urbanística. Els plans d'ordenació Territorial i d'Ordenació Urbanística Municipal.
- La ciutat i serveis urbans. Els sistemes d'actuació urbanística i del projecte d'urbanització.
- Concepte de mobilitat i xarxes sostenibles.
- Les infraestructures des de les seves relaciones amb la natura. L'Estudi d'impacte ambiental dels projectes d'infraestructures. L'avaluació ambiental estratègica.

1 Capacitat per analitzar una estructura urbana identificant les causes del seu desenvolupament.
2 Capacitat per analitzar el desenvolupament de les infraestructures al territori.
3 Capacitat per analitzar el desenvolupament de les xarxes de serveis urbans.

Coneixement de traçat de carreteres, tant en planta com en alçat, la coordinació entre ambdues. Coneixement de disseny de seccions transversals de carreteres. Coneixements de trànsit. Moviments de vehicles. Circulació i capacitat. Coneixements de explanacions incloent drenatge superficial i subterrani. Coneixement de el disseny i dimensionament de ferms. Coneixements de les característiques d'una infraestructura ferroviària. Rigidesa i deformabilitat de la via. Coneixements de les característiques fonamentals dels vehicles ferroviaris. Coneixements de traçat de línies ferroviàries. Trànsit mixt i vehicles pendulars. Sol·licitacions sobre la via. Coneixements de comportament mecànic d'una via enfront d'esforços verticals. Incorporació de sol·licitacions transversals. Coneixements de dimensionament de la infraestructura i superestructura de la via. Coneixements d'alta velocitat. Capacitat en l'anàlisi de la demanda de carreteres i ferrocarrils, les operacions i serveis de transport amb l'ajuda de les TIC, el seu finançament i tarifació.

- La lectura del territori: el plànol topogràfic.
- Els sistemes territorials, serveis tècnics i infraestructures de transport en la construcció de les ciutats. La construcció del sistema urbà. Característiques de la xarxes viària, ferroviària, de telecomunicacions i d'abastament d'energia en relació amb les característiques del territori on s'implanten. Relacions entre les xarxes de transport i el creixement de les ciutats. Mesures per millorar l'abastament d'aigua: millora dels recursos (dessalació, regulació) i disminució de la demanda (estalvi, reutilització). Els espais oberts (xarxa hidrogràfica, espais naturals, franja costanera) Xarxa de corredors i proveïdors biològics. La infraestructura verda.
- L'urbanisme: la revolució urbana a partir del segle XIX, l'increment de la població mundial i la concentració a les ciutats. Instruments d'ordenació urbanística: la planificació de les ciutats i de l'ocupació del territori. El planejament urbanístic i la planificació territorial a Catalunya
- La mobilitat. Eines de disseny de xarxes de mobilitat sostenible.
- Els aspectes ambientals en el disseny, construcció i explotació de les infraestructures. Continguts i metodologies d'avaluació ambiental dels plans i els projectes. Eines i institucions de gestió ambiental del territori

1 Capacidad para analizar una estructura urbana identificando las causas de su desarrollo.
2 Capacidad para analizar el desarrollo de las infraestructuras en el territorio.
3 Capacidad para analizar el desarrollo de las redes de servicios urbanos.

Conocimiento de trazado de carreteras, tanto en planta como

STUDY LOAD

Type	Hours	Percentage
Hours large group	30,0	20.00
Self study	84,0	56.00
Guided activities	6,0	4.00
Hours medium group	30,0	20.00

Total learning time: 150 h

CONTENTS

Territorial systems in the construction of the territory

Description:
Description Territory reading instruments. Territorial systems in the construction of the territory. Rural society. Urban society Description Transport infrastructures (road and rail network). Technical services (telecommunications network and electricity supply network) Objectives To know the characteristics of the road, railway, telecommunications and energy supply networks in relation to the characteristics of the territory where they are implemented. Highlight the relationships between transport networks and the growth of cities.
WATER CYCLE INFRASTRUCTURES Description Hydrological planning; water balances of Catalonia. Urban supply in the metropolitan area of Barcelona The reuse of water as a new hydraulic resource The Sanitation Plan of Catalonia Works to protect avenues and floods
CONCEPTS OF THE GEOGRAPHY OF THE TERRITORY Description The hydrographic network The protected natural spaces. The coastal strip The system of human settlements The evolution of a nodal territory to another of network type Indicators of reading of the networks in the theory of graphs.
PRACTICES UNIT I Description To express in a scheme a network of transport or of infrastructures Objectives To make the student realize of the deficiencies of his interpretation / perception, on the expression of a network
REVIEW OF AN ARTICLE (CONTENTS TOPIC 1) Description It is proposed to comment on a text regarding the content of sessions 1,2,3 or 4 (the 1st topic).
EVALUATION SESSIONS 1 TO 4 (SUBJECT I) Description Test of knowledge / Exam

Specific objectives:
Objectives To get to know the territory with special emphasis on reading topographic maps. Understand the importance of territorial systems, especially technical services and transport infrastructures in the construction of cities
Objectives To know the characteristics of the road, railway, telecommunications and energy supply networks in relation to the characteristics of the territory where they are implemented. Highlight the relationships between transport networks and the growth of cities.
Objectives To raise awareness of the two main groups of measures to improve water supply: increase resources (desalination, transfer, regulation) and reduce demand (savings, reuse, ...) Find out that flood protection is not can achieve absolutely.
Objectives To emphasize the importance of open spaces (hydrographic network, natural spaces, coastal strip) as a network of corridors and biological suppliers. To make known the theories of representation and interpretation of networks.
Objectives To make the student aware of the shortcomings of their interpretation / perception, about the expression of a network
Objectives Contextualize knowledge from reading an article related to the topic.
Objectives Evaluate

Full-or-part-time: 36h
Theory classes: 9h
Practical classes: 6h
Self study : 21h

Urban planning

Description:
URBAN PLANNING. Description Origins and evolution of the instruments of Urban Planning. The introduction in the city of urban services The types of management plans today Objectives To highlight the urban revolution that occurs from the nineteenth century and which involves the increase in world population and the concentration of this in cities. Different instruments are used to order this urban growth.
Description Territorial Planning Plans Municipal Urban Planning Plans Land classification: permitted uses and planned types of development New perspectives on the usefulness of Municipal Urban Planning Plans Development plans (Partial Plans and Improvement Plans Urban) Objectives To emphasize the importance of planning in the management of the growth of cities and in the occupation of the territory. Explain the methodological and content differences between territorial and urban planning
URBAN MANAGEMENT. THE REPARCELLATION PROJECT. THE URBANIZATION PROJECT Description The urban action systems Specificities of the Reparcelling Project and the urbanization project
PRACTICES ON THE PLANNING OF A MUNICIPALITY Description To do a work in group 3 or 4 participants on the content and the affectation of the planning of a municipality of more than 2000 inhabitants. Proposal for a script to inform about the current and planned infrastructures and the characteristics of the urban growth planned by the Poum. Inform of the situation of the territorial planning: PTC, PTP, PITC, PEIN .... To endow the work of the basic contextual elements: geographic, demographic, socioeconomic and political situation and conclusions.
Description Do a test of knowledge on the contents of the topic II (sessions 5,6 and 7) Objectives Evaluate
REVIEW OF AN ARTICLE (URBAN MANAGEMENT)

Specific objectives:
Objectives To highlight the urban revolution that took place from the 19th century onwards and which meant an increase in the world's population and its concentration in cities. Different instruments are used to order this urban growth.
Objectives To emphasize the importance of planning in the planning of the growth of cities and in the occupation of the territory. Explain the methodological and content differences between territorial and urban planning
Objectives To explain to the students the importance of urban management as a set of actions that allow to put into practice theoretical approaches To make known the techniques that allow to pass from a structure of the irregular property to properties adjusted to the urban planning
Objectives To understand the role played by the different territorial and urban plans using the case of a specific and possibly known municipality. Learn to report. Know the urban part of the municipal administration. To know the current situation of the Territorial planning in Catalonia To learn to work in group, to be cooperative in the scheme and development of the work. Acquire effective communication skills: contact with the administration of a municipality (search for information and documentation in a City Council)
Objectives Evaluate

Full-or-part-time: 38h 24m
Theory classes: 9h
Practical classes: 7h
Self study : 22h 24m

Mobility and environmental aspects

Description:
SUSTAINABLE MOBILITY Description Concept of sustainable mobility Pedestrian route network Network of routes for public transport Bicycle lane network Objectives Explain to students how the mobility generated by the different urban uses is evaluated. To give the tools to be able to design the different networks of sustainable mobility in a city.
ENVIRONMENTAL ASPECTS OF URBANIZATION Description The conception of infrastructures from their relations with nature. The reuse of materials Urbanization at the service of sustainable mobility Objectives Explain the importance of environmental aspects in the design, construction and operation of infrastructures.
ENVIRONMENTAL IMPACT STUDIES Description The Environmental Impact Study of Infrastructure Projects The Strategic Environmental Assessment
https://portal.camins.upc.edu/guiaDocent/manteniment?execution=e2s6#
PRACTICE ON THE MOBILITY OF A MUNICIPALITY Description Carry out an exercise in drawing up pedestrian routes, public surface transport and bike lanes. Exercise on a 1/1000 or 1/5000 scale map of a population center to implement the fit of sustainable mobility networks
PRACTICE: EIA SYNTHESIS EXERCISES. Description Carry out a work that synthesizes the main parts of an environmental impact study of a project: evaluation, characterization and definition of impacts and proposal of corrective measures.
REVIEW OF AN ARTICLE (CONTENTS TOPIC III) Description Contextualize knowledge from reading an article related to topic III
EVALUATION SESSIONS 8 TO 12 (SUBJECT III) Description Test of knowledge / Exam

Specific objectives:
Objectives To explain to the students how the mobility generated by the different urban uses is evaluated. To give the tools to be able to design the different networks of sustainable mobility in a city.
Objectives To explain the importance of environmental aspects in the design, construction and operation of infrastructures.
Objectives To make students aware of the contents and methodologies of environmental assessment of plans and projects
Objectives To make known the main tools and institutions of environmental management of the territory
Objectives To apply the technical knowledge developed in the theoretical class.
Objectives Documentation work: synthesis exercise
Objectives To contextualize knowledge from reading
Objectives Evaluate

Full-or-part-time: 40h 48m
Theory classes: 8h
Practical classes: 9h
Self study : 23h 48m

History and Urban Law

Description:
The birth of the cities Greece and Rome the Middle Ages Renaissance The modern city
Basic knowledge of administrative law Types of regulations Distribution of powers in the territory and the city The legislation of Civil Engineering
EVALUATION SESSIONS 8 TO 12 (SUBJECT III) Description Test of knowledge / Exam
REVIEW OF AN ARTICLE (URBAN HISTORY)

Specific objectives:
Objectives: knowledge and evolution of cities through history
Objectives: To introduce basic knowledge of regulations, administration and governance of the territory and the city
Objectives Evaluate

Full-or-part-time: 21h 36m
Theory classes: 5h
Practical classes: 4h
Self study : 12h 36m

Evaluation

Full-or-part-time: 7h 11m
Laboratory classes: 3h
Self study : 4h 11m

GRADING SYSTEM

To assess there will be 2 tests of knowledge: exams to verify the follow-up of the subject (40%) The weight of the mark of each exam will depend on the number of subjects that will fall to each partial exam.
The rest of the grade depends on the presentation and quality of the practical exercises delivered to the Athenaeum (40%).
The remaining 20% corresponds to the course work, in groups which is compulsory.
Attendances and deliveries of the exercises proposed in class help to re-scale the grade

To take the extraordinary exam, you must have the coursework and the internships delivered.
Criteria of qualification and of admission to the re-evaluation: the students suspended in the ordinary evaluation that have presented regularly in the proofs of evaluation of the asignatura suspended
they will have the option of taking a re-assessment test in the period set in the academic calendar.
Students who have already passed the subject, nor students qualified as not presented, will not be able to take the re-assessment test for a subject. The rating
maximum in the case of taking the re-assessment exam will be five (5.0). The non-attendance of a student summoned to the re-evaluation test, held in the fixed period no
may give rise to another test at a later date. Extraordinary assessments will be conducted for those students who due to accredited force majeure
have not been able to take any of the continuous assessment tests. Si l'estudiant que es presenta a la reavaluació no supera l'assignatura, es conserva la nota més alta entre el resultat de l'avaluació ordinària i el de la reavaluació.

EXAMINATION RULES.

There will be a maximum of 2 exams each year and the extraordinary call if the case arises

BIBLIOGRAPHY

Basic:
- Folch, R. (coord.). El territorio como sistema: conceptos y herramientas de ordenación. Barcelona: Diputació de Barcelona, 2003. ISBN 847794962X.
- Dupuy, G. El urbanismo de las redes: teoría y métodos. Barcelona: Oikos-tau : Colegio de Ingenieros de Caminos, Canales y Puertos, 1998. ISBN 8428109370.
- Herce, H.; Magrinyà, F. La ingenieria en la evolución de la urbanística [on line]. Barcelona: Edicions UPC, 2002 [Consultation: 23/03/2021]. Available on: http://hdl.handle.net/2099.3/36703. ISBN 848301632X.
- Galiana, L. Lec. 9. Teoria y practica para una Ordenacion racional del Territorio. Madrid: Síntesis, 2010. ISBN 9788497566889.
- 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.